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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

MEETING OF THE *AD HOC* WORKING GROUP ON OCEANOGRAPHIC DATA EXCHANGE POLICY

UNESCO Headquarters, Paris, France
15-17 May, 2000

ABSTRACT

The meeting of the *ad hoc* Working Group on Oceanographic Data Exchange Policy was convened to review existing agreements and practices, both within and outside IOC, with regard to the exchange of oceanographic and related environmental data and products. The Group discussed these issues with a view to proposing to the next session of the Assembly a restatement of the general IOC principles and policy with regard to oceanographic data exchange, and a statement of recommended practices and the required institutional arrangements for the operational exchange of oceanographic data. The Group concluded that issues of data commercialization are very complex and that they have far-reaching implications and consequences for the programmes of the IOC, and thus need to be discussed among Member States. Although the Group was unable to reach consensus on a new IOC data exchange policy, it brought together a substantial amount of information to aid the decision-making process of the IOC governing bodies. The Group also outlined a general statement of principles and practices for data exchange, with commercialization issues clearly marked for further discussion. The findings of the Group will be presented to the 33rd Session of the Executive Council for comments and recommendations for further action. This version (rev) contains some corrections, made to INF-1144.

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1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SESSION

The meeting of the *ad hoc* Working Group on Oceanographic Data Exchange Policy was convened at UNESCO headquarters, Paris, France, at 10:00 on Monday 15 May 2000 under the chairmanship of IOC Vice-Chairman David T. Pugh. The participants were welcomed by the Executive Secretary of the Intergovernmental Oceanographic Commission (IOC), Dr Patricio Bernal. Dr Bernal addressed the group and underscored the importance of the task with which the group was charged. In his address, he recalled that IOC Resolution XX-11 of the 20th Assembly of the IOC (see **Annex III**) instructs the Executive Secretary of IOC to establish an *ad hoc* Working Group on Oceanographic Data Exchange Policy to review existing agreements and practices, both within and outside IOC, with regard to the exchange of oceanographic and related environmental data and products, with a view to proposing to the next session of the Assembly a restatement of the general IOC principles and policy with regard to oceanographic data exchange, and a statement of recommended practices and the required institutional arrangements for the operational exchange of oceanographic data. The experts were chosen on the basis of the their involvement in international and regional scientific programmes (*e.g.*, JCOMM, ICSU, GOOS, POGO, IODE, WDCs, RNODCs, NODCs, and DNAs), and to ensure regional representation.

The Chairman then conducted a round-table introduction of participants, which included information about the international or regional programmes each represented. He emphasized that while the Group was expert in matters of data management, it was not an intergovernmental negotiating group.

The List of Participants for the Session is given in **Annex II**.

1.2 ADOPTION OF THE AGENDA

The Group adopted the Agenda for the Session as reproduced in **Annex I**. However, owing to the complexity of the debate surrounding the issue of commercialization of data in Agenda Item 3.1, the Group was unable to reach consensus on a new IOC data exchange policy in the time available. Therefore, Agenda Items 3.3 and 4 were not discussed.

2. STATUS OF DATA EXCHANGE POLICY IN THE TIME OF OPERATIONAL DATA EXCHANGE NEEDS AND COMMERCIALIZATION

2.1 REPORT ON EXISTING IOC POLICY

Mr Pissierssens provided an extensive overview of IOC's data policy since the foundation of the IOC in 1960. He noted that in Resolution I.9 (First Session of the IOC Assembly, 1961) a clear statement had been made with regard to exchange of oceanographic data:

> *"Recommends that all oceanographic data taken by ships and recording stations outside territorial waters within the limits of declared national programmes be exchanged under the headings listed and by the methods prescribed in the IGY data centre manual, commencing from 1 January 1960, in accordance with the attached extracts from the manual (IOC/INF.17).*
> *Recommends to member countries the establishment of national oceanographic data centres in order to facilitate the collection, processing, analysis, and exchange of oceanographic data;"*

He also referred to the IOC Manual on International Oceanographic Data Exchange (1965, 1967, 1973, 1976,1991) that (Fourth Edition, 1976 version) states:

"8.1 World Data Centres are held responsible for the provision of data and information to any qualified requester in the scientific community. In general, reasonably sized requests from activities or individuals affiliated with national or regional contributors to the WDCs-Oceanography will be considered as an exchange service and will be fulfilled without charge.

Small requests from non-contributors may be handled in a similar manner.

For certain types of requests, limitations in funding, personnel and facilities may preclude direct or free provision of data or information by the World Data Centre. The following guidelines should followed in such cases:

8.1.1 In the case of large specialized requests by non-contributors, the World Data Centre will recover the costs of processing and shipping.

8.1.2 Unusually voluminous requests, or requests for special data services or products not readily available at a World Data Centre, may be serviced by a regional, national, or disciplinary centre at the request of the World Data Centre. The requester will be charged an amount not to exceed the cost of processing and shipping

8.1.3 World Data Centres may serve and an intermediary or co-ordinator for requests for unique types of data or data in other disciplines by placing the originator of the request in contact with the appropriate institution or disciplinary centre.

8.1.4 Members of the IOC may apply to the IOC Secretariat and UNESCO for possible assistance in funding in connexion with their projects."

He then proceeded reporting on the Fourteenth Session of IOC's Committee on IODE (1992):

*"199 **The Committee noted** the lack of an adopted ocean data management policy statement of IOC. Such a statement would provide a useful instrument for Member States to influence their policy makers and scientists to support the IODE programme and participate actively in oceanographic data exchange.*

*200 **The Committee adopted** Recommendation IODE-XIV.6 for submission to the IOC Assembly in March 1993."*

He continued by giving a detailed overview of **Recommendation IODE-XIV.6**, which was adopted by the IOC Assembly during its Seventeenth Session (1993).

This document is considered the current policy of the IOC.

Recommendation IODE-XIV.6

POLICY STATEMENT ON OCEAN DATA MANAGEMENT FOR GLOBAL SCIENCE PROGRAMMES

The IOC Committee on International Oceanographic Data & Information Exchange,

Noting:

(i) the IOC/ICSU Manual on IODE (1992, UNESCO);
(ii) the proposed ICSU Data Policy for the International Geosphere-Biosphere Programme;
(iii) the proposed CEOS Satellite Data Exchange Principles in support of global change research;
(iv) the WMO policy on free and open international exchange of meteorological data.

Recognizing:

(i) that global ocean programmes, including the Global Ocean Observing System, require an international commitment to establish, maintain, and make available high quality, long-term datasets for co-operative projects and programmes;

(ii) that the objectives of the United Nations Framework Convention on Climate Change and of the United Nations Convention on Biological Diversity can best be achieved if there is a full and open access to global data sets of oceanographic and marine biological data;

Submits to the IOC Assembly for its consideration and eventual approval the Draft Statement on Data Management Policy for Global Ocean Programmes contained in the Annex to the Recommendation.

Annex to Recommendation IODE-XIV.6

DRAFT STATEMENT ON DATA MANAGEMENT POLICY FOR GLOBAL OCEAN PROGRAMMES

The overall purpose of this policy statement is to facilitate full and open access to quality ocean data for global ocean research programmes. The Global Ocean Programme to be carried out under GOOS requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility and distribution of high-quality, long-term datasets.

(i) Full and open sharing of a wide spectrum of global international data sets for all ocean programmes is a fundamental objective.

(ii) Data submitted for international exchange should be provided at the lowest possible cost to global ocean researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of processing, copying and shipping to fill a specific user request.

(iii) Preferably, all data should be made available in the public domain of IODE data centres within one year of collection (chemical, biological and geological data may require longer intervals). For those global ocean programmes in which selected principal investigators have initial periods of exclusive data use, data should be made available as soon as they become widely useful or at the maximum two years after data collection.

(iv) Preservation of data needed for long-term global ocean programmes is required. For each and every global ocean data parameter, there should be at least one explicitly designated archive.

(v) International data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.

(vi) National and international standards should be used to the greatest extent possible for media and for processing and communication of global oceanographic data sets.

When discussing the successes and failures of the IODE Policy during the past 40 years he identified as successes: (i) over 60 NODCs, DNAs, RNODCs, WDCs have been established and the number is increasing every year; (ii) the IODE programme has been existing and thriving for nearly 40 years; (iii) IODE has a positive family spirit; and (iv) data have been and are being made available by the IODE community through a wide variety of media (magnetic tape, diskette, CD-ROM, Internet), and as failures: (a) Submission delays are often not respected; (b) some Member States have 'classified data' or other restrictions which limit exchange (c) there are limits to the 'volunteer' principle used by IODE; and (d) the relation scientist-data centre needs to be improved as the scientist is both a data provider and user.

The full report given by Mr Pissierssens is presented in **Annex IV**.

Mr Pissierssens then provided an overview of the current guidelines and principles for data sharing used by the GOOS programme. While GOOS is still developing its data policy, it has established a set of design principles, principles of involvement, and guiding principles for data sharing. These are given in **Annex VI**.

Mr Pissierssens highlighted and discussed the major points in these principles and guidelines concerning data sharing:

- ***Principle D7. The management, processing and distribution of data will follow a specified data policy.***

  In concert with the policies of IODE, IGOSS and GCOS, and following the data management plan for the World Weather Watch of the WMO, commitment is required by GOOS participants to establishing, maintaining, validating, making accessible, and distributing high quality, long term data meeting internationally agreed standards. Preservation of GOOS data is required in suitable archives following appropriate procedures and criteria for data acquisition and retention, and should include information about data holdings. Data should be processed to a level which is generally suitable for the generation of operational products and for research, and described in internationally accessible on-line computerised directories that can also be made available by other means. GOOS contributors are responsible for full, open and timely sharing and exchange of GOOS-relevant data and products for non-commercial activities. Exchange implies that donation by individual nations gains access to data from others as well as to products derived using all available data, such that the benefit of cooperation exceeds the cost.

- ***Principle P2. Contributions will be compliant with a defined GOOS data policy.***

  Principle D7 indicates that data policies will be defined for GOOS. The success of GOOS depends critically upon the implementation of these policies. It is therefore necessary that compliance with these policies is a prerequisite to effective participation, recognising that the benefits of GOOS will flow primarily from the reciprocal exchange of data and products between countries.

- ***Principle P8. Participants will have full autonomy in the management of their contributions to GOOS.***

  GOOS will be implemented by nations and their agencies. While GOOS is planned and coordinated internationally, it is recognised that the way in which observations are gathered, resourced and managed differs widely between nations and agencies. This principle is an assurance that GOOS has no role in these internal processes, and its influence will be confined to the encouragement of adherence to the quality assurances protocols, data exchange policy, etc. according to the other GOOS Principles.

- ***Principle P9. Contributing nations and organisations will reserve the right to determine and limit their contributions to GOOS.***

  As a corollary to Principles P6 and P8, this principle affirms that, although the success of GOOS will depend on long-term and indefinitely sustained observations, nations must always retain full control of the resources and contributions they make to GOOS.

In addition, Mr Pissierssens discussed the recently drafted Data and Information Management Strategy and Plan [Dr Ron Wilson, May, 2000] which outlines 3 basic principles for data sharing:

i. The data obtained by GOOS will be most useful to people if there are no periods of proprietary holding, nor any restrictions on to whom or when the data are disseminated.

ii. The quality must be assured, which may mean some delays for some of the data.

iii. National and personal interests and needs are part of the overall equation, so it may not be possible to apply the first principle totally in all cases.

Mr Pissierssens also discussed the data policy statements developed in two regional GOOS programmes, EuroGOOS and NEAR-GOOS. EuroGOOS, whose draft policy is given in Annex VI, has followed very closely the policy of WMO's Resolution 40 and is also in line with ECOMET, the economic interest group formed by several of the European National Meteorological Services, the

European Council Directive on the freedom of access to information on the environment, and the European Parliament Directive on the legal protection of databases.

Mr Pissierssens outlined the major points of the EuroGOOS draft policy:

i. *Exchange on a free and unrestricted basis of essential, additional and other data and products between the Members of EuroGOOS*
ii. *The right for the originator of data and products to place conditions on additional and other data and products for re-distribution for commercial purposes*
iii. *Free and unrestricted access to data and products for non-commercial research and education*
iv. *All data and products that is financed with public means and used for commercial purposes must be available for other Service Providers*
v. *Transparency regarding availability, prices and conditions for re-distribution regarding oceanographic and related data and products through the maintenance of a EuroGOOS Product Catalogue*

Mr Pissierssens also briefly discussed the policy statement used by NEAR-GOOS, namely :

"The NEAR-GOOS data should be accessible, free of charge, to all users who are interested in obtaining the data. If it is required to ensure the security of the Data Bases and maintain effective utilization of data base, a password system can be introduced."

Dr Colin Summerhayes, Director of the GOOS Project Office, addressed the group briefly at this point to describe the nature of the inter-relations between the regional groups and International GOOS. He stated that the GOOS Steering Committee has a strong interest in data policy and is carefully studying the issues. EuroGOOS is the furthest ahead in the development of a concrete policy, but Dr Summerhayes assured the group that once the policy for IOC is developed, GOOS will then finalise its own data policy. According to Dr Nic Flemming, the Director of EuroGOOS (email to C. Summerhayes, 3 May 2000), *"The stated policy of EuroGOOS is that we will adopt any formal policy and procedures agreed and adopted by GOOS if and when they are published "*

Dr Summerhayes also stated that the published basic principles of GOOS (*Strategic Plan and Principles for the Global Ocean Observing System*, GOOS Report 41, IOC/INF-1091, Version 1.0, January 1998, given in **AnnexVI**) , which favour free and unrestricted access to data, should not be changed, and that the IOC and GOOS should not feel bound to follow the precise details of the policies of other organizations. He stressed, however, that different Member States may take a different view on what precise form the IOC policy should take, and recognised that these are very complex issues that must be debated and decided by the Assembly to determine the best course for the IOC.

2.2 IOC's ROLE IN RELATION TO THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS)

Ms Dienaba Beye of the IOC presented a talk on the UNCLOS issues regarding the exchange of oceanographic data and information. Ms Beye stated that the IOC, in the global framework of the United Nations Convention on the Law of the Sea, has a leading role to play in the promotion of international cooperation for marine scientific research, and accordingly, the IOC has developed oceanographic data and information exchange programmes, such as IODE, IGOSS (now JCOMM), and GOOS that could be considered as an implementation of UNCLOS.

Ms Beye also stated that according to UNCLOS, IOC should assist its Member States to obtain and exchange freely the scientific data and information through developing international and regional co-operation in the field of marine scientific research and transfer of technology, taking

advantage of its existing Regional Bodies and cooperative arrangements. In co-operating with other institutions, namely the International Seabed Authority (ISA) and the Commission for the Limits of the Continental Shelf (CLCS), IOC has, however, to keep confidential data and information obtained from or under the authority of these institutions [ISA: Part VI of ISA's Mining Code, *"Confidentiality"*; CLCS: art. 3 of para.2/Annex 2 of UNCLOS and CLCS' Rules of Procedure, art. 54 and Annex 2].

2.3 OVERVIEW OF DATA EXCHANGE POLICY ISSUES IN OTHER ORGANISATIONS

Dr Ferris Webster, Head of GOSIC discussed the broader setting in which the discussion on oceanographic data exchange policy is located. He noted that computers and the Internet have made access to data technologically easy. As a consequence, data owners are concerned about their investment and barriers to access are being erected to protect investment and to generate income. On the other hand, environmental research and monitoring programmes need global data. The scientific community has been reacting against the new limits to access.

A number of organisations (intergovernmental, non-governmental, international and national) have established policies on data exchange and sharing. Dr Webster described the policies of a few of these as examples: the World Meteorological Organization (WMO), the International Council for Science (ICSU), the World Intellectual Property Organization (WIPO), the European Union (EU), and the US Congress. These documents are given in **Annex VI**.

WMO

The World Meteorological Organization adopted a resolution on the exchange of meteorological and related data and products (Resolution 40) at the XII WMO Congress, 1995. This resolution is reprinted in **Annex VI**. The resolution says, in part:

> *"Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO…"* where "*free and unrestricted* means non-discriminatory and without charge" and "*without charge* means at no more that the cost of reproduction and delivery, without charge for the data and products themselves."

In addition, WMO established two categories of data. *Essential data* have no exchange restrictions and *additional data* have conditions on use defined by the producer. Dr Webster noted that Annex 1 to Resolution 40, *"Data and products to be exchanged without charge and with no conditions on use"*, contains a guideline that is highly relevant to IOC discussions:

> "…(2) All available *in situ* observations from the marine environment, e.g. data in SHIP, BUOY, BATHY, TESAC codes, etc.;…"

WMO WORLD DATA CENTERS

WMO operates a network of World Data Centres (WDCs) that operates under a different data exchange policy. The policy says, in part:

> *"3. WMO WDCs should provide data on a free and unrestricted basis, at the lowest possible cost which should be no more than the cost of reproduction and distribution. No charge will be made for the data themselves.*
>
> *4. WMO WDCs shall not accept in their holdings data for which there are restrictions for free and open access."*

Dr Webster thus illustrated that while provisions may exist within WMO Resolution 40 to restrict access to some types of data and information, the Resolution puts all oceanographic observations in

the '*essential data*' category having no exchange restrictions, and that this is a salient point to remember during these IOC policy discussions.

ICSU

Dr Webster next discussed the policy of The International Council for Science (ICSU). ICSU sponsors a network World Data Centres that handle geophysical and environmental data (including oceanographic data). The ICSU WDC guidelines say, in part:

> *"…6. No confidential or security-classified data are to be held in a WDC.*
>
> *7. Data may be subject to privileged use by their originators, for a period to be agreed beforehand, and not to exceed two years from the data of acquisition by the WDC.*
>
> *8. WDCs will provide data to scientists in any country free of charge, on an exchange basis or at a cost not to exceed the cost of copying and sending the requested data."*

DATABASE PROPERTY RIGHTS

Dr Webster discussed database property rights, describing how recent proposed legislation in the European Community may no longer protect 'fair use' access to databases for research and education, and that the 1990 EEC Directive on 'freedom of access to information on the environment' has clauses allowing Member States to make a charge for supplying information.

He also discussed the proposed database treaty at the World Intellectual Property Organization that would have severely restricted access to scientific data and information, and described how the treaty was withdrawn partly owing to pressure from the international research community and opposition from the United States. Dr Webster stated that database legislation in the US is still uncertain, and that if the US does pass a national database law, the WIPO would likely enact a global database treaty. Dr Webster stated that in such a situation, global change research and monitoring will likely face a daunting task.

Turning finally to the existing IOC data exchange policy, Dr Webster stated that in his opinion, the international management of ocean data under the auspices of IOC's Committee on Intergovernmental Oceanographic Data and Information Exchange (IODE) is exemplary. From his perspective as Chair of the World Data Centre Panel, he felt the ocean community was ahead of other disciplines. Ocean data access is generally full and open. Dr Webster cautioned that because of its leadership position in environmental data management, any policy adopted by the IOC will likely have an impact beyond the IOC and its programmes.

The complete text of Dr Webster's report is given in **Annex V**.

2.4 ROUND-TABLE DISCUSSION BASED ON GROUP MEMBER EXPERIENCES AND SCIENTIFIC NEEDS

The Group, representing a broad range of international and regional organisations, shared their experiences with policies and practices of data and information exchange. These discussions served to focus attention on several major issues of paramount importance for the IOC data exchange policy, including the effects of data access restrictions on global research programmes and dataset compilation, effects on developing nations, and compatibility with the policies of partner organisations. The Group also discussed the need to focus on the practical aspects of data and information exchange, including the importance of data and metadata archival, and data archaeology and rescue practices.

The Group further discussed the practices of data exchange that have resulted from recent policy changes in partner organisations that allow restrictions to be placed on access to data for

commercial purposes. These discussions drew attention to the fact that while the principles of the policies still encourage free and unrestricted data access for non-commercial activities such as research and education, in practice, this was sometimes not honoured by Members, who chose instead to carry out their activities within the framework of the allowable restrictions of the policies.

The major issues brought up during this part of the meeting are outlined in the next section of this report, and served as the basis for the data policy draft statement that was constructed.

3. SHOULD THE IOC POLICY BE MODIFIED, AND IF SO, HOW ?

3.1 DISCUSSION ON NEEDS, EXISTING PRACTICES, AND LIMITATIONS

3.1.1 Open Ocean *vs* Coastal Ocean Data

The Group discussed the exchange practices and needs of open ocean and coastal ocean data, and agreed that the policy does not need to make a distinction between the two. Instead, some members of the Group suggested that rather than distinguishing data types on a geographical basis that exchange practices should be distinguished by intended use of the data and the necessary timescales for exchange.

3.1.2 Operational *vs* Non-Operational Data

The Group agreed that the distinctions between operational and non-operational data using current technology are blurring in terms of data treatment, and that the policy should be careful not to impose a barrier between the components unnecessarily. The Group reiterated the need to deal with data on the basis of timescales needed for exchange, but also stated that these are issues related more to data treatment and practice than policy.

3.1.3 Operational *vs* Research Requirements

The Group recognised that differences in data exchange practices exist between operational ocean data (*i.e.*, intended for operational marine activities) and research data, such as time periods of proprietary access for researchers and data archiving. This issue also touches on issues of categorising data into raw data, derived data (*e.g.*, model output), and data products, and has implications for data commercialization. The Group reiterated the need to have adequate documentation and metadata accompanying any data, irrespective of their intended use. These issues were regarded mainly as technical ones rather than policy-oriented, and further discussions about the commercialization issues raised in this section were deferred to the next section.

