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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

Reports of Meetings of Experts and Equivalent Bodies

CENTRAL EDITORIAL BOARD FOR THE GEOLOGICAL/GEOPHYSICAL ATLASES OF THE ATLANTIC AND PACIFIC OCEANS

Fourth Meeting
Yalta, USSR, 8-11 May 1984

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CONTENTS

1. OPENING OF THE MEETING

The fourth meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans was held in Yalta, USSR, 8-11 May 1984.

Dr Igor' S.Gramberg opened the meeting, welcoming the members of the Central Editorial Board and also all those persons present who were working on different sections of the two atlases. He observed that the meeting was taking place in the Crimea during the important fortieth anniversary of the liberation of the Crimea from the Nazi invaders, and expressed his best wishes to the participants in the meeting for the forthcoming major Victory Day holiday.

Dr Gramberg then expressed his condolences on the death of Professor Eric S.W.Simpson, Deputy Editor GAPA, who had been one of the principal organizers of the work on the atlases. The participants stood to pay homage to his memory.

Mr Desmond P.D.Scott greeted participants to the meeting and congratulated them on this important anniversary which deserved to be celebrated with great joy by all those who remembered the dark days of the war.

He thanked Dr Gramberg for his condolences on the death of Professor Simpson and said that these would be passed on to his family. He then reported that, despite all efforts, it had not proved possible to find a replacement for Professor Simpson as Deputy Editor. He would do his best to carry out this task for the present and the Board would continue to function with only nine members.

He announced that Dr Manik Talwani and Lic. Félix H.Mouzo were unfortunately unable to attend and had sent their sincere regrets.

Dr Boris S.Volvovsky expressed greetings to the participants from the Soviet Geophysical Committee and reported on its work as a co-ordinating centre, in collaboration with the Ministry of Geology. He wished all participants success in their work.

Dr Gleb B.Udintsev, Chief Editor, outlined the history of the project and the various stages of its development. He suggested that the main task of this meeting would be to prepare a timetable for submission of maps to the Central Editorial Board and the Main Administration of Geodesy and Cartography.

Dr Udintsev thanked Mr Scott for his great contribution in taking over a large part of the work previously carried out by Professor Simpson. He also thanked other members of the Central Editorial Board. He concluded by saying that the atlases could be published in 1986-87.

A list of participants is attached at Annex IV.

2. ADOPTION OF THE AGENDA

The agenda (Annex I) was adopted.

3. REPORTS BY CURATORS ON PROGRESS WITH THEIR SECTIONS

3.1 GENERAL

It was noted that the forthcoming International Geological Congress which would take place in Moscow in the first half of August 1984, was an ideal opportunity for discussions between Curators

and other scientists working on the various components of the atlases. All such persons were asked to inform the Central Editorial Board should they be planning to attend the Congress.

Details were announced of the information that would be required on 'Bibliography, Source References and Author Attribution'. These were summarised in a paper to be sent to all Curators (see Annex II).

Dr Zhiv stated that, based on the list of maps approved during the third meeting of the Central Editorial Board (Tallinn, 1983), the Atlantic Ocean atlas would contain 148 pages and the Pacific Ocean atlas 180-184 pages. At the same meeting, she had been invited to investigate whether sheets 4 and 5 of the Pacific Ocean could be combined into one sheet; this had proved to be feasible and they would be presented as one sheet in the final publication.

3.2 INTRODUCTORY SECTION

Photographs of Ships - A list of ships which had operated in the Pacific had been prepared but it was too long and would need to be cut. This would take into account the relative importance of the work carried out by each ship as well as availability of suitable photographs. In preparing this list, use had been made of Soviet material and also a number of lists prepared by Dr R.L.Fisher. Further work was still needed on the list of ships which had operated in the Atlantic. This section was expected to be ready by the end of the year.

Historical bathymetric maps - Mr Scott delivered copies of early editions of certain GEBCO sheets, loaned by the International Hydrographic Bureau, Monaco. Dr Zhiv reported later on her further requirements if these were to be reproduced in the atlases.