3.1.4 Commercialization of Data

The Group supported the general principle that the best value of data is obtained when they are used as much as possible and that charging for data inhibits their use. It was stated that providing Member States with access to data collected within and/or contributed to IOC programmes is one of the founding principles of the IOC, and that there exist many examples of negative consequences for global programmes when this principle has not been respected. It was remarked that this is particularly important for many new components of the GOOS programme, such as *Argo*. Some members of the Group stated, however, that observation systems may be damaged financially if they cannot get funding through the commercialization of their data, and that any policy that is too generous will hurt the observation systems. The representative of the European Commission stated that there are conventions already in place in Europe to give data holders the right to restrict access and charge fees for data to protect the European data providers from competition outside Europe (see

Annex VI). Some members of the Group were of the opinion that since WMO and EuroGOOS allow data restrictions for commercial purposes, the IOC should follow suit.

3.2 SHOULD THE POLICY BE MODIFIED ?

It became clear during the round-table discussions by the Group that these issues are very complex and that they have far-reaching implications and consequences for the programmes of the IOC. These issues clearly must be discussed at length by the Member States. Although the Group was unable to reach consensus on a new IOC data exchange policy, it brought together a substantial amount of information to aid the decision-making process of the IOC governing bodies. The Group also outlined a general statement of principles and practices for data exchange, with commercialization issues clearly marked for further discussion. It was decided that this information and the results of the deliberations of the Group will be presented to the Executive Council for comment and recommendations for further action.

3.2.1 Summary of the Debated Commercialization Issues

Owing to the complexity of these issues and the number of international organisations currently reassessing their policies and practices regarding data and information exchange, a series of background documents was provided to the participants before and during the meeting for study. Because this report may be used by IOC governing bodies to examine further these issues, these documents are reprinted in **Annex VI**.

Arguments for Including Provisions in the Policy Allowing for Commercial Activities within IOC Programmes

In 1995, the World Meteorological Organization (WMO) adopted Resolution 40 (Cg-XII), *'WMO Policy and Practice for the Exchange of Meteorological and Related Data and Products Including Guidelines on Relationships in Commercial Meteorological Activities'*. A similar resolution, *'Exchange of Hydrological Data and Products'*, Resolution 25 (Cg-XIII) was also adopted in 1999 (see **Annex VI**). The primary objective of these policies was to protect and strengthen the fundamental principle of free and open exchange of meteorological data and products while at the same time recognizing the requirements of Members to undertake a range of commercial activities as determined by their governments. These policies were developed as a result of constraints by some Members' government policies to recover a substantial portion of their operating costs through commercial activities, including value-added product development as well as a portion of the basic costs of the observing networks, data management, and data processing activities. To protect their databases and prevent commercial competitors from undercutting the prices set by the agencies, certain restrictions on data exchange and usage have been implemented.

In 1999, EuroGOOS developed a data policy with similar provisions as WMO Resolution 40 and within the guidelines of ECOMET, the economic interest group formed by several of the European National Meteorological Services. It was stated that since many European NMS's also belong to EuroGOOS and are providers of oceanographic data, it is logical to expect that the EuroGOOS policy on the exchange of operational oceanographic data should be made compatible with existing policies in Europe. The EuroGOOS data policy has not yet been adopted by the Members.

Thus there are three major forces driving the call to include provisions in a revised IOC data exchange policy to allow for commercialization of data:

i. constraints placed on some Members by their governments to recuperate costs and support the operation of the observing systems
ii. the desire to protect databases from competition in the development of data products and services when data are freely available, and

iii. the wish for compatibility with partner programmes having existing policies regulating the exchange of other types of environmental data products and services.

Arguments Against Including Provisions in the Policy Allowing for Commercial Activities within IOC Programmes

At the time of the proposal of the WMO Resolution 40, a number of national and international organizations issued statements warning against commercialization practices and restrictions currently being placed on global scientific data. Several of these documents served as working papers for the group and can be found in **Annex VI**. Several Members of the Group echoed these sentiments and expressed their grave concern over the possible negative effects on the IOC's programmes if these types of commercial activities were permitted within the programmes of the IOC. The major points of concern are listed below:

i. Significant gaps may develop in 'global' data sets. Because individual countries have considerable freedom in choosing the types of restrictions they will apply to their data, the compilation of complete global data sets may be jeopardized and gaps in the records will exist where data are restricted. This may seriously affect the ability of scientists to conduct research on regional and global scale problems.

ii. A commercially-driven system will impose a cost of data on the scientific community. The impact of increased costs for data and data products will be greatest on education and research programmes, and may seriously affect the ability of the developing nations to fully collaborate in and benefit from global science and service programmes. In support of this argument, the following statement, transmitted by the newly elected Chairperson of IOCEA to the Secretariat, was made available to the meeting.

IOCEA-V DECLARATION ON OCEANOGRAPHIC DATA EXCHANGE POLICY

The Fifth Session of the IOC Regional Committee for the Central Eastern Atlantic (IOCEA) held in Dakar from 5 to 11 May, 2000, having considered IOC Resolution XX-11 on Oceanographic Data Exchange Policy and after extensive discussion on the above, declare as follows:

a) That IOCEA supports IOC's existing policy on free access to and unrestricted exchange of oceanographic data towards promotion of scientific activities, research and socio-economic development of the global community and sustainable management of the environment;

b) IOCEA affirms that the possible commercialization of oceanographic data will stifle scientific activities in marine and ocean sciences that require free access to and exchange of oceanographic data;

c) That commercialization of oceanographic data is likely to restrict access to territorial waters by countries in the Region to international cruises and the deployment of instruments for the collection of ocean data, as well as, discourage participation in joint global programmes related to ocean data collection;

d) That such restriction will jeopardise existing IOC programmes such as IODE, GODAR, GOOS, JCOMM, etc.;

e) That commercialization of data will have grave consequences for areas vulnerable to natural disasters such as tropical cyclones, storm surges, etc., as well as impact negatively on the socio-economic development of countries in the region;

f) That without prejudice to the recommendations of the *ad hoc* Working Group on Oceanographic Data Exchange Policy established by IOC Resolution XX-11, IOCEA affirms that it is against the possible commercialization of ocean data for the reasons adduced above;

g) IOCEA therefore kindly requests the Executive Secretary to convey to the *ad hoc* Committee and to the IOC Meeting on Oceanographic Data Exchange Policy, this declaration.

iii. Data that cannot be published or re-exported cannot be used as the basis for scientific conclusions or public policy. A dataset compiled by a scientist for research purposes that incorporates some data with restricted re-export conditions may not be openly published in scientific journals or exchanged with colleagues. Moreover, many Member States have laws stipulating that the scientific data underpinning public policy decisions must be made accessible to the public. Restrictions placed on data will significantly limit their use in both research and public policy.

In addition, it was remarked that under WMO Resolution 40, all marine data have been exempted from the restricted categories of data, owing mostly to the maritime safety issue. This led several members of the Group to question the need for the oceanographic community to adopt its own commercialization practices, since under a similar policy, operational ocean observations would most likely be deemed essential to maritime safety, and data for research should fall under the category for free and unrestricted data access. It was noted, however, that some Members of WMO have chosen to place restrictions on data even for non-commercial activities such as research and education. It was also noted that the current IOC policy does not prevent Member States from carrying out commercial activities, but rather that commercial activities should not be carried as part of IOC programmes.

3.2.2 Draft of IOC Data Exchange Policy Statement

The Group spent a substantial amount of time preparing a draft statement of data exchange policy and practices. While there was general agreement on a wide range of data exchange issues, it was not possible for the Group to reach consensus on the issues of commercialization, and the draft statement was prepared with the debated points enclosed in square brackets. The draft statement is given below:

DRAFT IOC DATA POLICY STATEMENT

It is a fundamental principle of the IOC that there shall be free and unrestricted [1] sharing of all ocean data and related information [2].

1. Member States shall provide on a free and unrestricted basis those ocean data and products which are necessary for the provision of services in support of the protection of life and property and for the well-being of all peoples;
2. Member States shall also provide on a free and unrestricted basis ocean data and products, where relevant, which are required to sustain programmes and projects of IOC, including those undertaken jointly with other organizations, related to operational oceanography and ocean research at the global, regional and national levels and, furthermore, to assist other Member States in the provision of ocean services in their countries;
3. Member States should provide to the research and education communities, *[for their non-commercial activities]* [3], free and unrestricted access to all ocean data and products exchanged under the auspices of IOC;

[4. Respecting (2) and (3) above, Member States may place conditions on the re-export [4] , for commercial purposes, of these ocean data and products, outside the receiving country or group of countries forming a single economic group;]

[5. Member States should make known to all Member States those ocean data and products which have such conditions as in (4) above;]

[6. Member States should make their best efforts to ensure that the conditions placed by the originator on ocean data and products are made known to initial and subsequent recipients;]

7. Ocean data and their related information [5], collected by IOC programmes and ocean data from IOC cooperative programmes should be preserved [6] in the long term, through the IODE system.
8. Member States shall work to enhance the capacity in developing countries to participate and benefit fully from the exchange of ocean data and products, through TEMA and other mechanisms.

Notes

[1] 'Free and unrestricted': Non-discriminatory and without charge. "Without charge", in this context means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.
[2] 'Data' : consists of observed and derived data including data generated by numerical models and created through data integration and assimilation.
[3] *[' Non-commercial activity': an activity which is not for profit and/or of which the results can be published in the open scientific literature.]*
[4] *['Re-export', in this context means to redistribute, physically or electronically, outside the receiving country, group of countries forming a single economic group, or regional and global data centres, directly or through a third party.]*
[5] *['Related information' consists of complete descriptions (metadata) to the level necessary to enable secondary users to make full use of the data]*.
[6] 'Preserved': the data will be managed, made accessible, updated or improved in quality and maintained on media suitable for long-term archival.

4. INSTITUTIONAL ARRANGEMENTS REQUIRED TO MEET MODERN AND FUTURE DATA EXCHANGE PRACTICES

The Group discussed the organizational and technical requirements of data centres to comply with the IOC data policy and suggested practices. While it was stated that the policy should remain independent of technology, several needs were highlighted in terms of practices that need to be developed or strengthened in the face of new operational oceanographic programmes. It was mentioned that the data centres need to increase communication and data sharing among themselves to create, as much as is technically possible, a seamless interface for users. It was also suggested that a centralized information system or catalogue is needed to describe the data holdings in various data centres serving IOC programmes. The Chairman of IODE, Mr Ben Searle, reminded the Group of the recent advances in metadata system development through the MEDI Pilot Project, and also of the initiation of the development of a Marine XML (extensible mark-up language) that will allow for the exchange of data and information independent of data formats. Mr Searle stated that the infrastructure for the metadata system is now in place and that the agreements for the co-operative development of the Marine XML are underway to meet most of these needs, and that IOC, through IODE, is now in a phase of implementation for these programmes.

Several members of the Group emphasized the need to not only strengthen the national data centre system, but also the regional data centres, since many nations do not have their own centres. The Group also strongly urged Member States to make their best efforts to recover and make available historical ocean data through data archaeology and rescue programmes, such as GODAR.

The Group considered that any resolution on an IOC policy or recommended practices should include statements urging Member States to make available all information that details how data were collected as well as the quality of the data through appropriate IOC and other relevant mechanisms. In addition, Member States should be urged to facilitate data exchange using international standards for media, formats, and communication to the greatest extent possible.

5. FOLLOW-UP ACTIONS

The Chairman noted that substantial progress had been made in preparing a draft statement of data exchange policy and practices. However, owing to the complex nature of the emerging commercialization issues and the far-reaching implications and consequences a revised policy would have for the programmes of the IOC, the Group recognized that Member States must resolve this matter through other mechanisms. The Chairman will present the draft statement of data exchange policy and practice and the background issues to the IOC Executive Council in June 2000 for comment and recommendations for further action.

6. CLOSURE

The Chairman thanked the Group for their participation and contributions to the meeting. The meeting closed at 12 noon on 17 May 2000.

ANNEX I

AGENDA

1. **Opening**

    1.1 The Chairman will open the meeting, identify objectives and provide background information, including Resolution 11 of the 20th Session of the IOC Assembly '*Oceanographic Data Exchange Policy*'.

    1.2 Round-table introduction of participants.

2. **Status of data exchange policy in the time of operational data exchange needs and commercialization**

    2.1 IOC Policy for Oceanographic Data Exchange (IODE and GOOS experiences) – M.Hood, P.Pissierssens

    2.2 IOC's role in relation to the United Nations Convention on the Law of the Sea – D. Beye

    2.3 Overview of data exchange policy issues of other organisations – F. Webster

    2.4 Round-table discussion based on the participants' experiences and scientific needs

3. **Should the IOC Policy be modified ? If so, how ?**

    3.1 Discussions on needs, existing practices, and limitations. Special attention should be paid to varying policy needs of:

    - open ocean *vs* coastal ocean data
    - operational *vs* non-operational data
    - applied / operational needs *vs* research needs
    - commercialization of data
    - institutional arrangements (both organisational and technical) required to meet modern and future data exchange practices

    3.2 Discussions on how to meet needs and overcome limitations

    3.3 Focus and drafting groups

4. **Adoption of the draft on:**

    a) general IOC principles and policy with regard to oceanographic data exchange, and,

    b) recommended practices and the required institutional arrangements for the exchange of oceanographic data

ANNEX II

LIST OF PARTICIPANTS

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ANNEX III

Current IOC / IODE Data Exchange Policy

Intergovernmental Oceanographic Commission (IOC) of UNESCO
Data Management Policy for Global Ocean Programs, adopted March 1993:

The overall purpose of this policy statement is to facilitate full and open access to quality ocean data for global ocean research programs. The Global Ocean Program to be carried out under GOOS (Global Ocean Observing System) requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility and distribution of high-quality, long-term data sets.

1. Full and open sharing of a wide spectrum of global international data sets for all ocean programs is a fundamental objective.
2. Data submitted for international exchange should be provided at the lowest possible cost to global ocean researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of processing, copying and shipping to fill a specific user request.
3. Preferably, all data should be made available in the public domain of IODE [International Organization for Data Exchange] data centers within one year of collection (chemical, biological and geological data may require longer intervals). For those global ocean programs in which selected principal investigators have initial periods of exclusive data use, data should be made available as soon as they become widely useful or at the maximum two years after data collection.
4. Preservation of data needed for long-term global ocean programs is required. For each and every global ocean data parameter, there should be at least one explicitly designated archive.
5. International data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
6. National and international standards should be used to the greatest extent possible for media and for processing and communication of global oceanographic data sets.

RESOLUTION XX-11

OCEANOGRAPHIC DATA EXCHANGE POLICY

The Intergovernmental Oceanographic Commission,

Noting:

i. the agreements on the broad principles of global data management already reached by the Sponsors Forum for the global observing systems, comprising IOC, UNESCO, UNESP, WMO, FAO and ICSU, and by the Integrated Global Observing Strategy (IGOS) Partners, which includes those same bodies plus CEOS, WCRP, IGBP and IGFA,

ii. the existing data management and exchange agreements set forth by the conventions for the protection of the marine environment, such as OSPAR, HELCOM or the Barcelona Convention,

iii. the existing broad agreements relating to data relevant to global change, climate change and data relevant to implementation of the International Conventions on Climate Change, Biodiversity and Sustainability,

iv. WMO Resolution 40 (Cg-XII) which defines a policy and practice as far as the international exchange of meteorological and related data is concerned and is intended to promote the free and unrestricted exchange of basic data,

v. the IOC statement on data management policy for global ocean programmes, as submitted by the Committee on IODE (Recommendation IODE-XIV.6, December 1992) and adopted by the Assembly at its Seventeenth Session (Paris, 25 February – 11 March 1993) (paragraph 220 of the Summary Report of the Session),

Noting also GOOS Design Principle D7, which calls for commitments by GOOS participants to establishing, maintaining, validating, making accessible, and distributing high quality, operational data which meet internationally agreed standards,
Considering the need for detailed technical arrangements regarding data and information to be developed in accordance with varying requirements in the different programmes, projects and regions of GOOS,

Instructs the Executive Secretary IOC to establish an ad hoc Working Group on Oceanographic Data Exchange Policy, including the two co-chairpersons of JCOMM and the Chairperson of IODE, and other experts to review existing agreements and practices, both within and outside IOC, with regard to the exchange of oceanographic and related environmental data and products, with a view to proposing to the next session of the Assembly:

a) a restatement of the general IOC principles and policy with regard to oceanographic data exchange; and
b) a statement of recommended practices and the required institutional arrangements for the operational exchange of oceanographic data;

Invites interested Member States to nominate experts to join the *ad hoc* group and actively contribute to its work.

ANNEX IV

HISTORICAL OVERVIEW OF IOC/IODE'S DATA EXCHANGE POLICY
(P.Pissierssens, IOC)

IOC's data policy has its origins in the foundations of the IOC in 1960. During the First Session of the IOC Assembly in 1961, through Resolution I.9 a clear statement was made with regard to exchange of oceanographic data:

> *"The Intergovernmental Oceanographic Commission,*
>
> *Desiring to foster the full and expeditious exchange of oceanographic data,*
>
> *Noting the existence of data centres listed in document IOC/1-7, including the centre for bathymetric data under the International Hydrographic Bureau with sub-centres at various national hydrographic offices,*
>
> *Reiterates the recommendation made by the Intergovernmental Conference on Oceanographic Research at Copenhagen in July 1960 that oceanographic data should be exchanged and that system of World Data Centres established during the International Geophysical Year should be continued in future;*
>
> *Recommends that all oceanographic data taken by ships and recording stations outside territorial waters within the limits of declared national programmes be exchanged under the headings listed and by the methods prescribed in the IGY data centre manual, commencing from 1 January 1960, in accordance with the attached extracts from the manual (IOC/INF.17).*
>
> *Recommends to member countries the establishment of national oceanographic data centres in order to facilitate the collection, processing, analysis, and exchange of oceanographic data;*
>
> *Urges member countries to participate with the I.H.B., in co-operation with World Data Centres A and B for Oceanography, in the preparation of bathymetric plotting sheets for the world ocean on as large s scale as possible;*
>
> *Recommends to the Governments of the U.S.A., USSR and the United Kingdom that they appoint representatives of World Data Centre A, World Data Centre B and the Permanent Service for Mean Sea Level to a working group of experts on the organization of oceanographic data exchanges and invites the International Council for the Exploration of the Sea, the International Hydrographic Bureau and the World Meteorological Organization to designate representatives to this working group*
>
> *The mission of this working group shall be the facilitating of exchanges of oceanographic data, the standardization of forms for reporting and coding data, the encouragement of the preparation of data catalogues, and the assistance of development of national oceanographic data centres.*
>
> *Requests the Secretary and the Bureau of the Commission to seek advice from appropriate bodies on the volume and nature of the data to be exchanged in the future."*

[Addendum to Resolution I-9 –IGY List of Data to be exchanged- not included here]

Through this Resolution the IODE programme and system was born. The 'Working Group on Oceanographic Data Exchanges' met for the first time in Washington in August 1962. At its Fifth Session it was renamed to 'IOC Working Group on International Oceanographic Data Exchange'; at its Eight Session it was renamed to 'IOC Working Committee on International Oceanographic Data Exchange', and as from its Thirteenth Session is was called 'IOC Committee on International Oceanographic Data and Information Exchange'.

Reference is also made to the IOC Manual on International Oceanographic Data Exchange (1965, 1967, 1973, 1976, 1991) that in its Fourth Edition (1976) states:

"8.1 World Data Centres are held responsible for the provision of data and information to any qualified requester in the scientific community. In general, reasonably sized requests from activities or individuals affiliated with national or regional contributors to the WDCs-Oceanography will be considered as an exchange service and will be fulfilled without charge. Small requests from non-contributors may be handled in a similar manner. Unless a requester specifies otherwise, the Centre will use the method which most satisfactorily reproduces the data or information item with the least expense. For certain types of requests, limitations in funding, personnel and facilities may preclude direct or free provision of data or information by the World Data Centre. The following guidelines should followed in such cases:

8.1.1 In the case of large specialized requests by non-contributors, the World Data Centre will recover the costs of processing and shipping.

8.1.2 Unusually voluminous requests, or requests for special data services or products not readily available at a World Data Centre, may be serviced by a regional, national, or disciplinary centre at the request of the World Data Centre. The requester will be charged an amount not to exceed the cost of processing and shipping.

8.1.3 World Data Centres may serve and an intermediary or co-ordinator for requests for unique types of data or data in other disciplines by placing the originator of the request in contact with the appropriate institution or disciplinary centre.

8.1.4 Members of the IOC may apply to the IOC Secretariat and Unesco for possible assistance in funding in connexion with their projects."

During the Fourteenth Session of IOC's Committee on IODE (1992), the Committee discussed the issue of a 'data policy' for the first time:

"199 ***The Committee noted*** *the lack of an adopted ocean data management policy statement of IOC. Such a statement would provide a useful instrument for Member States to influence their policy makers and scientists to support the IODE programme and participate actively in oceanographic data exchange.*

200 ***The Committee adopted*** *Recommendation IODE-XIV.6 for submission to the IOC Assembly in March 1993."*

Recommendation IODE-XIV.6, was subsequently adopted by the IOC Assembly, as part of the IODE-XIV report, during its Seventeenth Session (1993).

Recommendation IODE-XIV.6

POLICY STATEMENT ON OCEAN DATA MANAGEMENT FOR GLOBAL SCIENCE PROGRAMMES

The IOC Committee on International Oceanographic Data & Information Exchange,

Noting:

(i) the IOC/ICSU Manual on IODE (1992, UNESCO);
(ii) the proposed ICSU Data Policy for the International Geosphere-Biosphere Programme;
(iii) the proposed CEOS Satellite Data Exchange Principles in support of global change research;
(iv) the WMO policy on free and open international exchange of meteorological data.

Recognizing:

(i) that global ocean programmes, including the Global Ocean Observing System, require an international commitment to establish, maintain, and make available high quality, long-term datasets for co-operative projects and programmes;

(ii) that the objectives of the United Nations Framework Convention on Climate Change and of the United Nations Convention on Biological Diversity can best be achieved if there is a full and open access to global data sets of oceanographic and marine biological data;

Submits to the IOC Assembly for its consideration and eventual approval the Draft Statement on Data Management Policy for Global Ocean Programmes contained in the Annex to the Recommendation.

Annex to Recommendation IODE-XIV.6

DRAFT STATEMENT ON DATA MANAGEMENT POLICY FOR GLOBAL OCEAN PROGRAMMES

The overall purpose of this policy statement is to facilitate full and open access to quality ocean data for global ocean research programmes. The Global Ocean Programme to be carried out under GOOS requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility and distribution of high-quality, long-term datasets.

(i) Full and open sharing of a wide spectrum of global international data sets for all ocean programmes is a fundamental objective.

(ii) Data submitted for international exchange should be provided at the lowest possible cost to global ocean researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of processing, copying and shipping to fill a specific user request.

(iii) Preferably, all data should be made available in the public domain of IODE data centres within one year of collection (chemical, biological and geological data may require longer intervals). For those global ocean programmes in which selected principal investigators have initial periods of exclusive data use, data should be made available as soon as they become widely useful or at the maximum two years after data collection.

(iv) Preservation of data needed for long-term global ocean programmes is required. For each and every global ocean data parameter, there should be at least one explicitly designated archive.

(v) International data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.

(vi) National and international standards should be used to the greatest extent possible for media and for processing and communication of global oceanographic data sets.

It should be emphasized that the IODE system, applying its principle of 'free-of-charge' exchange services, has been able to grow into a family of over 60 NODCs, DNAs, RNODCs, WDCs during the past 40 years. Data and information have been, and are being made available intensively by the IODE community through a wide variety of media (magnetic tape, diskette, CD-ROM, Internet). The IODE system has been established to facilitate marine research and as such, its success depends on the support and collaboration of the participating member states and individual marine scientists in contributing data and information resources. The full and expeditious exchange of data, information and meta-data is an important aspect of scientific research, without which successful investigations of global scale phenomena and processes cannot be successful.

The IODE system has proven that free and unrestricted exchange of oceanographic data for the benefit of global ocean programmes across geographic and political boundaries is possible.

ANNEX V

OVERVIEW OF DATA EXCHANGE POLICY ISSUES IN OTHER ORGANISATIONS

(F. Webster, Global Observing Systems Information Center, University of Deleware)

Dr Webster began by discussing the broader setting in which the discussion on oceanographic data exchange policy is located. He noted that computers and the Internet have made access to data technologically easy. As a consequence, data owners are concerned about their investment and barriers to access are being erected to protect investment and to generate income. On the other hand, environmental research and monitoring programs have need of global data. The scientific community has been reacting against the new limits to access.

A number of organizations (intergovernmental, non-governmental, international and national) have established policies on data exchange and sharing. Dr Webster described the policies of a few of these as examples: the World Meteorological Organization, the International Council for Science, the World Intellectual Property Organization, the European Union, and the US Congress.

World Meteorological Organization (WMO)

The World Meteorological Organization adopted a resolution on the exchange of meteorological and related data and products (Resolution 40) at the XII WMO Congress, 1995. The resolution says, in part:

"Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO…" where "*free and unrestricted* means non-discriminatory and without charge" and "*without charge* means at no more that the cost of reproduction and delivery, without charge for the data and products themselves."

In addition, WMO established two categories of data. *Essential data* have no exchange restrictions and *additional data* have conditions on use defined by the producer.

Webster noted that Annex 1 to Resolution 40, "Data and products to be exchanged without charge and with no conditions on use", contains a guideline that is highly relevant to IOC discussions:

> "…(2) All available *in situ* observations from the marine environment, e.g. data in SHIP, BUOY, BATHY, TESAC codes, etc;…"

WMO operates a network of World Data Centers (WDCs) that operate under a different data exchange policy. The policy says, in part:

> "3. WMO WDCs should provide data on a free and unrestricted basis, at the lowest possible cost which should be no more than the cost of reproduction and distribution. No charge will be made for the data themselves.
>
> 4. WMO WDCs shall not accept in their holdings data for which there are restrictions for free and open access."

International Council for Science (ICSU)

The International Council for Science sponsors a network World Data Centers that handle geophysical and environmental data (including oceanographic data). The ICSU WDC guidelines say, in part:

> "6. No confidential or security-classified data are to be held in a WDC.
> 7. Data may be subject to privileged use by their originators, for a period to be agreed beforehand, and not to exceed two years from the data of acquisition by the WDC.
> 8. WDCs will provide data to scientists in any country free of charge, on an exchange basis or at a cost not to exceed the cost of copying and sending the requested data."

Database Property Rights

Databases owners are concerned: with the Internet, it's easy to make an exact copy of an original. Database owners have lobbied for new laws to provide more protection than is currently available under

copyright law. Under proposed legislation, a database would no longer need have original selection, coordination, or arrangement to be protected. Rather, the facts themselves would be protected from unauthorized use. Furthermore, there may no longer be "fair use" access to databases for research and education.

European Community

A Database Directive went into effect in the European Community in 1998. Under the terms of this directive, database producers can prohibit use of more than an insubstantial part of the database. Many European countries have enacted laws implementing the Directive, some without fair-use provisions for research and education. Even with fair-use provisions, available data may be unsuitable for global research and monitoring purposes.

In the terms of the EU Directive, "fair use" means:

> "Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a substantial part of its contents:… (b) in the case of extraction for the purposes of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved…"

In addition, the EEC adopted the Directive of 7 June, 1990 on freedom of access to information on the environment, which states:

> "… Member States shall ensure that public authorities are required to make available information relating to the environment to any natural or legal person at his request …"
>
> "Member States may make a charge for supplying the information, but such charge may not exceed a reasonable cost."

World Intellectual Property Organization (WIPO)

A database treaty was proposed at the World Intellectual Property Organization in 1996. Partly due to pressure from the research community, the treaty was withdrawn. In 1997, the US changed its opinion and opposed a database treaty. A similar position was taken by other delegations and the move for a new treaty stalled. Since 1997, WIPO has not moved forward.

United States Congress

US database legislation is uncertain, and WIPO will likely not act at this time. If the US does pass a national database law, Webster gave as his opinion that WIPO would likely enact a global database treaty. The consequence could be a patchwork of database laws around the world. In such a situation, global change research and monitoring will likely face a daunting task. Global datasets could prove so difficult and costly to assemble that researchers will be discouraged from doing so.

IOC Data Policy

Dr Webster stated that the international management of ocean data under the auspices of IODE is exemplary. From his perspective as Chair of the World Data Center Panel, he felt the ocean community was ahead of that in other disciplines. Ocean data access is generally full and open. Because of its leadership position in environmental data management, any policy adopted by the IOC will likely have an impact beyond the IOC and its programs.

ANNEX VI

BACKGROUND DOCUMENTS FOR THE MEETING

LIST OF DOCUMENTS IN THIS ANNEX

WMO

Resolution 40 (Cg-XII)

Resolution 25 (CG-XIII)

Draft principles governing access to data held in WMO World Data Centers (EC-L/Doc.71)

IOC

Oceanographic Data Exchange Policy and Resolution XX-11 – ***Given in Annex III***

GOOS principles

EuroGOOS Data Policy

ICSU

Principles and Responsibilities of ICSU World Data Centers

European Union

Directive on the legal protection of databases (96/9/EEC)

Directive on the freedom of access to information on the Environment (90/313/EEC)

US National Research Council

On the Full and Open Exchange of Scientific Data (CGED, 1995)

WORLD METEOROLOGICAL ORGANIZATION

RESOLUTION 40 (Cg-XII)

WMO POLICY AND PRACTICE FOR THE EXCHANGE OF METEOROLOGICAL AND RELATED DATA AND PRODUCTS INCLUDING GUIDELINES ON RELATIONSHIPS IN COMMERCIAL METEOROLOGICAL ACTIVITIES

(This resolution is discussed and explained in the WMO Brochure "Exchanging Meteorological Data, Guidelines on relationships in commercial meteorological activities, WMO policy and practice", Publication WMO - No. 837)

THE CONGRESS,

NOTING:
(1) Resolution 23 (EC-XLII) - Guidelines on international aspects of provision of basic and special meteorological services,
(2) Resolution 20 (EC-XLVI) - WMO policy on the exchange of meteorological and related data and products,
(3) Resolution 21 (EC-XLVI) - Proposed new practice for the exchange of meteorological and related data and products,
(4) Resolution 22 (EC-XLVI) - WMO guidelines on commercial activities,
(5) The report to Twelfth Congress of the chairman of the Executive Council Working Group on the Commercialization of Meteorological and Hydrological Services, established at the request of Eleventh Congress by the Executive Council in Resolution 2 (EC-XLIII) - Working Group on the Commercialization of Meteorological and Hydrological Services,

RECALLING:
(1) The general policies of the Organization, as set down in the Third WMO Long-term Plan (1992-2001) adopted by Eleventh Congress, which include, inter alia, that Members should reaffirm their commitment to the free and unrestricted international exchange of basic meteorological data and products, as defined in WMO Programmes (Third WMO Long-term Plan, Part 1, Chapter 4, paragraph 127),
(2) The concern expressed by Eleventh Congress that commercial meteorological activities had the potential to undermine the free exchange of meteorological data and products between national Meteorological Services,

CONSIDERING:
(1) The continuing fundamental importance, for the provision of meteorological services in all countries, of the exchange of meteorological data and products between WMO Members' national Meteorological or Hydrometeorological Services (NMSs), WMCS, and RSMCs of the VAM Programme,
(2) Other programmes of world importance such as GCOS, GOOS, WCRP, and IGOSS, which are sponsored and implemented in cooperation with other international organizations,
(3) The basic role of WMO Members' NMSs in furthering applications of meteorology to all human activities,
(4) The call by the world leaders at UNCED (Brazil, 1992) for increasing global commitment to exchange scientific data and analysis and for promoting access to strengthened systematic observations,
(5) The provision in the UN/FCCC committing all Parties to the Convention to promote and cooperate in the full, open, and prompt exchange of information related to the climate system and climate change,

RECOGNIZING:
(1) The increasing requirement for the global exchange of all types of environmental data in addition to the established ongoing exchange of meteorological data and products under the auspices under the auspices of the WWW,
(2) The basic responsibility of Members and their NMSs to provide universal services in support of safety, security and economic benefits for the peoples of their countries,
(3) The dependence of Members and their NMSs on the stable, cooperative international exchange of meteorological and related data and products for discharging their responsibilities,
(4) The continuing requirement for Governments to provide for the meteorological infrastructure of their countries,
(5) The continuing need for, and benefits from, strengthening the capabilities of NMSS, in particular in developing countries, to improve the provision of services,

(6) The dependence of the research and education communities on access to meteorological and related data and products,
(7) The right of Governments to choose the manner by, and the extent to, which they make data and products available domestically or for international exchange,

RECOGNIZING FURTHER:
(1) The existence of a trend towards the commercialization of many meteorological and hydrological activities,
(2) The requirement by some Members that their NMSs initiate or increase their commercial activities,
(3) The risk arising from commercialization to the established system of free and unrestricted exchange of data and products, which forms the basis for the WWW, and to global cooperation in meteorology,
(4) Both positive and negative impacts on the capacities, expertise and development of NMSS, and particularly those of developing countries, from commercial operations within their territories by the commercial sector including the commercial activities of other NMSS,

REMINDS Members of their obligations under Article 2 of the WMO Convention to facilitate worldwide cooperation in the establishment of observing networks and to promote the exchange of meteorological and related information; and of the need to ensure stable ongoing commitment of resources to meet this obligation in the common interest of all nations;

ADOPTS the following policy on the international exchange of meteorological and related data and products:
As a fundamental principle of the World Meteorological Organization (WMO), and in consonance with the expanding requirements for its scientific and technical expertise, WMO commits itself to broadening and enhancing the free and unrestricted[1] international exchange of meteorological and related data and products;

ADOPTS the following practice on the international exchange of meteorological and related data and products:
(1) Members shall provide on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of all nations, particularly those basic data and products, as, at a minimum, described in Annex I to this resolution, required to describe and forecast accurately weather and climate, and support WMO Programmes;
(2) Members should also provide the additional data and products which are required to sustain WMO Programmes at the global, regional, and national levels and, further, as agreed, to assist other Members in the provision of meteorological services in their countries. While increasing the volume of data and products available to all Members by providing these additional data and products, it is understood that WMO Members may be justified in placing conditions on their re-export for commercial purposes outside of the receiving country or group of countries forming a single economic group, for reasons such as national laws or costs of production;
(3) Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO with the understanding that their commercial activities are subject to the same conditions identified in ADOPTS[2] above;

STRESSES that all meteorological and related data and products required to fulfil Members' obligations under WMO Programmes will be encompassed by the combination of essential and additional data and products exchanged by Members;

URGES Members to:
(1) Strengthen their commitment to the free and unrestricted exchange of meteorological and related data and products;
(2) Increase the volume of data and products exchanged to meet the needs of WMO Programmes;
(3) Assist other Members, to the extent possible, and as agreed, by providing additional data and products in support of time-sensitive operations regarding severe weather warnings;
(4) Strengthen their commitments to the WMO and ICSU WDCs in their collection and supply of meteorological and related data and products on a free and unrestricted basis;

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[1] "Free and unrestricted" means non-discriminatory and without charge [Resolution 23 (EC-XLII) - Guidelines on international aspects of provision of basic and special meteorological services]. "Without charge", in the context of this resolution, means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.
[2] See Annex 4 to this resolution for definitions.

(5) Implement the practice on the international exchange of meteorological and related data and products, as described in Adopts (1) to (3) above;
(6) Make known to all Members, through the WMO Secretariat, those meteorological and related data and products which have conditions related to their re-export for commercial purposes outside of the receiving country or group of countries forming a single economic group;
(7) Make their best efforts to ensure that the conditions which have been applied by the originator of additional data and products are made known to initial and subsequent recipients;

FURTHER URGES Members to comply with:
(1) The Guidelines for Relations among National Meteorological or Hydrometeorological Services Regarding Commercial Activities as given in Annex 2 to this resolution;
(2) The Guidelines for Relations between National Meteorological or Hydrometeorological Services and the Commercial Sector as given in Annex 3 to this resolution;

INVITES Members to provide explanation of the WMO policy, practice, and guidelines to the commercial sector and other appropriate agencies and organizations;

REQUESTS the Executive Council to:
(1) Invite the president of CBS, in collaboration with the other technical commissions as appropriate, to provide advice and assistance on the technical aspects of implementation of the practice;
(2) Invite the president of CHy to continue his work on the issue of commercialization and the international exchange of hydrological data and products;
(3) Keep the implementation of this resolution under review and report to Thirteenth Congress;

REQUESTS the Secretary-General to:
(1) Keep Members informed on the impacts of commercialization on WMO Programmes and to facilitate the exchange of relevant information on commercialization among NMSS;
(2) Report on a timely basis to all Members on those meteorological and related data and products on which Members have placed conditions related to their re-export for commercial purposes;
(3) Maintain effective coordination with IOC and other involved international organizations in respect of joint programmes during WMO's implementation of the practice;

DECIDES to review the implementation of this resolution at Thirteenth Congress.

Annex 1 to Resolution 40 (Cg-XII)

DATA AND PRODUCTS TO BE EXCHANGED WITHOUT CHARGE
AND WITH NO CONDITIONS ON USE

PURPOSE
The purpose of this listing of meteorological and related data and products is to identify a minimum set of data and products which are essential to support WMO Programmes and which Members shall exchange without charge and with no conditions on use. The meteorological and related data and products which are essential to support WMO Programmes include, in general, the data from the RBSNs and as many data as possible that will assist in defining the state of the atmosphere at least on a scale of the order of 200 km in the horizontal and six to 12 hours in time.

CONTENTS
(1) Six-hourly surface synoptic data from RBSNS, e.g. data in SYNOP, BUFR or other general purpose WMO Code;
(2) All available in situ observations from the marine environment, e.g. data in SHIP, BUOY, BATHY, TESAC codes, etc.;
(3) All available aircraft reports, e.g. data in AMDAR, AIREP codes, etc.;
(4) All available data from upper air sounding networks, e.g. data in TEMP, PILOT, TEMP SHIP, PILOT SHIP codes, etc.;
(5) All reports from the network of stations recommended by the regional associations as necessary to provide a good representation of climate, e.g. data in CLIMAT/CLIMAT TEMP and CLIMAT SHIP/CLIMAT TEMP SHIP codes, etc.;

(6) Products distributed by WMCs and RSMCs to meet their WMO obligations;
(7) Severe weather warnings and advisories for the protection of life and property targeted upon end-users;
(8) Those data and products from operational meteorological satellites that are agreed between WMO and satellite operators. (These should include data and products necessary for operations regarding severe weather warnings and tropical cyclone warnings.)

Annex 2 to Resolution 40 (Cg-XII)

GUIDELINES FOR RELATIONS AMONG NATIONAL METEOROLOGICAL OR HYDROMETEOROLOGICAL SERVICES (NMSS) REGARDING COMMERCIAL ACTIVITIES

PURPOSE
The purpose of these guidelines is to maintain and strengthen in the public interest the cooperative and supportive relations among NMSs in the face of differing national approaches to the growth of commercial meteorological activities.

GUIDELINES
In order to ensure the maintenance of the international exchange of data and products among WMO Members, and to develop the applications of meteorology, while adapting to the new challenge from the growth of commercial meteorological activities:

1. NMSs should provide the first point of receipt within a country for WWW data and products, in order to have complete and timely access to all the information necessary for the production of weather forecasts and warnings and other meteorological/climatological services necessary for the protection of life and property and other public interest responsibilities entrusted to the NMSs and without prejudice to the national laws of their territory of location;
2. NMSs should make their best efforts to ensure that the conditions which have been applied by the originator of additional data and products[3] are made known to initial and subsequent recipients;
3. In the case where conditions accompanying the exchange of additional data and products are not honoured, the originating NMS may take appropriate actions including denial of access of these additional data and products to the receiving Member;
4. NMSs may export NWP regional model products employing additional data and products for commercial purposes outside the country of the Member running the model, unless objected to by an affected Member. Every effort should be made to coordinate the provision of such services prior to implementation to avoid possible harm to other Members;
5. NMSs may distribute and export products from global NWP models without regard to conditions which were attached to the original data used in the models;
6. Services or products whose construction would suffer significant degradation by removal of the additional data or products and from which the additional data and/or products can be retrieved easily, or their use can be identified unambiguously, should carry the same conditions on their re-export for commercial purposes as those additional data or products;
7. An NMS receiving a request from a local client for service that it cannot fulfil may seek assistance from another NMS with the capacity to provide it. Where appropriate to enhance the free and unrestricted exchange of data and products among WMO Members, the service should as far as possible be made available through the offices of the NMS of the country within which the client is located;
8. Similarly, unless other arrangements have been agreed to, an NMS receiving a request to provide service in another country should refer the request back to the NMS in that country, i.e. to the local NMS. In the event that the local NMS is unable to provide the service for lack of facilities or other legitimate reasons, the external NMS may seek to establish a collaborative arrangement with the local NMS to provide the service;
9. Where the service originated by one NMS is likely to affect other Members (e.g. in the provision of regional broadcasts of meteorological information or the wide distribution of seasonal or climate forecasts), the NMS originating the service should seek, well in advance, and take into account the response of the NMSs of the affected Members, to the extent possible;

[3] "Additional data and products" means data and products additional to those with no conditions on their use.

10. NMSs should, to the extent possible, refrain from using basic VAM data and products received from other countries in ways which jeopardize the performance of the public interest responsibilities of the originating NMSs within their own countries. If an NMS finds that, in the undertaking of its public interest responsibilities it is affected adversely by a public or private organization in another country, it may warn the NMS in the country from which the organization is deriving the data and products. The latter NMS should consider measures to mitigate these adverse effects and take those actions appropriate under its national laws;
11. NMSs with experience in commercial activities should make their expertise available, on request, to other NMSS, especially NMSs of developing countries, through the WMO Secretariat and bilaterally, and provide relevant documentation, seminars and training programmes to developing countries, on request, on the same financial basis as other WMO education and training courses are provided.

In implementing these guidelines, NMSs should take into account and, as far as possible, respect the different legal, administrative, and funding frameworks which govern the practices of NMSs in other countries or group of countries forming a single economic group. NMSs should, in particular, note that other NMSs will be bound by their own national laws and regulations regarding any trade restrictive practices. Furthermore, where a group of countries forms a single economic group, the internal laws and regulations appropriate to that group shall, for all internal group activities, take precedence over any conflicting guidelines.

Annex 3 to Resolution 40 (Cg-XII)

GUIDELINES FOR RELATIONS BETWEEN NATIONAL METEOROLOGICAL OR HYDROMETEOROLOGICAL SERVICES (NMSS) AND THE COMMERCIAL SECTOR

PURPOSE

The purpose of these guidelines is to further improve the relationship between NMSs and the commercial sector. The development of the exchange of meteorological and related information depends greatly upon sound, fair, transparent, and stable relations between these two sectors.

GUIDELINES

These guidelines apply to the commercial sector engaged in meteorological activities, which includes government organizations engaged in commercial meteorological activities.