Development of New Techniques -

i. Seabeam; Gloria; etc.;

ii. Multi-channel Seismics;

iii. Submersibles;

Dr Montadert reported that work on these three contributions would be completed at the Centre Océanologique de Bretagne, Brest, by the time of the International Geological Congress (August 1984).

iv. Heat Flow;

Dr Winterer reported that he had not received a definite reply from Langseth. He would approach him again and if he is unwilling, Dr S.Uyeda would be invited to prepare a contribution.

v. Gravity;

To be prepared by Dr Y.D.Boulanger.

vi. Satellite Altimetry;

To be prepared by Professor R.Rapp.

vii. Magnetics;

Dr A.Karasik will prepare by October 1984.

viii. Seismicity;

Contribution received by the Chief Editor.

ix. Deep Seismic Sounding;

Scott reported that Purdy will prepare by August 1984.

x. Progress in Navigation;

Contribution received by the Chief Editor.

3.3 MAIN ATLAS SECTIONS

Bathymetry - Atlantic

Dr G.V.Agapova reported that all four sheets of the 1:10 million scale map, and the 1:30 million scale map had been compiled. They were at various stages of cartographic production.

Bathymetry - Pacific

All the 1:10 million scale sheets had been completed - sheets 4 and 5 had been combined (see para. 3.1.3 above). The 1:30 million scale map would be completed within two months and would be available at the time of the International Geological Congress (August 1984).

Magnetics - Atlantic

Dr E.M.Litvinov presented three map sheets of magnetic field anomalies, on a scale of 1:10 million; he noted that little western material had been received.

Dr Montadert handed over a map (two sheets) of magnetic anomalies in the eastern North Atlantic, prepared by Roberts and Jones (Institute of Oceanographic Sciences, United Kingdom). He agreed to investigate the availability of a Magnetic Anomaly map prepared by Schouten and Klitgord and also the atlas compiled by Uchupi and Emery. Mr Scott would request a copy of the magnetic anomaly map which had been prepared for the new Shrivastava/Veppel atlas, and would ask Simpson's institute for copies of any maps of the South Atlantic, if such existed. Dr Winterer agreed to approach Larson and Pitman concerning their Crustal Age map.

It was noted that the Roberts/Jones map referred to above had been compiled in isolines; the possibility of constructing the entire 1:10 million scale map in isolines was discussed but considered to be impracticable. Dr Litvinov said that it would not be possible to alter the basis on which the map had been compiled as a great deal of work had already been undertaken. However, the map would be accompanied by a number of insets of transoceanic sections, showing the intensity of the field in all the principal areas of the ocean.

Dr Arkady Karasik presented maps of a component survey in the North Sea and a map of linear anomalies on a scale of 1:50 million; these had already been passed to the cartographers.

The possibility of including MAGSAT material in the atlases was again raised. Dr Winterer agreed to approach the Lamont-Doherty Geological Observatory for this material.

It was noted that the map of linear magnetic anomalies had been compiled mainly from western sources in which differences of interpretation were evident; it needed to be harmonised with the more modern material.

Magnetics - Pacific

A map of the north-western part of the Pacific Ocean, compiled by Krasny and his colleagues, was presented.

Dr Winterer reported that Handschumacher was willing to act as Compiler Curator for this map but he had not, as yet, received permission from his superiors; he would clarify the situation in the near future. In the event of a refusal, Dr Nobuhiro Isezaki (Kobe University) would be prepared to consider accepting the task.

Dr Winterer would also request material from Dr T.Hilde for the western part of the ocean.

The remarks concerning MAGSAT material and the Larson/Pitman map under Atlantic above also apply to the Pacific Ocean.

Gravity - Atlantic

Professor Y.D.Boulanger presented sheets 1 and 3 of the 1:10 million scale map, which had been compiled by Sazhina; sheet 2 was still in preparation. He also presented 1:30 million scale maps of isostatic, Free Air and Glennie anomalies, compiled on a 1° grid (prepared by Gainanov and his colleagues) and of the long-period component of the isostatic anomalies of the North Atlantic (prepared by Artemjev and his colleagues). In order to complete the maps, Scott agreed to request from Voppel a copy of the map prepared for the new Shrivastava/Voppel atlas.