In order to enhance the relationship between the two sectors:

1. In the common interest, the commercial sector is urged to respect the international data exchange principles of the VAM and other WMO Programmes;
2. The commercial sector is urged to recognize and acknowledge the essential contribution of NMSs and of WMO to the activities of the commercial sector. NMSs and the commercial sector are urged to recognize the interdependence and mutual benefit possible from cooperative interaction;
3. In the case where the NMS of a country, particularly of a developing country, were to consider itself affected by the commercial sector's commercial use of data originated in its own country, all parties involved shall undertake negotiations to achieve appropriate and satisfactory agreements;
4. Unless authorized to do so by the relevant Member, commercial sector providers of meteorological services should not publicly issue warnings and forecasts relevant to the safety of life and property in the country or maritime area where they operate. Warnings and forecasts relevant to the safety of life and property publicly issued by the commercial sector should be consistent with those originated by NMSs or by other official originators in the course of the performance of their public service responsibilities;
5. In providing services, the commercial sector should be encouraged to employ meteorological terminology consistent with established national and international practice;
6. Commercial sector providers of meteorological services should respect the sovereignty and rules and regulations of the countries in which they deliver services;
7. NMSs are encouraged to discuss with their countries' meteorological community and professional societies the issues associated with the international activities of the commercial sector;
8. NMSs are encouraged to collaborate with their countries' commercial sector and their professional societies to maximize the use of meteorological information within their country.

Annex 4 to Resolution 40 (Cg-XII)

DEFINITIONS OF TERMS IN THE PRACTICE AND GUIDELINES

Term	**Definition**
Practice	Specifications for the classification of, and the conditions attached to, the use of data and products exchanged among WMO Members.
Re-export	Redistribute, physically or electronically, outside the receiving country or group of countries forming a single economic group, directly or through a third party.
For commercial purposes	For recompense beyond the incremental cost of reproduction and delivery.
Commercial sector	Governmental or non-governmental organizations or individuals operating for commercial purposes.
Meteorological and related data and products	Geophysical (meteorological, oceanographic, etc.) observational data and products developed from these data acquired and/or produced by Members to support WMO Programme requirements. *NOTES:* 1. Meteorological and related data and products are considered to include climatological data and products. 2. Hydrological data and products, at this stage, are not included in the application of the practice. 3. Aeronautical information generated specifically to serve the needs of aviation and controlled under the Convention on International Civil Aviation (Chicago, 1944) is not included in the application of the practice.
Free and unrestricted	Non-discriminatory and without charge (Resolution 23 (EC-XLII)) - Guidelines on international aspects of provision of basic and special meteorological services. "Without charge", in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.
Research and education communities	Researchers, teachers and students in academic and research institutions, in other research institutions within governmental and non-governmental organizations, and these institutions themselves, as provided for in national laws and regulations.

ACRONYMS

CBS	Commission for Basic Systems (of WMO)
Cg	WMO Congress
CHy	Commission for Hydrology (of WMO)
EC	Executive Council (of WMO)
FAO	Food and Agriculture Organization of the United Nations
GCOS	Global Climate Observing System
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System
ICSU	International Council of Scientific Unions
IGOSS	Integrated Global Ocean Services System
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
NMS	National Meteorological or Hydrometeorological Service
NWP	Numerical Weather Prediction
RBSN	Regional Basic Synoptic Network
RSMC	Regional Specialized Meteorological Centre
RTH	Regional Telecommunication Hub
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme

UN/FCCC	United Nations Framework Convention on Climate Change
WCRP	World Climate Research Programme
WDC	World Data Centre
WGCOM	Working Group on the Commercialization of Meteorological and Hydrological Services (of WMO Executive Council)
WMC	World Meteorological Centre
WMO	World Meteorological Organization
WWW	World Weather Watch (of WMO)

WORLD METEOROLOGICAL ORGANIZATION

Thirteenth WMO Congress, Geneva, May 1999

RESOLUTION 25 (Cg-XIII)

EXCHANGE OF HYDROLOGICAL DATA AND PRODUCTS

THE CONGRESS,

NOTING:

1. Resolution 40 (Cg-XII) WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities,

2. The inclusion of dedicated observations of the climate system, including hydrological phenomena, as one of the four main thrusts of The Climate Agenda, which was endorsed by Twelfth Congress,

3. That Technical Regulation [D.1.1] 8.3.1(*k*), states that, in general, the routine functions of NHSs should include, *inter alia*, "making the data accessible to users, when, where and in the form they require" and that the Technical Regulations also contain a consolidated list of data and product requirements to support all WMO Programmes,

4. That the nineteenth Special Session of the United Nations General Assembly agreed, in its overall review and appraisal of the implementation of Agenda 21, that there is an urgent need to "...foster regional and international cooperation for information dissemination and exchange through cooperative approaches among United Nations institutions, …" (A/RES/S-19/2, paragraph 34(*f*)),

5. That the fifty-first session of the United Nations General Assembly adopted, by resolution 51/229, the Convention on the Law of the Non-navigational Uses of International Watercourses, Article 9 of which provides for "regular exchange of data and information",

6. That the Intergovernmental Council of the International Hydrological Programme of UNESCO adopted at its twelfth session Resolution XII-4 which dealt with the exchange of hydrological data and information needed for research at the regional and international levels,

CONSIDERING:

1. The significance attached by International Conference on Water and the Environment (ICWE) (Dublin, 1992) to extending the knowledge base on water and enhancing the capacity of water sector specialists to implement all aspects of integrated water resources management,

2. The call of world leaders at the United Nations Conference on Environment and Development (UNCED)(Rio de Janeiro, 1992) for a significant strengthening of, and capacity building in, water resources assessment, for increasing global commitment to exchange scientific data and analyses and for promoting access to strengthened systematic observations,

3. That the United Nations Commission on Sustainable Development (CSD) in its Decision 6/1 "Strategic Approaches to Freshwater Management" has strongly encouraged States to promote the exchange and dissemination of water-related data and information, and has recognized "the need for periodic assessments … for a global picture of the state of freshwater resources and potential problems",

4. The call by the nineteenth Special Session of the United Nations General Assembly "for the highest priority to be given to the serious freshwater problems facing many regions, especially in the developing world" and the "urgent need … to strengthen the capability of Governments and international institutions to collect and manage information … and environmental data, in order to facilitate the integrated assessment and management of water resources",

5. The requirements for full, open and prompt exchange of hydrological data and products in support of various international conventions, such as the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, and the Convention to Combat Desertification,

6. The requirement for the global exchange of hydrological information in support of scientific investigations of world importance such as those on global change and the global hydrological cycle, and as a contribution to relevant programmes and projects of WMO, other United Nations agencies, ICSU and other organizations of equivalent status,

7. The opportunities for more efficient management of water resources and the need for cooperation in mitigating water-related hazards in transboundary river basins and their water bodies which depend on the international exchange of hydrological data and information,

8. The increasing recognition through scientific and technical endeavours, such as GEWEX, of the importance of hydrological data and products in improving the understanding of meteorological processes and subsequently the accuracy of meteorological products,

RECOGNIZING:

1. The responsibility of Members and their NHSs to provide for the security and well-being of the people of their countries, through mitigation of water-related hazards and sustainable management of water resources,

2. The potential benefits of enhanced exchange of hydrological data and information within shared river basins and aquifers, based on agreements between the Members concerned,

3. The continuing need for strengthening the capabilities of NHSs, particularly in developing countries,

4. The right of Governments to choose the manner by which, and the extent to which, they make hydrological data and products available domestically and internationally,

5. The right of Governments also to choose the extent to which they make available internationally data which are vital to national defense and security. Nevertheless, Members shall cooperate in good faith with other Members with a view to providing as much data as possible under the circumstances,

6. The requirement by some Members that their NHSs earn revenue from users, and/or adopt commercial practices in managing their businesses,

7. The long-established provision of some hydrological products and services on a commercial basis and in a competitive environment, and the impacts, both positive and negative, associated with such arrangements,

ADOPTS a stand of committing to broadening and enhancing, whenever possible, the free and unrestricted[4] international exchange[5] of hydrological data and products, in consonance with the requirements for WMO's scientific and technical programmes;

FURTHER ADOPTS the following practice on the international exchange of hydrological information:

1. Members shall provide on a free and unrestricted basis those hydrological data and products which are necessary for the provision of services in support of the protection of life and property and for the well-being of all peoples;

2. Members should also provide additional hydrological data and products, where available, which are required to sustain programmes and projects of WMO, other United Nations agencies, ICSU and other organizations of equivalent status, related to operational hydrology and water resources research at the global, regional and national levels and, furthermore, to assist other Members in the provision of hydrological services in their countries;

[4] "Free and unrestricted" means non-discriminatory and without charge. "Without charge", in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and the product themselves.
[5] "Exchange", in the context of this resolution, means the movement of data and product between countries or, as it is more likely in the case in the field of hydrology, the movement of data and product from one country to another.

3. Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all hydrological data and products exchanged under the auspices of WMO;

4. Respecting (2) and (3) above, Members may place conditions on the re-export[6], for commercial purposes, of these hydrological data and products, outside the receiving country or group of countries forming a single economic group;

5. Members should make known to all Members, through the WMO Secretariat, those hydrological data and products which have such conditions as in (4) above;

6. Members should make their best efforts to ensure that the conditions placed by the originator on the additional hydrological data and products are made known to initial and subsequent recipients;

7. Members shall ensure that the exchange of hydrological data and products under this resolution is consistent with the application of Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities;

URGES Members, in respect of the operational and scientific use of hydrological data and products, to:

1. Make their best efforts to implement the practice on the international exchange of hydrological data and products, as described in FURTHER ADOPTS (1) to (7);

2. Assist other Members, to the extent possible, and as agreed upon, in developing their capacity to implement the practice described in FURTHER ADOPTS (1) to (7);

REQUESTS the Executive Council to:

1. Invite the Commission for Hydrology to provide advice and assistance on technical aspects of the implementation of the practice on the international exchange of hydrological data and products;

2. Keep the implementation of this resolution under review and report to Fourteenth Congress;

DECIDES to review the implementation of this resolution at Fourteenth Congress.

[6] "Re-export", in the context of this resolution, means to redistribute, physically or electronically, outside the receiving country, group of countries forming a single economic group, or regional and global data centres, directly or through a third party

PRINCIPLES GOVERNING ACCESS TO DATA HELD IN WMO WORLD DATA CENTRES (WDCs)

The overall purpose of these principles is to facilitate the full, open and prompt availability of quality assured data. They were prepared in consonance with the goals of the relevant WMO Programmes, and the WMO policy on international data exchange, as set out in Resolution 40 (Cg-XII) - WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities.

1. WMO World Data Centres (WDCs) are coordinated through the relevant WMO bodies. The Centres themselves are established, organized, supported and managed entirely within national and international entities, as their contribution to the relevant WMO Programmes.

2. WMO Members have a common ownership of the data held in the WMO WDCs.

3. WMO WDCs should provide data on a free and unrestricted basis, at the lowest possible cost which should be no more than the cost of reproduction and distribution. No charge will be made for the data themselves.

4. WMO WDCs shall not accept in their holdings data for which there are restrictions for free and open access.

5. Members participating in the relevant WMO Programmes are urged to endeavor to submit data to the relevant WMO WDCs as promptly as possible in accordance with the procedures defined by the Centres.

6. Procedures and criteria for data reporting to the WMO WDCs should be developed by each of the Centres.

7. Data archives of WMO WDCs must include readily accessible and comprehensive information describing the datasets, including quality assessments.

8. WMO WDCs should, to the greatest extent possible, use media as well as processing and communication systems which are compatible with internationally accepted standards and protocols.

9. Long-term preservation of all data submitted to the WMO WDCs should be ensured.

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

The GOOS PRINCIPLES

GOOS Report 41, IOC/INF-1091, Strategic Plan and Principles for the Global Ocean Observing System (GOOS) Version 1.0, January 1998

Introduction

It has been recognized for some time that a set of GOOS principles concerning the design and implementation of GOOS could provide coherence to the program, a set of basic rules for the design of the system itself and a clear statement to engage the interest and commitment of agencies and governments while spelling out the expected 'terms' of their involvement in this ambitious undertaking.

The Principles are designed as a set of relatively concise statements that could be understood without great elaboration. The SSC of I-GOOS requested that explanations of the principles be prepared in time for distribution to J-GOOS in April 1997 and I-GOOS in June 1997. Explanations of the intent of the principles are given below, incorporating modifications by J-GOOS.

Two sets of Principles are defined. The first (Design Principles) define the overall principles that determine the design of the system and provide a guide for what the design should include and exclude. The second is a guide to the conditions that should determine participation in the system, and the elements that determine those conditions.

These Principles have been adopted to guide the design and implementation of GOOS. Nothing within them should be interpreted as contravening or conflicting with the rules and regulations of the sponsoring organizations or the individual rights of Member States.

Explanations of the GOOS Design Principles

- ***Principle D1. GOOS is based on a plan designed to meet defined objectives on the basis of user needs.***

This principle states foremost that GOOS from its conception, is a planned system for the acquisition and value-added application of a specific subset of observations gathered according to a designed strategy. It is not an opportunistic assembly of whatever ocean observations are offered for contribution by participating countries. The plan will therefore state (or at least outline) the observations that are required for each particular objective, and should where possible define how they would be applied to the needs of users. Applications should include the 'public good' where there is a defined socio-economic basis. Observations that qualify for inclusion as contributions to GOOS will, by definition, be of a kind and quality applicable to the defined objectives and end-use.

- ***Principle D2. The design assumes that contributions to GOOS are long term.***

GOOS is founded on the concept of an observing system that is ongoing or of an indefinite lifetime, in the same sense as the system of global meteorological observations. Although it will inevitably include observations gathered and sponsored for a limited duration and for differing purposes, the design will assume that such observations will be selected and contributed as part of a continuum that assembles to create a long-term, systematically structured and quality-controlled dataset.

- ***Principle D3. The design will be reviewed regularly.***

GOOS will evolve as plans consolidate, alliances form, commitments are made, needs become better defined and prioritised and technology improves. In addition, an essential element of the observing system must be the continual evaluation of the system design through the analysis of its products. Thus, to ensure that implementation proceeds continuously and effectively, the system design will require frequent review and adaptation.

- ***Principle D4. The design allows for flexibility of technique.***

GOOS is aimed at the assembly of a data set of specific oceanic variables. Depending on the capability of the participating observing agencies and the advance of technology, the method of observation of these variables

will differ. The design should not unnecessarily restrict the technique used for observation provided its standard is adequate for the purpose.

- ***Principle D5. GOOS is directed towards global problems and/or those ubiquitous problems benefiting from global observing systems.***

Among the range of needs for systematic observation of the marine environment on all scales, there is a subset of needs that can be most effectively addressed through cooperation within GOOS. Some depend on a scheme of related observations; such as are required for the changing climate of the large-scale ocean or for a pollutant stressing the capacity of large parts of the ocean. Others are generic, common or dependent and can be facilitated and in some cases only made possible by a globally coordinated or globally designed and facilitated system of observations. Even needs that are dependent only on local observations, as is the case for many coastal applications, may benefit greatly from data products that are generated as part of a globally coordinated system. The thrust of the GOOS design should be to service this subset of needs without prejudice to existing systems operating outside of the GOOS framework.

- ***Principle D6. The design covers the range from data capture to end products and services.***

The end-to-end concept implies a known or definable pathway of connections between a basic observational element and the end use or purpose to which the observation (or information derived from it) is applied. Typically, each type of ocean observation has a range of potential applications, and most applications have the need for more than one observation type. In designing a system to serve a given range of end-uses, it is important to know how the observation would be used, processed and combined with other observations to deliver an observational 'product' of value to the end user. The GOOS design must therefore be concerned not only with how observations should be made but the steps and operational and scientific products (eg technology and models) required for their end use.

- ***Principle D7. The management, processing and distribution of data will follow a specified data policy.***

In concert with the policies of IODE, IGOSS and GCOS, and following the data management plan for the World Weather Watch of the WMO, commitment is required by GOOS participants to establishing, maintaining, validating, making accessible, and distributing high quality, long term data meeting internationally agreed standards. Preservation of GOOS data is required in suitable archives following appropriate procedures and criteria for data acquisition and retention, and should include information about data holdings. Data should be processed to a level which is generally suitable for the generation of operational products and for research, and described in internationally accessible on-line computerised directories that can also be made available by other means. GOOS contributors are responsible for full, open and timely sharing and exchange of GOOS-relevant data and products for non-commercial activities. Exchange implies that donation by individual nations gains access to data from others as well as to products derived using all available data, such that the benefit of cooperation exceeds the cost.

- ***Principle D8. The design takes into account the existence of systems outside GOOS that can contribute to and/or benefit from GOOS.***

A cornerstone of GOOS development is that it will be built to the greatest extent upon existing systems of observation and data management, national, regional and global This requirement is vitally important for the most effective use of global resources. By the same token, these systems have their own defined purposes and goals outside GOOS and these goals cannot necessarily be deflected to the delivery of GOOS. GOOS must therefore be designed to 'co-exist' and interact cooperatively and to mutual benefit with the other systems. As a particular example, to the present time, most interior ocean physical observations have been made through individual research projects or in connection with global research programs like TOGA and WOCE. These provide valuable data sets to GOOS and could in turn benefit from GOOS observations, although in many respects they are inappropriate for incorporation into a GOOS implementation framework. Systems like IGOSS, GLOSS and IODE are presently structured as central points for the management of specific data types collected by national agencies for reasons that will often be outside the scope of GOOS. Their operations could be adapted and/or expanded to the management of a subset of data that contributes to GOOS.

- ***Principle D9. The design takes into account quality assurance procedures.***

The incorporation of quality assurance (qa) procedures as an integral part of the GOOS plan represents a departure from the practice of existing observing systems, which in some cases apply qa processes but not as part of the observation design and acceptance strategy. Without quality assurance procedures, the great promise of global data sets to address specified problems will certainly not be met. Several of the principles stated above, for example D2, D3 and D4, address the need for strong oversight of the observing system and its continued

review with an eye to assessing and improving its effectiveness. Quality assurance is a fundamental part of that effort.

Explanations of the GOOS Principles of Involvement

In order to assist nations and national agencies to decide whether they are willing and able to participate in the implementation of GOOS, there needs to be a set of principles that define the nature of participation, in terms of the 'requirements' of GOOS as conceived and consistent with the foregoing Design Principles.

- ***Principle P1. Contributions to GOOS will be compliant with plans developed and agreed on the basis of the above design principles.***

Consistent with Principle D1, GOOS is designed and implemented according to a plan or series of plans. There will be a great deal of latitude in the way nations participate in GOOS. However, it is very important for the coherence and orderly development of GOOS as well as the optimisation of cooperation between countries and the delivery of benefits, that all contributions are made with the clear intent to comply as closely as possible with these plans.

- ***Principle P2. Contributions will be compliant with a defined GOOS data policy.***

Principle D7 indicates that data policies will be defined for GOOS. The success of GOOS depends critically upon the implementation of these policies. It is therefore necessary that compliance with these policies is a prerequisite to effective participation, recognising that the benefits of GOOS will flow primarily from the reciprocal exchange of data and products between countries.

- ***Principle P3. Contributions should reflect an intent for sustained observations.***

Nations contributing to GOOS will be understandably reluctant to make an open-ended commitment to GOOS. However, it needs to be recognised that the benefits of GOOS, and indeed the whole concept, depend upon the collation of data sets that are continuous and sustained. Thus, this principle requires affirmation of an intention that, subject to changing circumstances, observations submitted as part of GOOS will be sustained.

- ***Principle P4. Standards of quality will apply to GOOS contributions.***

Participants should be aware that GOOS will not be a repository of any data that might be contributed to it. GOOS data will be subject to quality testing to ensure its capacity to meet GOOS requirements. Contributors will be encouraged to apply the agreed quality assurance procedures.

- ***Principle P5. Implementation will be effected using existing national and international systems and organisations where appropriate.***

There are a number of international organizations and agencies responsible for the coordination of ocean data collection and its storage. It has been accepted from the start of GOOS that for reasons of efficiency, such bodies, which include IGOSS, DBCP, GLOSS and the IODE, will be used whenever possible to implement GOOS. At the same time it is recognised that these bodies exist to serve purposes outside of GOOS. Therefore GOOS will not substitute for them or subsume their function. The principle implies the effective use of existing systems, and that the proliferation of new systems and organisations to serve GOOS alone will not be encouraged. At national level observation systems exist primarily to serve defined national objectives. In many cases these systems could be expanded or adapted to meet GOOS requirements. The principle therefore encourages nations and agencies to facilitate their participation in GOOS through these systems, rather than requiring the creation of new systems.

- ***Principle P6. Implementation will be incremental and progressive, whilst bearing in mind the long term goals.***

The implementation of GOOS will occur gradually as nations and agencies decide to submit part of their existing ocean observing effort and put in place new systems as contributions to GOOS networks. It will take time for regional alliances to take shape and new resources to be committed for GOOS as the benefits become apparent. Also, GOOS will evolve as techniques and technologies change and its scope extends, and it is realistic to expect that full implementation will take many years. This principle makes it clear that participation should not be inhibited by the lack of implementation of the complete observing system, and that incremental contributions are effective additions to the whole.

- ***Principle P7. Participation in GOOS implies an undertaking to help less-developed countries to participate and benefit.***

Consistent with the global nature of GOOS and its purpose to serve all humankind there is an obligation to enable all nations to participate in and benefit from GOOS. Without external assistance and cooperation, few countries are well-equipped to establish observing systems to meet the requirements of GOOS or to derive full benefit from the enhanced knowledge and the management tools that GOOS will create. Therefore the undertaking to assist these countries where possible to become capable and effective partners in GOOS is incorporated as a core principle of GOOS participation.

- ***Principle P8. Participants will have full autonomy in the management of their contributions to GOOS.***

GOOS will be implemented by nations and their agencies. While GOOS is planned and coordinated internationally, it is recognised that the way in which observations are gathered, resourced and managed differs widely between nations and agencies. This principle is an assurance that GOOS has no role in these internal processes, and its influence will be confined to the encouragement of adherence to the quality assurances protocols, data exchange policy, etc according to the other GOOS Principles.

- ***Principle P9. Contributing nations and organisations will reserve the right to determine and limit their contributions to GOOS.***

As a corollary to Principles P6 and P8, this principle affirms that, although the success of GOOS will depend on long-term and indefinitely sustained observations, nations must always retain full control of the resources and contributions they make to GOOS.

- ***Principle P10. Use of the GOOS 'label' implies conformity with the relevant principles of GOOS.***

The GOOS acronym is already in widespread use and, in the absence of overarching GOOS plans and principles, has become associated with a variety of national and international activities. Some of these lack any effective association with the intended global system. This principle indicates the intention to ensure the quality and dependability of GOOS programs and the consistency and coherence of GOOS development by requiring all activities using the GOOS 'label' to comply with the fore-stated GOOS Principles.

EuroGOOS Data Policy
(9 March 2000)

Policy and practice for EuroGOOS for the exchange of oceanographic and related data and products including guidelines on relationships in commercial oceanographic activities

NOTING:

(1) WMO Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities,

(2) The Decision of the Commission for the European Union dated 21.10.1999 regarding ECOMET Economic Interest Grouping according to Belgium Law,

(3) The UN convention of 1998 on the access to information, public participation in decision-making and access to justice in environmental matters (the Aarhus-Convention)

(4) Council Directive 90/313/EEC of June 1990 on the freedom of access to information on the environment,

(5) Directive 96/9/EC of The European Parliament and of the Council of 11 March 1996 on the legal protection of databases,

RECALLING:

(1) The present GOOS Policy for exchange of data and products

CONSIDERING:

(1) The continuing fundamental importance, for the provision of oceanographic services in all countries, of the exchange of oceanographic and related data and products between EuroGOOS Members,

(2) Other programmes of world importance and the ocean observing and Marine Meteorological programmes under JCOMM,

(3) The basic role of EuroGOOS Members to furthering applications of oceanography to all human activities,

(4) The call by world leaders at UNCED (Brazil, 1992) for increasing global commitment to exchange scientific data and analysis and for promoting access to strengthening systematic observations,

(5) The provisions in the UN/FCCC committing all Parties to the Convention to promote and co-operate in the full, open and prompt exchange of information related to the climate system and climate change,

(6) UN Convention on the Law of the Sea, especially those articles on international data exchange: 200, 244.2, 249.1(c), 249.1(d) and 277(e).

RECOGNISING:

(1) The increasing requirement for the global exchange of all types of environmental data and in particular ocean data,

(2) The basic responsibility for the Members to provide universal services in support of safety, security and economic benefits for the peoples in their countries,

(3) The dependence of Members on the stable, co-operative international exchange of data and products for the discharge of their responsibilities,

(4) The continuing requirement for Governments to provide for the oceanographic infrastructure of their countries,

(5) The continuing need for, and benefits from, strengthening the capabilities of Members, in particular in developing countries, to improve the provision of services,

(6) The dependence of the research and education communities on access to oceanographic and related data and products,

(7) The right of Governments to choose the manner by, and the extent to, which they make data and products available domestically or for international exchange.

RECOGNISING FURTHER:

(1) The existence of a trend towards the commercialization of many oceanographic and related services and products,

(2) The requirement by some Governments that the Members initiate or increase their commercial activities,

(3) The risk arising from the commercialization to the established system of free and unrestricted exchange of data and products, which forms the basis for the European co-operation in oceanography,

(4) The EU-principle that all data and products, financed with public means and used by public entities for commercial activities shall also be available to other Service Providers.

ADOPTS the basic principles for the exchange of oceanographic and related data and products:

(1) Exchange on a free and unrestricted basis of essential, additional and other data and products between the Members of EuroGOOS,

(2) The right for the originator of data and products to place conditions on additional and other data and product for re-distribution for commercial purposes,

(3) Free and unrestricted access to data and products for non-commercial research and education,

(4) All data and products that is financed with public means and used for commercial purposes must be available for other Service Providers,

(5) Transparency regarding availability, prices and conditions for re-distribution regarding oceanographic and related data and products through the maintenance of a EuroGOOS Product Catalogue,

These principles are in harmony with WMO Res. 40 and the EU Commissions decision regarding ECOMET.

FURTHER ADOPTS the following practice on the international exchange of oceanographic and related data and products

(1) Members shall provide on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of all nations, particularly those data and products, as, at a minimum described in Annex 1 to this document, required to support WMO or GOOS Programmes;

(2) Members should also provide additional data and products which are required to sustain programmes at the global, regional and national levels and, further as agreed, to assist other Members in the provision of oceanographic services in their countries. While increasing the volume of data and products available to all Members by providing the additional data and products, it is understood that EuroGOOS Members may be justified in placing conditions on their re-delivery for commercial purposes;

(3) Members shall also provide to anybody all other data and products which are used in commercial activities and which have been funded through core/infrastructure activity or government grants. It is hereby understood that Members may be justified in placing conditions on their re-distribution for commercial purposes as well as to charge for the information and the delivery;

(4) Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of this document with the understanding that their commercial activities are subject to the same conditions identified in FURTHER ADOPTS (2) and (3) above;

URGES Members to:

(1) Strengthen their commitment to the free and unrestricted exchange of oceanographic and related data and products;

(2) Increase the volume of data and products exchanged under the auspices of this document;

(3) Assist other Members, to the extent possible, and as agreed, by providing additional data and products in support of time-sensitive operations regarding oceanographic and environmental warnings, rescue operations and safety of life at sea;

(4) Strengthen their commitment in their collection and supply of oceanographic and related data and products;

(5) Implement the practice on the international exchange of oceanographic and related data end products, as described in ADOPTS (1) to (4) above;

(6) Make known to all Members those oceanographic and related data and products which have conditions related to their re-distribution for commercial purposes;

(7) Make their best efforts to ensure that the conditions which have been applied by the originator of additional and other data and products are complied with and made known to initial and subsequent recipients;

DECIDES to review the implementation of this document at the EuroGOOS Annual Meeting.

Annex 1 to the EuroGOOS Data Policy and Practices

Data and products to be exchanged without charge
and with no conditions on use

Provisional Synopsis
Coarse resolution data and products in the following sectors:

- Waves
- Currents
- Sea level
- Tides
- Storm surges
- Temperature profiles
- Sea ice
- Icebergs
- Algal blooms
- Chlorophyll
- Ocean colour

Annex 2 to the EuroGOOS Data Policy and Practices

Guidelines for the relations among Members of EuroGOOS
regarding commercial activities

Purpose

The purpose of these guidelines is to maintain and strengthen in the public interest the co-operative and supportive relations among Members in the face of different national approaches to the growth of commercial activities.

Guidelines

In order to ensure the maintenance of the exchange of data end products among EuroGOOS Members, and to develop the applications of oceanography, while adapting to the new challenge from the growth of commercial activities:

Members should provide the first point of receipt within a country for data and product exchanged under the auspices of the EuroGOOS Data Policy and Practices, in order to have complete and timely access to all information necessary for the production of oceanographic and environmental warnings and other oceanographic services necessary for rescue operations and safety of life at sea and other public interests responsibilities entrusted to the Member and without national laws of their territory of location;

Members should make their best efforts to ensure that the conditions which have been applied by the originator of additional and other data and products are made known to initial and subsequent recipients;

In the case where conditions accompanying the exchange of additional and other data and products are not honoured, the originating Member may take appropriate actions including denial of access of these additional and other data and products to the receiving Member;

Members may export regional model products employing additional and other data and products for commercial purposes outside the country of the Member running the model, unless objected to by an affected Member. Every effort should be made to co-ordinate the provision of such services prior to implementation to avoid possible harm to other Members;

Services or products whose construction would suffer significant degradation by removal of the additional or other data or products and from which the additional or other data and/or products can be retrieved easily, or their use can be identified unambiguously, should carry the same conditions on their re-distribution for commercial purposes as those additional or other data and products;

A Member receiving a request from a local client for service that it cannot fulfil may seek assistance from another Member with the capacity to provide it. Where appropriate to enhance free and unrestricted exchange of data and products among EuroGOOS Members, the service should as far as possible be made available through the offices of the Member of the country within which the client is located;

Similarly, unless other arrangements have been agreed to, a Member receiving a request to provide service in another country should refer the request back to the Member in that country. In the event that the local Member in unable to provide the service far lack of facilities or other legitimate reasons, the external Member may seek to establish a collaborative arrangement with the local Member to provide the service;

Where the service originated by one Member is likely to affect other Members, the Member originating the service should seek, well in advance, and take into account the response of the affected Members, to the extent possible;

Members should, to the extent possible, refrain from using basic data and products received from other Members in ways which jeopardise the performance of the public responsibilities of the originating Members within their own countries. If a Member finds that, in the undertaking of its public interest responsibilities it is affected by a public or private organisation in another country, it may warn the Member in the country from which the organisation is deriving the data and products. The latter Member should consider measures to mitigate these adverse effects and take those actions appropriate under its national laws;

Members with experience in commercial activities should make their expertise available, on request, to other Members;

In implementing these guidelines, Members should take into account and, as far as possible, respect the different legal, administrative, and funding frameworks which govern the practices of other counties or group of countries forming a single economic group. Members should, in particular, note that other Members will be bound by their own national laws and regulations regarding any trade restrictive practices. Furthermore, where a group of countries form a single economic group, the internal laws and regulations appropriate to that group shall, for all internal group activities, take precedence over any conflicting guidelines.

Annex 3 to the EuroGOOS Data Policy and Practices

Guidelines for the relations between Members of EuroGOOS
and the commercial sector

Purpose

The purpose of these guidelines is to improve the relationship between Members and the commercial sector. The development of the exchange of oceanographic and related information depends greatly upon sound, fair, transparent, and stable relations between these two sectors.

Guidelines

These guidelines apply to the commercial sector engaged in oceanographic activities, which includes government organisations engaged in commercial activities in order to enhance the relationship between the two sectors:

1. In the common interest, the commercial sector is urged to respect the international data exchange principles;

2. The commercial sector is urged to recognise and acknowledge the essential contribution of EuroGOOS Members to the activities of the commercial sector. EuroGOOS Members and the commercial sector are urged to recognise the interdependence and mutual benefit possible from co-operative interaction;

3. In case where a Member were to consider itself affected by the commercial sector's use of data originated in its own country, all parties involved shall undertake negotiations to achieve appropriate and satisfactory agreements;

4. Unless authorised to do so by the relevant Member or by official originators of oceanographic or environmental warnings and forecasts relevant to rescue operations and safety of life at sea, commercial sector providers of oceanographic services should not publicly issue oceanographic or environmental warnings and forecasts relevant to rescue operations and safety of life at sea in the country or maritime area where they operate. Oceanographic or environmental warnings and forecasts relevant to rescue operations and safety of life at sea publicly issued by the commercial sector should be consistent with those originated by official originators in the course of the performance of their public service responsibilities;

5. In providing services, the commercial sector should be encouraged to employ Oceanographic terminology consistent with established national and international practice;

6. Commercial sector providers of oceanographic services should respect the sovereignty and rules and regulations of the countries in which they deliver services;

7. Members are encouraged to discuss with their countries' oceanographic community and their professional societies the issues associated with the international activities of the commercial sector;

8. Members are encouraged to collaborate with their countries commercial sector and their professional societies to maximise the use of oceanographic information within their country.

Annex 4 to the EuroGOOS Data Policy and Practices

Definitions in the policy, practice and guidelines

1. *Free and unrestricted* means non-discriminatory and without charge.

2. *Without charge*, in the context of this document, means at no more than the cost of reproduction and delivery, without charge for the information.

3. *Data* means all meteorological, oceanographic, hydrological and environmental observations obtained by Members of EuroGOOS.

4. *Products* means all information that results from the transformation or processing of data in the form of pictures, charts, text, or data files embodies substantial know-how, is considered to require oceanographic know-how to be interpreted, and has been prepared to meet the requirements of a Member of EuroGOOS.

5. *Essential data and products* means data defined as such in Annex 1.

6. *Additional data and products* means data defined as such by annexes to this document and in the EuroGOOS Data Catalogue.

7. *Other data and products* means data defined as such by annexes to this document and in the EuroGOOS Data Catalogue.

8. *Oceanographic and related data and products* means: all measurements of the state of the sea, the sea water, chemistry, biology, and state of the sea floor and sediments, including temperature and salinity, sea surface temperature and waves, and the products of wave models, but excluding marine meteorological data and products.

9. *For commercial purposes* means for recompense beyond the incremental cost of reproduction and delivery.

10. *Commercial sector* means governmental or non-governmental organisations or individuals operating for commercial purposes.

11. *Re-distribution* means distribution to a third party other than the originator of the data and products.

INTERNATIONAL COUNCIL FOR SCIENCE

Principles and Responsibilities of ICSU World Data Centers

The basic principles and responsibilities of the international exchange of solar, geophysical and environmental data through the World Data Centers have carried forward under ICSU rules, essentially unchanged since the establishment of the WDC system for the IGY. The following text replaces the sections on "Principles and Responsibilities of the World Data Centers" in Part I of the Guide to the World Data Center System, dated November 1987.

1. World Data Centers are operated for the benefit of the international scientific community. WDCs in the United States are designated as WDCA, in Russia as WDC-B, in other European countries as WDC-C or WDC-C1, in Japan or India as WDC-C2, and in China as WDC-D. They are supported by national organizations according to these Principles laid down by the ICSU Panel on World Data Centres.

2. The resources required to operate WDCs are the responsibility of the host country or institution, which is expected to provide these resources on a long-term basis. If for any reason a WDC is closed, the data holdings shall be transferred to another WDC.

3. WDCs will, subject to their financial resources, accept data according to the data management plans of appropriate ICSU scientific programs or monitoring activities, and store these data safely and in good condition. WDCs may enhance their holdings by seeking and collecting related data sets. They may prepare higher-order data products such as indices of activity and collated or condensed data sets.

4. WDCs will prepare and publish catalogs of their data holdings, or otherwise make freely available information on their holdings, e.g., by electronic access.

5. WDCs will exchange data among themselves, as mutually agreed and when-ever possible without charge, to facilitate data availability, to provide back-up copies, and to aid the preparation of higher order data products.

6. No confidential or security-classified data are to be held in a WDC.

7. Data may be subject to privileged use by their originators, for a period to be agreed beforehand, and not to exceed two years from the date of acquisition by the WDC.

8. WDCs will provide data to scientists in any country free of charge, on an exchange basis or at a cost not to exceed the cost of copying and sending the requested data. Additional charges may be made for special services, or for acquiring data from outside the WDC system.

9. WDCs will accept any scientist as a visitor to work on site with data holdings held under WDC auspices.

10. WDCs will report to the ICSU Panel as requested.

Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection

This is an unofficial text. For the authoritative text of the Directive, reference should be made to the Official Journal of the European Communities of 27/3/96 no L 77 p. 20

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CHAPTER I - SCOPE

Article 1 - Scope

1. This Directive concerns the legal protection of databases in any form.
2. For the purposes of this Directive, 'database' shall mean a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means.
3. Protection under this Directive shall not apply to computer programs used in the making or operation of databases accessible by electronic means.

Article 2 - Limitations on the scope

This Directive shall apply without prejudice to Community provisions relating to:

(a) the legal protection of computer programs;

(b) rental right, lending right and certain rights related to copyright in the field of intellectual property,

(c) the term of protection of copyright and certain related rights.

CHAPTER II - COPYRIGHT

Article 3 - Object of protection

1. In accordance with this Directive, databases which, by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation shall be protected as such by copyright. No other criteria shall be applied to determine their eligibility for that protection.
2. The copyright protection of databases provided for by this Directive shall not extend to their contents and shall be without prejudice to any rights subsisting in those contents themselves.

Article 4 - Database authorship

1. The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by that legislation.
2. Where collective works are recognized by the legislation of a Member State, the economic rights shall be owned by the person holding the copyright.
3. In respect of a database created by a group of natural persons jointly, the exclusive rights shall be owned jointly.

Article 5 - Restricted acts

In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize:

(a) temporary or permanent reproduction by any means and in any form, in whole or in part;

(b) translation, adaptation, arrangement and any other alteration;

(c) any form of distribution to the public of the database or of copies thereof. The first sale in the Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;

(d) any communication, display or performance to the public;

(e) any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).

Article 6 - Exceptions to restricted acts

1. The performance by the lawful user of a database or of a copy thereof of any of the acts listed in Article 5 which is necessary for the purposes of access to the contents of the databases and normal use of the contents

by the lawful user shall not require the authorization of the author of the database. Where the lawful user is authorized to use only part of the database, this provision shall apply only to that part.

2. Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases:

(a) in the case of reproduction for private purposes of a non-electronic database;

(b) where there is use for the sole purpose of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;

(c) where there is use for the purposes of public security of for the purposes of an administrative or judicial procedure;

(d) where other exceptions to copyright which are traditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).

3. In accordance with the Berne Convention for the protection of Literary and Artistic Works, this Article may not be interpreted in such a way as to allow its application to be used in a manner which unreasonably prejudices the rightholder's legitimate interests or conflicts with normal exploitation of the database.

CHAPTER III - *SUI GENERIS* RIGHT

Article 7 - Object of protection

1. Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part evaluated qualitatively and/or quantitatively, of the contents of that database.

2. For the purposes of this Chapter:

   (a) 'extraction' shall mean the permanent or temporary transfer of all or a substantial part of the contents of a database to another medium by any means or in any form;

   (b) 're-utilization' shall mean any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line or other forms of transmission. The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community. Public lending is not an act of extraction or re-utilization.

3. The right referred to in paragraph 1 may be transferred, assigned or granted under contractual licence.

4. The right provided for in paragraph 1 shall apply irrespective of the eligibility of that database for protection by copyright or by other rights. Moreover, it shall apply irrespective of eligibility of the contents of that database for protection by copyright or by other rights. Protection of databases under the right provided for in paragraph 1 shall be without prejudice to rights existing in respect of their contents.

5. The repeated and systematic extraction and/or re-utilization of insubstantial parts of the contents of the database implying acts which conflict with a normal exploitation of that database or which unreasonably prejudice the legitimate interests of the maker of the database shall not be permitted.

Article 8 - Rights and obligations of lawful users

1. The maker of a database which is made available to the public in whatever manner may not prevent a lawful user of the database from extracting and/or re-utilizing insubstantial parts of its contents, evaluated qualitatively and/or quantitatively, for any purposes whatsoever. Where the lawful user is authorized to extract and/or re-utilize only part of the database, this paragraph shall apply only to that part.

2. A lawful user of a database which is made available to the public in whatever manner may not perform acts which conflict with normal exploitation of the database or unreasonably prejudice the legitimate interests of the maker of the database.

3. A lawful user of a database which is made available to the public in any manner may not cause prejudice to the holder of a copyright or related right in respect of the works or subject matter contained in the database.

Article 9 - Exceptions to the *sui generis* right

Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a substantial part of its contents:

(a) in the case of extraction for private purposes of the contents of a non-electronic database;

(b) in the case of extraction for the purposes of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;

(c) in the case of extraction and/or re-utilization for the purposes of public security or an administrative or judicial procedure.

Article 10 - Term of protection

1. The right provided for in Article 7 shall run from the date of completion of the making of the database. It shall expire fifteen years from the first of January of the year following the date of completion.

2. In the case of a database which is made available to the public in whatever manner before expiry of the period provided for in paragraph 1, the term of protection by that right shall expire fifteen years from the first of January of the year following the date when the database was first made available to the public.

3. Any substantial change, evaluated qualitatively or quantitatively, to the contents of a database including any substantial change resulting from the accumulation of successive additions, deletions or alterations, which would result in the database being considered to be a substantial new investment, evaluated qualitatively or quantitatively, shall qualify the database resulting from that investment for its own term of protection.

Article 11 - Beneficiaries of protection under the *sui generis* right

1. The right provided for in Article 7 shall apply to database whose makers or rightholders are nationals of a Member State or who have their habitual residence in the territory of the Community.

2. Paragraph 1 shall also apply to companies and firms formed in accordance with the law of a Member State and having their registered office, central administration or principal place of business within the Community; however, where such a company or firm has only its registered office in the territory of the Community, its operations must be genuinely linked on an ongoing basis with the economy of a Member State.

3. Agreements extending the right provided for in Article 7 to databases made in third countries and falling outside the provisions of paragraphs 1 and 2 shall be concluded by the Council acting on a proposal from the Commission. The term of any protection extended to databases by virtue of that procedure shall not exceed that available pursuant to Article 10.

CHAPTER IV - COMMON PROVISIONS

Article 12 - Remedies

Member States shall provide appropriate remedies in respect of infringements of the rights provided for in this Directive.

Article 13 - Continued application of other legal provisions

This Directive shall be without prejudice to provisions concerning in particular copyright, rights related to copyright or any other rights or obligations subsisting in the data, works or other materials incorporated into a database, patent rights, trade marks, design rights, the protection of national treasures, laws on restrictive practices and unfair competition, trade secrets, security, confidentiality, data protection and privacy, access to public documents, and the law of contract.

Article 14 - Application over time

1. Protection pursuant to this Directive as regards copyright shall also be available in respect of databases created prior to the date referred to Article 16 (1) which on that date fulfil the requirements laid down in this Directive as regards copyright protection of databases.

2. Notwithstanding paragraph 1, where a database protected under copyright arrangements in a Member State on the date of publication of this Directive does not fulfil the eligibility criteria for copyright protection laid down in Article 3 (1), this Directive shall not result in any curtailing in that Member State of the remaining term of protection afforded under those arrangements.

3. Protection pursuant to the provisions of this Directive as regards the right provided for in Article 7 shall also be available in respect of databases the making of which was completed not more than fifteen years prior to the date referred to in Article 16 (1) and which on that date fulfil the requirements laid down in Article 7.

4. The protection provided for in paragraphs 1 and 3 shall be without prejudice to any acts concluded and rights acquired before the date referred to in those paragraphs,

5. In the case of a database the making of which was completed not more than fifteen years prior to the date referred to in Article 16 (1), the term of protection by the right provided for in Article 7 shall expire fifteen years from the first of January following that date.

Article 15 - Binding nature of certain provisions

Any contractual provision contrary to Articles 6 (1) and 8 shall be null and void.

Article 16 - Final provisions

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 1 January 1998.

1. When Member States adopt these provisions, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. Member States shall communicate to the Commission the text of the provisions of domestic law which they adopt in the field governed by this Directive.

3. Not later than at the end of the third year after the date referred to in paragraph 1, and every three years thereafter, the Commission shall submit to the European Parliament, the Council and the Economic and Social Committee a report on the application of this Directive, in which, *inter alia*, on the basis of specific information supplied by the Member States, it shall examine in particular the application of the *sui generis* right, including Articles 8 and 9, and shall verify especially whether the application of this right has led to abuse of a dominant position or other interference with free competition which would justify appropriate measures being taken, including the establishment of non-voluntary licensing arrangements. Where necessary, it shall submit proposals for adjustment of this Directive in line with developments in the area of databases.

Article 17

This Directive is addressed to the Member States.

EUROPEAN UNION

Council Directive 90/313/EEC of 7 June 1990 on the freedom of access to information on the environment

390L0313 Official Journal L 158 , 23/06/1990 p. 0056 - 0058
Amendments:
Incorporated by 294A0103(70) (OJ L 001 03.01.94 p.494)
Text:
*****
COUNCIL DIRECTIVE of 7 June 1990
on the freedom of access to information on the environment (90/313/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 130s thereof,

Having regard to the proposal from the Commission (1),

Having regard to the opinion of the European Parliament (2),

Having regard to the opinion of the Economic and Social Committee (3),

Considering the principles and objectives defined by the action programmes of the European Communities on the environment of 1973 (4), 1977 (5) and 1983 (6), and more particularly the action programme of 1987 (7), which calls, in particular, for devising 'ways of improving public access to information held by environmental authorities';

Whereas the Council of the European Communities and the representatives of the Governments of the Member States, meeting within the Council, declared in their resolution of 19 October 1987 on the continuation and implementation of a European Community policy and action programme on the environment (1987 to 1992) (8) that it was important, in compliance with the respective responsibilities of the Community and the Member States, to concentrate Community action on certain priority areas, including better access to information on the environment;

Whereas the European Parliament stressed, in its opinion on the fourth action programme of the European Communities on the environment (9), that 'access to information for all must be made possible by a specific Community programme';

Whereas access to information on the environment held by public authorities will improve environmental protection;

Whereas the disparities between the laws in force in the Member States concerning access to information on the environment held by public authorities can create inequality within the Community as regards access to information and/or as regards conditions of competition;

Whereas it is necessary to guarantee to any natural or legal person throughout the Community free access to available information on the environment in written, visual, aural or data-base form held by public authorities, concerning the state of the environment, activities or measures adversely affecting, or likely so to affect the environment, and those designed to protect it;

Whereas, in certain specific and clearly defined cases, it may be justified to refuse a request for information relating to the environment;

Whereas a refusal by a public authority to forward the information requested must be justified;

Whereas it must be possible for the applicant to appeal against the public authority's decision;

Whereas access to information relating to the environment held by bodies with public responsibilities for the environment and under the control of public authorities should also be ensured

Whereas, as part of an overall strategy to disseminate information on the environment, general information should actively be provided to the public on the state of the environment;

Whereas the operation of this Directive should be subject to a review in the light of the experience gained,

HAS ADOPTED THIS DIRECTIVE:

Article 1
The object of this Directive is to ensure freedom of access to, and dissemination of, information on the environment held by public authorities and to set out the basic terms and conditions on which such information should be made available.

Article 2
For the purposes of this Directive:
(a) 'information relating to the environment' shall mean any available information in written, visual, aural or data-base form on the state of water, air, soil, fauna, flora, land and natural sites, and on activities (including those which give rise to nuisances such as noise) or measures adversely affecting, or likely so to affect these, and on activities or measures designed to protect these, including administrative measures and environmental management programmes;
(b) 'public authorities' shall mean any public administration at national, regional or local level with responsibilities, and possessing information, relating to the environment with the exception of bodies acting in a judicial or legislative capacity.

Article 3
1. Save as provided in this Article, Member States shall ensure that public authorities are required to make available information relating to the environment to any natural or legal person at his request and without his having to prove an interest.
Member States shall define the practical arrangements under which such information is effectively made available.
2. Member States may provide for a request for such information to be refused where it affects:
· the confidentiality of the proceedings of public authorities, international relations and national defence,
· public security,
· matters which are, or have been, sub judice, or under enquiry (including disciplinary enquiries), or which are the subject of preliminary investigation proceedings,
· commercial and industrial confidentiality, including intellectual property,
· the confidentiality of personal data and/or files,
· material supplied by a third party without that party being under a legal obligation to do so,
· material, the disclosure of which would make it more likely that the environment to which such material related would be damaged.
Information held by public authorities shall be supplied in part where it is possible to separate out information on items concerning the interests referred to above.
3. A request for information may be refused where it would involve the supply of unfinished documents or data or internal communications, or where the request is manifestly unreasonable or formulated in too general a manner.
4. A public authority shall respond to a person requesting information as soon as possible and at the latest within two months. The reasons for a refusal to provide the information requested must be given.

Article 4
A person who considers that his request for information has been unreasonably refused or ignored, or has been inadequately answered by a public authority, may seek a judicial or administrative review of the decision in accordance with the relevant national legal system.

Article 5
Member States may make a charge for supplying the information, but such charge may not exceed a reasonable cost.

Article 6
Member States shall take the necessary steps to ensure that information relating to the environment held by bodies with public responsibilities for the environment and under the control of public authorities is made available on the same terms and conditions as those set out in Articles 3, 4 and 5 either via the competent public authority or directly by the body itself.

Article 7
Member States shall take the necessary steps to provide general information to the public on the state of environment by such means as the periodic publication of descriptive reports.

Article 8
Four years after the date referred to in Article 9 (1), the Member States shall report to the Commission on the experience gained in the light of which the Commission shall make a report to the European Parliament and the Council together with any proposal for revision which it may consider appropriate.

Article 9
1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 1992 at the latest. They shall forthwith inform the Commission thereof.
2. Member States shall communicate to the Commission the main provisions of national law which they adopt in the field governed by this Directive.

Article 10
This Directive is addressed to the Member States.
Done at Luxembourg, 7 June 1990.
For the Council
The President
P. FLYNN
(1) OJ No C 335, 30. 12. 1988, p. 5.
(2) OJ No C 120, 16. 5. 1989, p. 231.
(3) OJ No C 139, 5. 6. 1989, p. 47.
(4) OJ No C 112, 20. 12. 1973, p. 1.
(5) OJ No C 139, 13. 6. 1977, p. 1.
(6) OJ No C 46, 17. 2. 1983, p. 1.
(7) OJ No C 70, 18. 3. 1987, p. 3.
(8) OJ No C 289, 29. 10. 1987, p. 3.
(9) OJ No C 156, 15. 6. 1987, p. 138.

End of the document

U.S. NATIONAL RESEARCH COUNCIL

ON THE FULL AND OPEN EXCHANGE OF SCIENTIFIC DATA
(Committee on Geophysical and Environmental Data, U.S. National Research Council, 1995)

NOTICE

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce Alberts is president of the National Academy of Sciences.

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The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce Alberts and Dr. Robert M. White are chairman and vice-chairman, respectively, of the National Research Council.

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Preface

A growing trend to restrict the international exchange of scientific data is an issue of considerable concern within the U.S. environmental science research community. For example, a proposal now before the World Meteorological Organization (WMO) to change the basis for the exchange of weather and climate data and information could drastically affect the way the scientific community conducts research on weather, climate, and global environmental variability and change. Recognizing the concerns of the scientific community, the State Department has requested that the National Research Council's Committee on Geophysical and Environmental Data (CGED) report on how proposed restrictions on the exchange of environmental data could affect international collaboration in programs of high priority to the United States. The CGED is charged with providing guidance to the U.S. government and World Data Centers (WDC-A)* on the management of environmental data and information from the perspective of the scientific community. Although this report focuses on data pertaining to global environmental change in general and the WMO proposal in particular, the issues discussed have relevance to all types of environmental data.

Francis Bretherton
Chair, CGED

* The WDC-A is the U.S. component of the International Council of Scientific Unions (ICSU) World Data Center system. The World Data Center system was created after the International Geophysical Year for worldwide dissemination of scientific information and is a recognized vehicle for the U.S. Global Change Research Program and international programs such as the International Geosphere-Biosphere Programme (IGBP).

Committee on Geophysical and Environmental Data

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The Committee on Geophysical and Environmental Data is a part of the NRC's Board on Earth Sciences and Resources and is overseen by the Commission on Geosciences, Environment, and Resources.

* Member, Board on Earth Sciences and Resources; Membership pending on the Committee on Geophysical and Environmental Data

Summary

To address issues of the global environment, it is essential to have a sound scientific understanding of the Earth and its constituent elements. The research required to attain that understanding vitally depends on observations and processed data on all aspects of the system and from all parts of the globe. Such research has been facilitated by an international system of full and open exchange of scientific data and information. In May 1995, however, a proposal will be considered by the Congress of the World Meteorological Organization (WMO), originating in its working group on commercialization. This proposal would restrict the availability of environmental data, information, and relevant products, seriously affecting the ability of scientists to conduct research on global- or regional-scale problems. Current international practices guaranteeing the full and open exchange of scientific data should, if anything, be expanded, not restricted.

The Need for Full and Open Exchange

The Earth's atmosphere, oceans, and biosphere form an integrated system that transcends national boundaries. To understand the elements of the system, the way they interact, and how they have changed with time, it is necessary to collect and analyze environmental data from all parts of the world. Studies of the global environment require international collaboration for many reasons:

- to address global issues, it is essential to have global data sets and products derived from these data sets;
- it is more efficient and cost-effective for each nation to share its data and information than to collect everything it needs independently; and
- the implementation of effective policies addressing issues of the global environment requires the involvement from the outset of nearly all of the nations in the world.

International programs for global change research and environmental monitoring crucially depend on the principle of full and open exchange (i.e., data and information are made available without restriction, on a non-discriminatory basis, for no more than the cost of reproduction and distribution; see Attachment 1, OECD [1994]). Commonly, observations collected for a specific, narrow purpose have had unforeseen, yet crucial application to research activities of widely differing scope and magnitude. Since it is difficult to predict what data may be important for environmental issues in the future, as much data as possible must be made available to scientists. Moreover, prompt feedback on the quality and completeness of distributed data is essential for building quality data sets of all types. The quality of remotely-sensed data, for example, is only assured through immediate use of the data; problems uncovered a year or more after the data are collected could result in extensive gaps in time-series data sets. For these reasons, an international system of full and open exchange has been and remains the best means of supporting essential environmental research.

Experience has shown that increased access to scientific data, information, and related products has often led to significant scientific discoveries and the opportunity for educational enhancement. For example, the declassification of GEOSAT (a U.S. Navy geodetic satellite) data below 30 degrees south latitude led to a breakthrough in the study of global ocean floor topography and ocean sediment thickness (Smith and Sandwell, 1994a). The researchers also produced a global sea floor topography map that is being distributed internationally through the World Data Center system (Smith and Sandwell, 1994b). An example where not only the scientific community but the general public was engaged, was the near-real-time monitoring of Shoemaker-Levy comet fragments colliding with Jupiter. Impact phenomena observed by individual scientists from around the world were shared over the Internet, allowing astronomers an unprecedented opportunity to continuously modify their plans to make the optimal observations (Kerr, 1994). A third example concerns the transmission of real-time weather information into elementary and high schools with the goal of fostering science education. A one-year pilot program organized by the American Meteorological Society was so successful in engaging teachers and students on problems ranging from science to social studies that it will be expanded to include other types of environmental information (Geer et al., 1995).

In contrast, international agreements and actions that restrict the flow of data and information limit the ability of scientists to conduct research and develop adequate predictive tools to advise their governments on global issues. Unreasonable financial charges, restrictions on further distribution -- especially when the burden of enforcement rests on individual scientists or data centers -- or undue delays in obtaining data are deleterious to scientific enterprise, particularly in economically developing countries. For example, the commercialization of Landsat put the cost of Thematic Mapper data beyond the reach of many scientists and greatly diminished data sharing with foreign countries (e.g., Gabrynowicz, 1993; Goward, 1989). An example where delays in obtaining data allowed a calibration error to go undetected for months concerns the Advanced Very High Resolution Radiometer (AVHRR) satellite. Misinterpretation of these data led to erroneous estimates of global warming (Reynolds, 1993).

The Proposal for a Change in WMO Policy

The free and unrestricted exchange[1] of weather and climate data and information under the aegis of the WMO has long been a shining example of global international scientific collaboration, to the mutual benefit of all participating nations. Studies of weather, its interannual and interdecadal variability, and its long-term trends are key to understanding climate and the underlying causes of global change. Such understanding is essential for

making effective policies that address issues of the global environment. A critical requirement for such research programs is the acquisition and assimilation of a complete spectrum of meteorological and hydrological observations, from hourly to multi-annual, with global geographical coverage at high spatial resolution. Such observations are necessary for developing and creating the requisite information products.

In order to understand climate processes, it is necessary to document the daily progression of weather on a global basis. The WMO provides a mechanism for exchanging global weather observations among its Member nations. Much of these data are collected for operational purposes, but they are also integral to climate research. Climate research is thus built scientifically, culturally, and institutionally upon a foundation provided by the weather services of the world. All participating nations, whether or not they maintain vigorous climate research programs, have an abiding interest in the equitable and effective access to raw and processed data, information, and climate and weather-related products. Developing countries rely on these products for building scientific expertise on environmental issues. Access to the products has been facilitated by the free and unrestricted exchange policy advocated by the WMO (see Attachment 2).

There is now a proposal before the WMO Congress from its working group on commercialization to replace the present principle of free and unrestricted exchange of meteorological and related data and information with a two-tiered data exchange system (WMO, 1994). Tier 1 would include a minimum list of types of data, information, and products that are available for free and unrestricted exchange, plus any data that originating countries so designate (Attachment 2). Tier 2 would include all remaining data; these are subject to restrictions to prevent their use for commercial purpose other than by the originating Member. An analysis of the reasoning behind the proposed change is given in White (1994). According to a representative of a proponent Member nation, "...such a Resolution is required in order to ensure the harmonious co-existence within the framework of WMO of Meteorological or Hydrometeorological Services (NMSs)[2] and the private sector in countries with different general policies about the funding of the infrastructure, on which all operational and research meteorology, hydrology and related environmental services depend. Currently, certain factors arising from these general policies are seriously affecting some NMSs and are leading to the breakdown of data and product exchange under WMO auspices" (Hunt, 1994). The intent of the resolution is to exempt data, information, and products for research and education programs (WMO, 1994).

In spite of this disclaimer, the CGED feels for reasons listed below that a change to a two-tiered system will result in restricted access to and degradation of data, information, and products that are crucial to global environmental research:

1. ***Since the data and information exchanged through the WMO are used for both scientific and commercial purposes, there is no satisfactory way to divide the data into categories with different restrictions.*** Governments must therefore determine whether their interests in commercialization undermine their goals of understanding and monitoring the global environment.

2. ***Individual countries have considerable freedom to decide what data and information are placed in Tier 1 (i.e., unrestricted)*** The aggregation of complete global data sets requires that all Member nations exercise this freedom in a similar manner. Given the motivation toward commercialization, it is likely that for purposes of scientific research, Tier 1 will be incomplete. According to Annex 2 to draft Resolution 11.4, there is no requirement that climatological data, high-resolution satellite data and products, and global model products are placed in Tier 1 (Attachment 3, paragraphs 3, 4, and 7). Even if Tier 1 were to include all data and information traditionally regarded as "climate," that would not be sufficient for implementing global programs like the World Climate Research Program and the International Geosphere-Biosphere Programme.

3. ***Publication of Tier 2 (i.e., restricted) data constitutes re-export under the terms of the proposal.*** According to Annex 2, paragraph 10 of the WMO proposal, "The new practice introduces no restrictions on access to, or re-export of, Tier 1 and Tier 2 data and products for research and education programmes having non-commercial purposes." Nevertheless, the nature of restrictions on Tier 2 data and information prevent publication of such data as the basis of a scientific conclusion (see Attachment 3, paragraphs 12, 13, and 15a). Dependence on proprietary data that cannot be subject to public scrutiny destroys credibility in science.

4. ***Under the same provision, such data and information cannot be made available to scientists in other countries; their aggregation into global data sets is prohibited.*** There is no credible mechanism that allows effective data sharing among scientists for research and educational purposes but precludes its use for commercial purposes.

5. ***The scientific community and data centers would have to enforce proprietary restrictions on the further distribution of Tier 2 data (see Attachment 3, paragraphs 22 and 23).*** In particular, the World Data Centers, which hold only unrestricted data, would be unable to exchange any Tier 2 data, and thus could not function as a primary means of data exchange for global environmental programs.

6. ***Restrictions on access to WMO-exchanged satellite data will make it more difficult to prevent unacceptable gaps in the climate record.*** Since satellite data and products can be placed in Tier 2 (Appendix 3, paragraph 4), there is no guarantee that the raw data will be scrutinized by the scientific user community in sufficient time to detect any degradation in data quality. Environmental research and monitoring require uninterrupted, high-quality time series data and information.

7. ***It is difficult to imagine a commercially-driven system that does not raise the cost to the scientific user community.*** With limited research budgets, the apparent price to the user has considerable impact on which data sets and products are actually utilized for research. This impact is likely to be greatest for education and small research programs, particularly in developing countries.

Conclusions

The pressing need to understand and monitor the environment has made it more important than ever for scientists to have increased access to relevant data, information, and products. WMO draft resolution 11.4 (Cg-XII) would have the opposite effect, and would set a damaging precedent for other international agreements. It is thus incumbent on the United States to take all actions necessary to foster the principle of full and open exchange.

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1. It is the understanding of the CGED that the terms "full and open exchange "and "free and unrestricted exchange" are effectively equivalent (see Attachment 2).
2. NMSs are the hydrometeorological organizations in various countries; they are presumed to represent their governments in forming and implementing WMO policy.

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Attachment 1: Reproduced from OECD (1994)

Appendix II: Scientific Data Management Policy Statements (page 139-144)

World Meteorological Organisation (WMO) Executive Council Resolution, adopted June 1990:

Requests members to reaffirm their commitment to the "free and unrestricted international exchange of basic meteorological data and products" among national meteorological services.

Houston Economic Summit of the Group of Seven Most Industrialised Nations, July 1990:

"We recognise the importance of coordinating and sharing the collection of satellite data on earth and its atmosphere. We welcome and encourage the ongoing discussions for the establishment of an International Network."

International Geosphere-Biosphere Programme (IGBP) Report No. 12 of the International Council of Scientific Unions, November 1990:

"Consequently, IGBP-DIS should have the following characteristics:

- suitable preservation of all data needed for long-term, global change research must be ensured;
- data archives must include readily accessible and comprehensive information describing data sets (metadata about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data);
- national and international agencies with responsibilities for archiving and distributing global change data should, to the greatest extent possible, use media and processing and communications systems which are consistent with internationally accepted standards and protocols;
- in those cases in which individual scientists have initial periods of exclusive data use, data should be made openly available as soon as they become widely useful;
- data should be provided at the lowest possible cost which, as a first principle, should be no more than the cost of reproduction and distribution."

Committee on Earth Observations Satellites (CEOS), Terms of Reference Amendment, adopted November 1990:

"Members must have a continuing activity in space-borne Earth observations (...) and provide non-discriminatory and full access to data which will be made available to the international community."

Scientific and Technical Statement of the Second World Climate Conference (SWCC), adopted November 1990:

"High priority must be placed on the provision and international exchange of high-quality, long-term data for climate-related studies. Data should be available at no more than the cost of reproduction and distribution. A full and open exchange of global and other data sets needed for climate-related studies is required."

Organisation for Economic Co-operation and Development (OECD), Ministerial Communiqué, adopted January 1991:

"OECD governments should strengthen their efforts to support and encourage the international science community to assess environmental risks to human health and natural ecosystems, and to promote a full and open exchange of environmental data and information."

Data Management for Global Change Research Policy Statements, U.S. Global Change Research Programme, July 1991:

"The overall purpose of these policy statements is to facilitate full and open access to quality data for global change research. They were prepared in consonance with the goal of the U.S. Global Change Research Program and represent the U.S. Government's position on the access to global change research data.

- The Global Change Research Program requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality, long-term data sets.
- Full and open sharing of the full suite of global data sets for all global change researchers is a fundamental objective.
- Preservation of all data needed for long-term global change research is required. For each and every global change data parameter, there should be at least one explicitly designated archive. Procedures and criteria for setting priorities for data acquisition, retention, and purging should be developed by participating agencies, both nationally and internationally. A clearinghouse process should be established to prevent the purging and loss of important data sets.

- Data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
- National and international standards should be used to the greatest extent possible for media and for processing and communication of global data sets.
- Data should be provided at the lowest possible cost to global change researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of filling a specific user request. Agencies should act to streamline administrative arrangements for exchanging data among researchers.
- For those programmes in which selected principal investigators have initial periods of exclusive data use, data should be made openly available as soon as they become widely useful. In each case, the funding agency should explicitly define the duration of any exclusive use period."

Agreement Establishing the Inter-American Institute for Global Change Research, May 1992:

"Article II, Objectives:
The Institute shall pursue the principles of scientific excellence, international co-operation, and of full and open exchange of scientific information, relevant to global change. In order to do so, the objectives of the Institute are to: (...)
c) foster standardization, collection, analysis and exchange of data relative to global change" (...).
Article IX, Institute Research Centers:
3. The Institute Research Centers shall, *inter alia* : (...)
b) collect data and promote the full, open, and efficient exchange of data and information between the Institute and the Parties" (...)."

Agenda 21, UN Conference on the Environment and Development (UNCED), June 1992:

"Chapter 31: The Scientific and Technological Community A. Improving communication and cooperation among the scientific and technological community and decision makers and the public
Basis for action:

31.2 The scientific and technological community and policy makers should increase their interaction in order to implement strategies for sustainable development on the basis of the best available knowledge. This implies that decision makers should provide the necessary framework for rigorous research and for full and open communication of the findings of the scientific and technological community, and develop with it ways in which research results and the concerns stemming from the findings can be communicated to decision-making bodies so as to better link scientific and technical knowledge with strategic policy and programme formulation (...)
Activities:

31.4 Governments should undertake the following activities: (...)
e) To improve and strengthen programmes for disseminating research results of universities and research institutions (...).
This requires full and open sharing of data and information among scientists and decision makers.
Chapter 35: Science for Sustainable Development D. Building up scientific capacity and capability
Activities:

35.22 The following activities should be undertaken: (...)
c) Develop and expand national scientific and technological databases, processing data in unified formats and systems, and allowing full and open access to the depository libraries of regional scientific and technological information networks. Promote submission of scientific and technological information and databases to global or regional data centres and network systems; (...)

e) Develop, strengthen and forge new partnerships among national, regional and global capacities to promote the full and open exchange of scientific and technological data and information and to facilitate technical assistance related to environmentally sound and sustainable development. This should be done through the development of mechanisms for the sharing of basic research, data and information, and the improvement and development of international networks and centres, including regional linking with national scientific databases, for research, training and monitoring. Such mechanisms should be designed so as to enhance professional cooperation among scientists in all countries and to establish strong national and regional alliances between industry and research institutions (...)."

Framework Convention on Climate Change, June 1992

"Article 4: Commitments
1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:
(...)
g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and regarding the economic and social consequences of various response strategies;
h) Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate change, and to the economic and social consequences of various response strategies (...)."

Committee on Earth Observations Satellites (CEOS) Resolution, adopted December 1992:

"...RECOGNIZING the common goal of providing data to global change researchers from all missions on a consistent basis reflecting primarily the cost of fulfilling the user request; recognizing also that the constraints of the mission operations and of available resources may require different mechanisms for data exchange/sharing to be found for different programmes:
CEOS members endorse the following principles relating to data exchange in support of global change/climate and environmental research and agree to work toward implementing them to the fullest extent possible (...).

- preservation of all data needed for long-term global change/climate and environmental research and monitoring is required;
- data archives should contain easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data;
- international standards, including those generated by the CEOS Working Group on Data, should be used to the greatest extent possible for recording/storage media and for processing and communication of data sets;
- maximising the use of satellite data is a fundamental objective. An exchange/sharing mechanism among CEOS members is an essential first step;
- non-discriminatory access to satellite data by all users for global change/climate and environmental research and monitoring is essential. This should be achieved within the framework of the exchange and sharing mechanisms set up by CEOS members;
- programmes should have no exclusive period of data use. Where the need to provide validated data is recognised, any initial period of exclusive data use should be limited and explicitly defined. The goal should be release of data in some preliminary form within three months after the start of routine data acquisition;
- criteria and priorities for data acquisition, archiving, and purging should be harmonised."

UN Intergovernmental Oceanographic Commission (IOC) Data Management Policy for Global Ocean Programmes, adopted by the IOC Assembly, March 1993:

"The overall purpose of this policy statement is to facilitate full and open access to quality ocean data for global ocean research programmes. The Global Ocean Programme to be carried out under GOOS (Global Ocean Observing System) requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility and distribution of high-quality, long-term data sets.
i) Full and open sharing of a wide spectrum of global international data sets for all ocean programmes is a fundamental objective.
ii) Data submitted for international exchange should be provided at the lowest possible cost to global ocean researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of processing, copying and shipping to fill a specific user request.
iii) Preferably, all data should be made available in the public domain of IODE [International Organisation for Data Exchange] data centers within one year of collection (chemical, biological and geological data may require longer intervals). For those global ocean programmes in which selected principal investigators have initial periods of exclusive data use, data should be made available as soon as they become widely useful or at the maximum two years after data collection.

iv) Preservation of data needed for long-term global ocean programmes is required. For each and every global ocean data parameter, there should be at least one explicitly designated archive.
v) International data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
vi) National and international standards should be used to the greatest extent possible for media and for processing and communication of global oceanographic data sets."

Intergovernmental Meeting of the World Climate Programme, Statement on the Climate Agenda, adopted April 1993:

"...the WCP (World Climate Programme) and the associated activities have:
--established concerted efforts to obtain and preserve data from the atmosphere, ocean and land surface, together with a co-ordinated international framework for the standardization and full and open exchange of such data" (...).

Global Climate Observing System (GCOS) policy on data access, January 1993:

"The Joint Scientific and Technical Committee of GCOS has begun to discuss and formulate its data policy. The following points will be important considerations in such a policy:

- Global environmental concerns, as reflected in the recommendations agreed at the UNCED, are an overriding justification for ensuring the unrestricted international exchange of GCOS data for non-commercial scientific and applications purposes.

- The GCOS requires an early and continuing commitment by participating national governments and international bodies to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality, long-term data.

- The sharing and exchange of GCOS data is a fundamental objective. Data should be provided at the lowest possible cost to users.

- Preservation of all data needed for GCOS is required; suitable archive facilities should be ensured for all GCOS data; procedures and criteria for setting priorities for data acquisition, retention, and purging should be developed and implemented by participating nations and international bodies; an international clearinghouse process should be established to prevent the purging and loss of important data.

- To the maximum extent possible, data archives must include easily accessible information about the data holdings, including long-term quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.

- International standards should be used as far as possible to acquire, process, and distribute global data.

- For those data relevant to GCOS in which selected investigators or organisations have initial periods of exclusive data use, data should be made available as soon as possible."

Attachment 2:
Reproduced from Annex 1 to the WMO draft Resolution 11.4 (Cg-XII) - New Practice for the Exchange of Meteorological and Related Data and Products

APPENDIX E (page 2-3, section A: Policy)

"**ADOPTS** the following policy on the international exchange of meteorological and related data and products:
As a fundamental principle of the World Meteorological Organization (WMO), and in consonance with the expanding requirements for its scientific and technical expertise, WMO commits itself to broadening and enhancing the free and unrestricted* international exchange of meteorological and **related data and products;**

STRESSES that the data and products exchanged among Members are essential to the provision of services in support of the protection of life and property and the well-being of all nations;

URGES Members to:

1. Strengthen their commitment to the free and unrestricted exchange of meteorological and related data and products;
2. Provide to the research and education communities free and unrestricted access to data and products for their non-commercial activities;
3. Strengthen their commitments to the WMO and ICSU (International Council of Scientific Unions) World Data Centres;"

APPENDIX E (Annex 1, page 6-7)

"Data and products required to sustain WMO Programmes should be placed in Tier 1, unless the Member originating them is reasonably certain that their re-export for commercial purposes by a receiving Member would cause harm to the originating NMS. In such cases the data and products may be placed in Tier 2.

Content of Tier 1 and Tier 2

7. Tier 1 shall include as a mandatory component:

(a) Six-hourly surface synoptic data from Regional Basic Synoptic Networks e.g. in SYNOP, BUFR or other general purpose WMO code;

(b) All available in situ observations from the marine environment e.g. in SHIP, DRIBU, BATHY, TESAC code, etc.;

(c) All available aircraft reports e.g. in ASDAR, AMDAR, AIREP code, etc.;

(d) All available data from upper air sounding networks e.g. in TEMP, PILOT, TEMP SHIP, PILOT SHIP code etc.;

(e) All reports from the network of stations recommended by the Regional Association as necessary to provide a good representation of climate e.g. in CLIMAT/CLIMAT TEMP and CLIMAT SHIP/CLIMAT TEMP SHIP code, etc.;

(f) Products distributed by WMCs and RSMCs to meet their WMO obligations, respecting paragraph 10 below;

(g) Severe weather warnings and advisories for the protection of life and property targeted upon end-users.

8. Tier 1 should also include:

(a) As many additional data as possible from the Regional Basic Synoptic Networks;

(b) Additional data required to define the state of the atmosphere at least on a scale of the order of 200 km in the horizontal and 6 to 12 hours in time;

(c) Data and products from operational meteorological satellites as agreed between WMO and satellite operators, to include those data and products necessary for operations regarding severe weather warnings and tropical cyclone warnings.

9. Noting the criterion, Tier 2 should consist of those meteorological and related data and products required to sustain WMO programmes which are not included in Tier 1.

10. Meteorological and related model products, should be classified as follows:

(a) Products whose construction adds little value to the data on which they are based, or from which the original data can easily be retrieved, should carry the same restrictions as those data;

(b) Products from global NWP models may be distributed without regard to restrictions which were attached to the original data used in the models;

(c) Products from a Member's regional NWP model employing Tier 2 data from other NMSs may be exported for commercial purposes outside the territory of the Member running the model, unless objected to by an affected Member. Considering the guidelines for relations among NMSs in Annex 3 every effort should be made to coordinate the provision of such services prior to implementation to avoid possible harm to other Members."

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* "Free and unrestricted" means non-discriminatory and without charge [Res. 23 (EC-XLII)]. "Without charge", in the context of Resolution 11.4 (Cg-XII) means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.

Attachment 3

Reproduced from Annex 2 to the WMO draft Resolution 11.4 (Cg-XII) - Explanatory Comments for Implementing the New Practice

The following explanations of the new WMO practice for the international exchange of meteorological and related data and products are provided to assist in understanding how the practice will be applied.

Categorizing particular data types and products under Tier 1 and 2

In conjunction with the Guidelines for Members to Use in Defining Tiers 1 and 2, the following policy will apply to marine data, aviation data, climatological data, satellite data and products, and regional model products.

Marine data

1. The majority of marine data which are distributed internationally among Members to sustain their WMO Programme activities will be exchanged as Tier 1 data, including observations provided by the voluntary observing ships and data and products required in support of the International Convention for the Safety of Life at Sea (SOLAS). In developing the specifics of the basic minimum sets for Tier 1 and Tier 2, WMO will review, with the International Maritime Organization (IMO) the requirements for meteorological data and products for the purpose of aiding navigation.

Aircraft reports and aeronautical information

2. Increasing amounts of data are being generated by the aviation community in the form of aircraft reports (e.g. AIREPS) which are of value to meteorology generally and NWP in particular. These data have been identified as mandatory Tier 1 data because their re-export for commercial purpose is unlikely to cause harm to the Member arranging for their collection. Aeronautical information such as OPMET data and products, comprising METARs, TAFs and WAFS products, generated specifically to serve the needs of aviation, have been excluded from the proposed new practice because they are controlled under the Convention on International Civil Aviation (Chicago 1994). Nevertheless, WMO will continue to liaise with ICAO to encourage as much compatibility as possible with the WMO new practice.

Climatological data

3. Climatological data and products will be treated the same as other meteorological data and products. That is, Members' requirements will be identified as part of the technical commissions' activities, and Members, considering the guidelines approved by Congress and Articles 4 and 5 of the United Nations Framework Convention on Climate Change, will classify the exchanged information as Tier 1 or Tier 2.

Satellite data and products

4. Members requirements for satellite data and products, including high resolution data, multispectral imagery, etc., will be identified by the technical commissions. Following approval by Congress of the new practice and guidelines, NMSs will classify the information that it distributes as Tier 1 or Tier 2. International organizations made up of Members which operate meteorological satellites and distribute their data and products to other WMO Members, will be requested to examine their organizations' policies regarding the distribution, with a view to aligning their policies with WMO practice. Formal discussions between these organizations and WMO to this end may take place.

Global model products

5. By their nature, global models are general purpose tools designed to provide a uniform service everywhere;

6. Any model represents a substantial investment of human and material resources and its outputs are expected to add considerable value to the basic data which were used to initialise it. It is expected that most of the data used in large scale general purpose model will be exchanged as Tier 1, but there is no intention to exclude Tier 2 data from any model;

7. In most cases, the impact on model outputs of any individual data element is expected to be small. Therefore, the original tiering of the data should not automatically carry through to model products. The circumstance should be avoided whereby the originator of a single Tier 2 data element could demand that it not be used in a general purpose global model without making all its model products Tier 2;

Regional model products

8. Regional models provide products for limited geographical areas with accuracy normally higher than those from global models. The products from such models are exchanged between Members to fulfill agreed requirements.

Distribution, use, export and re-export of data and products

Improved data availability under the new practice

9. An objective of the new practice is that the combined exchange of Tier 1 and Tier 2 data and products among Members, which by definition will be exchanged free of charge, will exceed the volume of information currently being exchanged. It is hoped that this increase in the exchange of data and products will come about by:

(a) Providing a framework for the distribution which addresses NMSs concerns about the redistribution and use of the information;
(b) Permitting information previously withdrawn from the GTS to be returned;
(c) Increasing Members' awareness of existing sets which may be of potential interest.

Data and products for research and education programmes

10. The new practice introduces no restrictions on access to, or re-export of, Tier 1 and Tier 2 data and products for research and education programmes having non-commercial purposes. Tier 1 and Tier 2 data and products will be available to the research and education communities for no more than the cost of reproduction and delivery. Members should encourage their research organizations to make their operationally useful data available in a timely manner.

European Centre for Medium Range Weather Forecasts (ECMWF) and European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) products on the Global Telecommunication System (GTS)

11. The new practice accommodates the current agreement between WMO and ECMWF for the distribution of ECMWF products on the GTS with no negative impacts anticipated. Following acceptance of the proposed new practice by Congress, formal discussions will be initiated to address any outstanding issues between WMO and EUMETSAT, ECMWF and other international organizations made up of WMO Members, which distribute their data and products to WMO Members.

Data from WMO Centres

12. For those designated Data Centres which operate in accordance with WMO resolutions, the new practice will introduce no restrictions on their distribution of Tier 1 and Tier 2 data and products for research and education programmes having non-commercial purposes, nor is the modality of access to the WMO Data Centres expected to change. The question of policy implications of the new practice on data archives will be explored further at a later stage in consultation with Members and user communities including other classes of data centres, ICSU World Data Centres being the foremost.

Commercial use and/or re-export of Tier 2 data and products

13. Within a receiving Member's territory, the proposed new practice does not restrict the commercial use of any Tier 1 and/or Tier 2 information received or originated by the NMS, either by the private sector, by government organization operating commercially or by the NMS. The new practice does restrict direct or indirect re-exports of Tier 2 information for commercial purposes by a receiving Member.

14. The export for commercial purposes of Tier 2 data by their originator or by any intermediate organization is not restricted by the new practice. The NMS undertaking the export should consider the impacts of the export on any other affected NMS within the context of the Guidelines for Relations among NMSs Regarding Commercial Activities, as set out in Annex 3.

Decisions based on Tier 2 data and products

15. The intent of the restriction on re-exporting Tier 2 data and products is that decisions based on Tier 2 information should be subject to the same restriction as for products in the Guidelines for Members to Use in Defining Tiers 1 and 2, i.e.:

(a) Products whose construction adds little value to the data on which they are based, or from which the original data or products can be easily retrieved should carry the same restrictions as the original data or products on which they are based;
(b) Products from a Member's regional model employing Tier 2 data from other NMSs may be exported for commercial purposes outside the territory of the Member running the model, unless objected to by an affected member. Every effort should be made to coordinate the provision of such services prior to implementation to avoid possible harm to other Members.

GTS consideration

16. Considering the configuration of the GTS, the project of the EC Working Group on the Commercialization of Meteorological and Hydrological Services to develop and test guidelines for the proposed new practice will provide the first opportunity to assess the need for change. The project may conclude that further study of

specific issues is required. In this case, an appropriate recommendation will be made to the Executive Council requesting the Commission for Basic Systems to carry these out and to examine options for any modifications to the structure and/or procedures of the GTS, and their cost implications. At present, it would appear that:

(a) The HF radio broadcast systems used by Members for distributing GTS data and products to other Member will be [text missing].

(b) The use of satellite transmissions for GTS data and products may require control procedures, such as encryption of the information to ensure appropriate security.

Functioning of the private sector and government organizations operating commercially under the new practice.

17. The new practice places no constraints on:

(a) Private sector or government organizations operating commercially based in the country or territory of one Member operating within the country or territory of another Member. However, all NMSs will encourage such organizations in their countries or territories to respect the Guidelines in Relations between NMSs and the Private Sector, as set out in Annex 4. Furthermore, such organizations may wish to obtain from the originating Member any Tier 2 data or products which are necessary to provide the services required;

(b) A purchase by an organization within country A of country B's Tier 2 data and products (from either country B or country A) for commercial activity within country A. Commercial activities operate under the laws of the Members' countries or territories. Therefore, countries B and A are free to decide on the sale and/or purchase within their own legal frameworks. If problems arise between the NMSs, they should be addressed within the context of the Guidelines for Relations among NMSs Regarding Commercial Activities, as set out in Annex 3.

Commercial activities of NMSs

18. The private sector, government organizations operating commercially and NMSs have access to Tier 1 and Tier 2 data and products as decided by the Member. Members will do their utmost to ensure that the restriction placed on the use of Tier 2 data and products by the new practice is respected by their NMSs and by all organizations given access to them within their territories or abroad following a legitimate re-export. Government organizations operating commercially enjoy the same rights and responsibilities as the private sector and, in particular, as concerns the guidelines set out in Annex 4.

19. Regarding groups of NMSs wishing to establish themselves in economic consortia, WMO's role is neither to encourage nor to discourage Members' commercial activities The Secretariat should keep Members informed of NMHSs' activities in forming and operating such associations.

Relations among NMSs resulting from commercial activities

20. The traditional exchange of services and the transfer to technologies between NMSs on a "no charge", "donation", "technical co-operation" or "incremental cost" basis (e.g. software, training, apprenticeships, surplus equipment) continue to be important WMO activities in the interests of all Members:

(a) To develop the capabilities of Members;

(b) To further the applications of meteorology within Member countries;

(c) To carry out the WMO Programmes;

(d) To enable capacity building in response to Agenda 21 and the UN Framework Convention on Climate Change.

Members are encouraged to maintain and to augment agreements whereby these free exchanges and transfers take place, particularly those Services to lesser developed Services. Formal commitments excepting lesser developed Services from commercial recovery of costs will be strongly encouraged.

21. NMSs undertaking commercial activities within the territories of other Members will do so in a manner which is consistent with the practice and with its restriction on re-export of Tier 2 data and products. Furthermore, the Guidelines for Relations among NMSs Regarding Commercial Activities given in Annex 3, will be observed, i.e., ***where the service originated by one NMS is likely to affect other Members (e.g. in the provision of regional broadcasts of meteorological information or the wide distribution of seasonal or climate forecasts), the NMS originating the service should seek, well in advance, and take into account the response of the NMSs of the affected Members, to the extent possible***; Furthermore, NMSs will consider the legal and administrative frameworks which govern the operations of the NMSs and the applicable laws and regulations regarding trade and service restrictive practices before undertaking commercial activities within the territories of other Members.

Enforcing the restriction on the use of Tier 2 data and products

22. All Members shall do their utmost to implement the decision (Article 9 (a), WMO Convention).

23. Members assume the responsibility for enforcing the restrictions attached to re-exporting Tier 2 information or exporting products based on Tier 2 information. Should problems develop regarding the export of decisions based on Tier 2 data and/or products, consultations should be undertaken among the Members affected.

History of Database Protection:
Legal Issues of Concern to the Scientific Community

Anne Linn[7]

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(National Academy Press: http://www.nap.edu/readingroom/books/exch/exch.html)

SUMMARY

At the instigation of the publishing industry and international information conglomerates, new database protections are being considered in the United States and abroad. In fact, a strong new right for database owners is already being implemented in the 18 countries of the European Economic Area. The EU Database Directive directs member countries to enact laws preventing unauthorized use of more than insubstantial portions of a database for 15 years after the database was produced. (In some countries, scientists and teachers are permitted to use substantial parts of databases as long as their activities are not commercial in nature.) In response to these factors, several bills have been introduced in Congress and an international treaty has been put forward in the United Nations' World Intellectual Property Organization. Because of strong coordinated opposition from scientific and library organizations, none of these efforts have succeeded to date and Europe is the only region in the world with these new protections.

New database protections, however, are supported by both houses of Congress and the administration, so legislation will likely pass this year in the United States. (Two bills are currently pending in the House.) If it does, the World Intellectual Property Organization will likely resume work on a global treaty. In the absence of U.S. opposition, such a treaty could pass, resulting in new database protection in 171 countries. The U.S. legislation currently being considered is somewhat different in design from the EU Database Directive, but the impact on science and education would be similar. Unless substantial modifications are made, it could lead to a more restricted environment for data collection, exchange, and use. In particular, enactment of U.S. database legislation under discussion could have the following impacts:

- reduce the amount of data that can be obtained, particularly from the private sector or public-private partnerships, an increasingly important source of data;
- increase the cost of obtaining data, particularly from database owners with a monopoly on the data;
- restrict access to data for at least 15 years from the time the database was created;
- discourage the transformation of existing databases into new ones, creating artificial gaps in data availability;
- prevent the use of data for purposes other than which it was collected, minimizing the scientific and societal value of the original data; and
- increase restrictions on the use of compilations of all kinds, including works of authorship (e.g., collection of articles) not normally considered to be databases.

Further restrictions on the acquisition and use of data are likely to be placed on researchers by risk-adverse universities and government agencies seeking to avoid the possibility of costly litigation. The net result is that a legal culture would be created which encourages commercial exploitation at the expense of the public domain.

DATABASE PROTECTION IN THE UNITED STATES AND EUROPE

What are the Drivers?

Databases are protected against piracy through a combination of legal and technical means—primarily copyright and contract, but also patent, trademark, trade secrets, and encryption. This legal and technical environment, however, has changed significantly in recent years because of the following factors:

- digital environment—individuals can now copy and distribute publications and large amounts of data at little cost or effort;
- U.S. Supreme Court *Feist* decision and similar decisions in European high courts—restated copyright law principle denying protection to databases produced by *sweat of the brow* (i.e., databases created with large amounts of money, effort, or labor) but without creativity; and

[7] This background paper expresses the views of the author and not necessarily those of the National Academies or the National Research Council. Please send comments to alinn@nas.edu.

- European Database Directive—provides 15 years of protection for the contents of the database and each significant update, and permits database owners to prevent the use of substantial parts of the database. The directive also has a reciprocity clause which states that only countries which offer similar protections to EU nationals will receive this new level of protection within the European Economic Area.

Notwithstanding the *Feist* decision, most databases are protected by copyright, which protects the creative elements of a database—the selection, coordination, and arrangement of the information—although not the facts themselves. For example, the yellow pages are protected by copyright because the organization of information, use of boxes, colors, etc., required thought and creativity. On the other hand, the white pages are a simple alphabetical listing, which is *not* protected by copyright. Most databases used by scientists either fall under copyright law or are in the public domain and available to all. (By law, the U.S. federal government cannot copyright databases, although private vendors disseminating government information can.) Scientists can generally use copyrighted material because of a fair use exception in the United States or equivalent exemptions in Europe (see Box 1).

Box 1. Fair Use Exceptions in U.S. Copyright Law
Fair use is a bedrock principle that reconciles the Copyright Act's grant of exclusive rights to authors and the First Amendment's constitutional guarantee of free speech. Under copyright, certain public purposes including "criticism, comment, news reporting, teaching, scholarship, or research" are permitted.

U.S. courts consider four factors for determining whether the fair use exception is allowable:

- the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
- the nature of the copyrighted work;
- the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- the effect of the use on the potential market for or value of the copyrighted work (most heavily weighted factor).

Decades of court interpretations define what is meant by fair use today. A fair use exception is most likely to be granted under the following conditions:

- the use is for non-commercial purposes;
- the original work was inexpensive to produce and/or distribute;
- a relatively small amount of the original work is used;
- the portion used is transformed, not merely copied; and
- the economic impact is insignificant.

It is important to note that the level of protection offered by copyright is thin compared with the new additional protection offered by the EU Database Directive or proposed U.S. legislation. Even without such additional protection, however, other legal means (e.g., contract) and technical devices (e.g., encryption) can be used by database producers to maintain control over unauthorized use of a database. A contract is a two-party agreement, the terms of which are specified by the individuals involved. It can be used to prevent unauthorized uses of a database by the parties to the agreement. This form of protection has some limitations, including (1) a high administrative burden of negotiating terms with each user and provider of data, particularly for databases compiled from several sources, and (2) they cannot prevent unauthorized downstream uses of the database because they are only binding on the parties to the agreement. Downstream uses of databases can be controlled through encryption, although such measures can be expensive or cumbersome to implement.

In general, the existing legal regime of copyright plus contract protects databases produced and distributed within the United States. U.S. databases distributed in Europe will also receive copyright and contract protection, but not the stronger legal protections of the EU Database Directive. Because of the reciprocity features of the EU Database Directive, unless similar legislation in enacted in the United States, U.S. databases could theoretically be at a competitive disadvantage in Europe, where they may be susceptible to unauthorized uses.

EU Database Directive

The EU Database Directive was created to harmonize the intellectual property laws regarding databases of the 18 countries of the European Economic Area (EEA) by supplementing copyright to protect databases produced by sweat of the brow. The Directive was passed in March 1996 and member nations were responsible for implementing it by January 1998, although only nine countries have implemented it so far (see Table 1 below). The Directive creates a new kind of intellectual property protection (a *sui generis* right, which means of its own kind) for databases produced in the EEA. Under the Directive, database producers can prohibit use of more than an insubstantial part of the database. The term of protection is 15 years, but each time the database is updated significantly, the entire database (not just the updated parts) receives another 15 years of protection. Consequently, active databases apparently can be protected in perpetuity.

Member countries are permitted to designate exceptions and limitations in their implementing legislation, as long as the exceptions do not conflict with the normal exploitation of the database. (Anyone may use insubstantial parts of the database for any purpose.) Most countries which have implemented the directive have granted exceptions for science and education as long as these activities do not serve a commercial purpose (Table 1). (France does not permit any exceptions.) This is a narrower exception than that granted in copyright. In addition, many EU countries have freedom of information acts, which provide for access to government data, but it is not clear whether they can be overridden by the Database Directive. Moreover, freedom of information acts do not include data collected or disseminated by state-owned companies operating under market conditions without a public service obligation. Finally, basic principles of European law may in some cases constrain the ability of database makers from exercising monopoly control over information protected by the Database Directive.

The European Commission is supposed to review the impact of the Database Directive in 2001. As input, member nations will report on whether the *sui generis* right has decreased competition. If so, non-voluntary licensing agreements may be imposed on database producers to increase user access.

Table 1. Implementation of EU Database Directive

EEA Country	Date Implemented	Exceptions for Science and Education
Implemented		
Austria	January 1, 1998	Substantial use permitted for scientific purposes without the intention of commercial exploitation; data can be published if source is acknowledged
Belgium	September 1, 1998	Not available in English
Denmark	July 1, 1998	Not available in English
Finland	April 4, 1998	Not available in English
France	June 16, 1998	No exceptions for science or education
Germany	January 1, 1998	Substantial use permitted for private purposes, teaching in non-commercial institutions, and scientific purposes to the extent that copying is necessary and does not serve commercial purposes; data can be published if source is acknowledged
Spain	April 1, 1998	Not available in English
Sweden	January 1, 1998	Not available in English
United Kingdom	January 1, 1998	Substantial use permitted for purposes of illustration in teaching and research, as long as the purpose is non-commercial and the source is indicated [data publication is not explicitly permitted]; public records are also exempt
Not implemented	(as of June 1999)	
Greece		
Ireland		
Italy		
Luxembourg		
The Netherlands		
Portugal		

EEA Country	Date Implemented	Exceptions for Science and Education
Unknown		
Iceland		
Norway		
Liechtenstein		

History of U.S. Database Legislation

In recent years, four database bills have been introduced in Congress, although none have become law. The key provisions of the failed bills are summarized in Box 2. The first U.S. database bill (HR 3531) was introduced in the House in 1996 and was modeled after the EU Database Directive, except that the term of protection was 25 years, instead of 15 years. Like the EU Database Directive, there were no exceptions for fair use or for government data. The bill also imposed potentially severe criminal penalties. These provisions alarmed the scientific and library communities, which sent letters to Representative Moorhead expressing their concerns and asking for a period of public debate. Supporters of the legislation were surprised by such strong opposition and the bill was not brought to a vote.

A year later, the second database bill (HR 2652) was introduced in the House. HR 2652 was slightly more science-friendly than the previous bill, but users were still forbidden to use more than insubstantial parts of a database, and they would be punished if their actions resulted in economic harm to the database producer. Given the high cost of some data sets (e.g., a single synthetic aperture radar scene costs $1,600), economic harm would be easy to prove. HR 2652 also permitted exceptions for government data and for scientific uses, but the exceptions did not apply if a *potential* market might be harmed or if the data were collected by public-private partnerships (e.g., SeaWiFS), an increasingly important method of data collection. A hypothetical example of the impact of HR 2652 on genetic research is given in Box 3.

Box 2. Key Provisions of Failed U.S. Database Bills

1996 HR 3531 (Moorhead)—*sui generis* approach (creates a new property right)

- 25 year term of protection
- criminal penalties
- no fair use exceptions
- no exception for government data

1997 HR 2652 (Coble)—"so called" misappropriation approach (harm triggers liability)

- 15 year term of protection
- no criminal penalties to non-profits
- exception for non-profit science unless harm to *potential* markets
- exception for government data unless overridden by contract or collected by public-private partnership

Hearings on HR 2652 were held, but the invited scientists failed to make their case and the bill passed the House unopposed. The bill was subsequently folded into a House copyright bill, which also passed, then moved into House-Senate conference. Up to this point, the strategy of database opponents—a loose coalition of scientific groups, libraries, telecommunication companies, Internet service providers, and value-added database producers—was to question the need for additional database protections, given the absence of documented cases of database piracy and the likely harm to science and education. With the arrival of the copyright/database bill in conference committee, opponents began drafting alternate language for a database bill. A compromise could not be reached and the database provisions were ultimately thrown out. (The copyright provisions passed subsequently and are now law.)

Box 3. Hypothetical Example Illustrating Pitfalls of HR 2652

Advanced Genetic Data (AGD) has compiled data on variation in human DNA sequences and sells access to these data to pharmaceutical firms and other biotechnical customers. The company made a considerable investment to compile the database from their research and from publicly available databases.

Dr. Susan Jones is a molecular geneticist funded by NIH. She has developed a software application that detects whether DNA samples contain members of a library of biologically significant target sequences. The sequence library is stored in a database that is a component of Dr. Jones's application. Dr. Jones compiled her library from various sources, including sequences purchased from the AGD database. After the publication of her work, she shared her application, including the sequence library, with colleagues working on similar problems.

At about the same time, AGD tripled the price of accessing the data set. AGD also filed suit against Dr. Jones, stating that by sharing AGD's sequence with colleagues, she has harmed their market for the data themselves and the software application embodying the data that AGD had planned to develop.

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SOURCE: Gardner, W. and J. Rosenbaum, 1998, Database Protection and Access to Information. *Science*, vol. 281, p. 786-787)

Potential Consequences to Science

By turning data into a commodity, the database protections in force or currently being considered will likely exacerbate problems U.S. researchers are having with existing commercialization policies in other countries. Organizations with commercialization policies rely on contract law to restrict the use of data to approved individuals and/or for specific purposes. Such contracts commonly prohibit normal scientific practices, such as sharing the data with colleagues, publishing the data in scientific journals, or using the data to address several different scientific problems. Contracts can also be written to override fair use exceptions in most cases.

With the passage of the EU Database Directive, European commercial database producers and privatized government agencies have a new tool for restricting data use. However, the directive does not permit the exceptions for science and education to be overridden by contract. In this sense, the EU Database Directive is more science friendly than U.S. database bills considered thus far, none of which have imposed limits on contract. Thus, any fair use exception in U.S. database legislation could be overridden by means of contract law.

If database legislation passes in the United States, it will likely have exceptions for government data. Consequently, as long as scientists and teachers obtain their data directly from the U.S. government, the proposed database legislation may have little impact on their activities. However, the role of the U.S. government in collecting and disseminating information is changing in the following ways:

- the number of public-private partnerships is growing;
- federal agencies are going out of the data collection business and are increasingly willing to buy data for scientific purposes from commercial vendors; and
- the private sector is becoming increasing involved in disseminating government data.

These changes are partly a result of declining budgets, which force agencies to look for partners to share costs, and partly a result of new legislation and regulations aimed at reducing competition with the private sector. For example, the Commercial Space Act of 1997 encourages NASA to purchase data collection and dissemination services from the private sector. NASA has already taken advantage of a commercial partner when it teamed with Orbital Sciences Corporation to launch SeaWiFS, an ocean color sensor of interest to the fishing and shipping industries, as well as to oceanographers and global change researchers. Similarly, NOAA has announced that it will no longer allow the data collection systems on its geostationary and polar-orbiting satellites to be used where there are commercial space-based services available that meet the user's requirements.

The increasing involvement of the private sector in scientific data collection and dissemination has two ramifications for science: (1) the resulting data are eligible for copyright and database protections not available to government data sets, and (2) a market for scientific data is developed. The first is important because less data could enter the public domain, thereby increasing the cost of obtaining data and/or restrictions on its use. The second is important because the argument is circular: where scientific data is concerned, researchers form

the commercial market and are therefore ineligible for a fair use exception. (Scientists working at commercial institutions would not be eligible for a fair use exception in any case, even if their research is not directed toward the development of a commercially competitive product.) Thus, researchers freely sharing data and applications could reduce the profits of a data vendor and draw a lawsuit (see Box 3). Even the threat of such lawsuits could undermine the principles of sharing data for the benefit of the community and seeking rewards from publication and attribution. In the long run, selling data to scientists may not prove to be a viable commercial strategy, but as Landsat showed, such commercialization experiments can cause significant setbacks to science.

In addition to these long-term changes to the public domain, passage of the proposed database legislation could have an immediate impact on scientific practice, particularly for basic research with commercial applications. Table 2 compares scientific practices that are permitted under copyright and the database protections of HR 2652. If database legislation passes, scientists and other users would have to conform to both copyright (which protects the creative elements) and database protection (which protects the facts themselves) provisions.

Table 2. Scientific Practices Under Copyright and Database Protection*

Practices Permitted Under Copyright	Practices Permitted Under HR 2652
• use *all* of the factual data in a database, regardless of the amount or age of data being used, as long as the creative elements (i.e., selection, arrangement) are not directly or indirectly reproduced	• use *insubstantial* amounts of factual data in a database; • use *all* of the factual data in a database as long as the data are more than 15 years old; or • use *all* of the factual data in a database as long as all the following conditions are met: (1) the purpose is justified for teaching or research, (2) the individual is at a nonprofit institution, and (3) the action does not harm the market
• use the creative elements of a database for public purposes such as teaching, scholarship, or research, subject to the fair use doctrine	• same as above—database laws don't distinguish between factual data and creative elements
• recreating an entire database is prohibited (if it can't be done without reproducing the creative elements), even if original sources were used	• recreate an existing database using data from the original sources
• combine the factual data with other data into a new database without permission or additional payment to the originators	• combine the factual data with other data into a new database as long as permission is obtained and/or payment is made to the originators
• purchase a book or article, then lend it to a colleague	• purchase access to a database and lend the data to a colleague as long as doing so did not result in potential lost sales
• borrow a book or article from a library, use it for virtually any purpose, and make a copy of it for scholarly purposes	• borrow a database from a library as long as it is used for scholarly purposes

*Note: these practices may also be subject to contractual provisions.

Current Status of Database Legislation in the United States

Database producers, Congress, and the White House have all agreed that additional database protections are needed. Thus, database legislation may be inevitable, and may even be passed during this session of Congress. The White House has identified five principles for database legislation:

- the language should be simple, minimalist, and clear;
- there must be exceptions for government data;
- prohibited activities should be clearly defined to avoid unintended consequences;
- fair use exceptions similar to copyright should be included; and
- U.S. databases should receive the same protections in other countries as databases produced in those countries (i.e., satisfy the reciprocity clause of the EU Database Directive).

Two database bills—HR 354 and HR 1858—are currently pending in the House of Representatives. Each takes a different approach to prevent unfair competition in the form of parasitic copying of databases (Box 4), and would have very different consequences for science and education. HR 354 was introduced in the House Judiciary Committee by Coble in January 1999. It is oriented toward database *producers* and prohibits uses which could harm the primary or related market of the database. On the other hand, HR 1858, which was introduced in the House Commerce Committee by Bliley in May 1999, is more oriented toward database *users*. HR 1858 allows all uses of databases, except commercial uses meant to compete directly with the original database.

HR 1858 has a broader range of exceptions than HR 354. For example, both bills exclude government data from protection, but HR 1858 also excludes individual ideas, facts, principles, preexisting databases, and works of authorship. Both bills contain fair use exceptions, but HR 354 permits only non-profit uses, and only if they do not result in market harm. HR 1858 permits all scientific and educational uses, including those in the private sector, as long as the database is not used for purposes of direct commercial competition. In addition, systematic or repeated use of a database is permitted under HR 1858, but not under HR 354. For these reasons, HR 1858 is supported by scientific organizations, libraries, value-added database producers, Internet service providers, and telecommunications companies. However, the bill may not satisfy the reciprocity clause of the EU Database Directive.

Both bills have been marked up and are awaiting action in the House. However, HR 354 has more than three times as many supporters as HR 1858 and will likely be the first (if not only) bill to be voted on in the House. To date, there is no corresponding bill in the Senate.

The following advice was voiced by Judge Edward Damich, a former Hatch staffer who worked on database legislation:

> *The scientific community has done an impressive job of getting organized over the past five years. Their main strengths are (1) no one in Congress wants to be against science and education, and (2) there is widespread recognition that science underpins the economy. On the other hand, scientists tend to be uncompromising and risk being excluded from debate. If the science community wants to play a role in the database issue, it should (1) make the case for science, (2) know what compromises it can live with (and be ready to compromise); and (3) come to the negotiating table with specific language for the bill.*

Scientists have begun to heed Damich's advice by helping to draft alternate language for current and past database bills and supporting HR 1858.

Box 4. Key Provisions of Current U.S. Database Bills

HR 354 (Coble)—*so called* misappropriation approach

- broad prohibition of database uses, with narrow exceptions
- 15 year term of protection, with no extension for later updates
- no criminal penalties to non-profits, and reduced or eliminated monetary damages
- exception for non-profit science unless *material* harm to *primary* markets
- exception for government data unless overridden by contract

HR 1858 (Bliley)—*targeted antipiracy* approach

- most database uses are permitted, except those meant to compete commercially
- no term of protection
- no criminal penalties to *anyone*
- exception for science unless the purpose of use is direct commercial competition with the database producer or avoiding payment of reasonable fees
- exception for government data unless overridden by contract
- limitations on database monopolies

GLOBAL DATABASE ISSUES

The World Intellectual Property Organization (WIPO) has been considering database protection since 1996. WIPO is a specialized agency of the United Nations and is responsible for the promotion and protection of intellectual property throughout the world through cooperation and treaties among its 171 member nations. The U.S. Patent and Trademark Office (Department of Commerce) heads the U.S. delegation to WIPO.

Database action in WIPO began in December 1996, when delegations from the European Union and the United States introduced a treaty modeled after the EU Database Directive. A bill with similar provisions (HR 3531) was simultaneously introduced in the U.S. House of Representatives to help ensure U.S. support and passage of the WIPO treaty. As noted above, however, strong opposition from the scientific and library communities led to the withdrawal of HR 3531, and the U.S. Delegation to WIPO was instructed to oppose its own treaty. (One of the most effective letters in changing the U.S. position came from the presidents of the National Academies. They described the proposed bill as having a "deleterious long-term impact on our nation's research capabilities" by making it difficult for scientists to reuse and combine data for publication or research.)

Since that time, WIPO has sponsored a number of information meetings to gather input from a broader range of stakeholders. Notable among the nongovernmental organizations permitted to attend the information meetings and submit position papers are the World Meteorological Organization (WMO) and the International Council for Science (ICSU). ICSU created an international committee (ICSU/CODATA Committee on Data and Information) to speak on its behalf at these meetings. Both the ICSU committee and the WMO secretariat have written papers opposing the provisions of the proposed treaty and describing the importance of full and open exchange to science and education. The ICSU papers have also defined scientific principles that should be upheld in any database treaty and provided examples of a wide range of research activities that could be adversely affected by such a treaty. The information meetings will continue, although the timetable is unclear. The schedule is likely to be accelerated by passage of a database bill in the United States. U.S. legislation and the EU Database Directive will probably be used as the starting point for a global treaty.

Meanwhile, the ICSU/CODATA Committee on Data and Information is seeking to establish a dialog on the database issue among European scientists, few of whom have ever heard of the EU Database Directive or the proposed WIPO treaty. Participation by scientists in the process is important for determining the impact of databases leaving the public domain as a result of the directive and other commercialization policies. This information would also be valuable input to an eventual WIPO treaty or the 2001 review of the EU Database Directive. Thus far, however, efforts to engage European scientists on this issue have failed.

ANNEX VII

LIST OF ACRONYMS

ARGO	Argo is a global array free-drifting temperature and salinity profiling floats
BATHY	Bathythermograph Report
BUOY	Report from Buoy Observations
CLCS	Commission for the Limits of the Continental Shelf
DNA	Designated National Agency (IOC/IODE)
ECOMET	Economic Interest Group of European National Meteorological Services
EEC	European Economic Community
EU	European Union
EuroGOOS	European Component of the Global Ocean Observing System
GODAR	Global Oceanographic Data Archaeology and Rescue Project
GOOS	Global Ocean Observing System (IOC)
GOSIC	Global Observing Systems Information Center, University of Deleware
ICSU	International Council for Science
IGOSS	Integrated Global Ocean Services System (IOC-WMO)
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange (IOC)
ISA	International Seabed Authority
ITLS	International Tribunal for the Law of the Sea
JCOMM	Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (IOC-WMO)
NEAR-GOOS	North-East Asia Regional Component of the Global Ocean Observing System
NMS	National Meteorological Service (WMO)
NODC	National Oceanographic Data Centre (IOC/IODE)
POGO	Partnership for Observation of the Global Ocean
RNODC	Responsible National Oceanographic Data Centre (IOC/IODE)
SHIP	Report of a Surface Observation from a Sea Station
TESAC	Temperature, Salinity, and Currents report
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WDC	World Data Centre (IOC/IODE)
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization (UN)
XML	Extensible Mark-up Language