Mr Scott drew attention to the fact that Watts and Kogan had already prepared and published a map of the South Atlantic. He also reported that Watts had prepared a long list of source material for the North Atlantic and that this had been passed to Kogan so that he could check off which documents he did not hold; Watts would transmit these missing documents to Kogan at the time of the International Geological Congress.

Dr Montadert agreed to obtain and supply a copy of the Weddell Sea Atlas - no.13 in the Woods Hole Ocean Margin Drilling Program Regional Atlas series.

The Central Editorial Board recalled the decision it had made at its third meeting (Tallinn, May 1983) but considered that, despite this, an unintentional duplication of work had occurred. Taking into account the considerable amount of work already undertaken by Boulanger and Sazhina, and also the progress made by Watts and Kogan, the Board decided (subject to discussion with Talwani) that the Watts/Kogan map of the South Atlantic would be included in the atlas, but with minor updating by Kogan where needed, and taking into account comments by Boulanger; for the North Atlantic, the Boulanger/Sazhina map would be accepted, subject to comments by Watts who would also be asked to check that all available data had been incorporated. Copies of the above-mentioned maps would be sent to Talwani, the CEB member responsible for gravity, for review.

Mr Scott presented the sea surface height maps compiled by Rapp from satellite altimetry data. The main maps were on a scale of 1:10 million, with a 1 metre contour interval; two larger maps covering the Bay of Biscay and the Caribbean Sea, with a 0.5 metre contour interval, were also displayed. Gravity inverse from altimetry would only be provided by Rapp where needed by Watts for filling in blanks on the 1:10 million scale Free Air gravity anomaly map. The Board stipulated that where such data are used, there must be a clear indication on the base map.

It was decided to ask Haxby for permission to reproduce the Atlantic and Pacific portions of his map 'Gravity Field of the World's Oceans - Recovered from Seasat Altimeter Data', on a scale of 1:30 million. Haxby would be invited to convert his map to the atlas projection but if he was unable to accept this additional work, the map would be reproduced using its original projection, scale and colour. Haxby would also be asked for permission to use his complete map of the World's Oceans for the 'dust cover' of both atlases.

Gravity - Pacific

Professor Boulanger stated that his group could not start work on this map before the end of the year. All published data had been gathered and he expected to be able to obtain some additional data from the International Gravity Bureau in Toulouse, France. Material from Carl Bowin's World Gravity Atlas would be taken as a base. Maps of the East China Sea and the Sea of Japan (Free Air, Bouguer and isostatic anomalies) had been compiled at a scale of 1:5 million; the East China Sea map would be included in the Gravity section but the Sea of Japan map would form part of the Special Study of that region.

Mr Scott reported that Watts and Kogan were already working on this section. All available data had already been collected by Watts and the various maps were being reduced to the scale of the atlas ready for redrawing. Additional data from two recent Soviet expeditions were being transmitted to Watts. The map would be ready for submission to the Central Editorial Board by the end of the year.

In the light of this information, the Board decided to accept the Watts/Kogan map for inclusion in the atlas.

The remarks on the maps prepared by Rapp and Haxby, under Atlantic above, also apply to the Pacific Ocean.

Thickness of Sediments - Atlantic

Mr Scott presented a map of the western Atlantic which had been compiled by Tucholke. He stated that Tucholke had informed him that a map of the north-western part of the North Atlantic would be completed within two months, and that covering the eastern part of the North Atlantic by May 1985 at the latest. The north-western map was being compiled for the Shrivastava/Voppel atlas (50°-72° N., 0°-65° W.); permission to use it would be obtained from Voppel.

Dr Montadert would prepare a map covering the South Atlantic as far north as 13°30' N., the southern limit of the Tucholke maps; he would also provide material for the Norwegian Sea, east of 0°, and the Caribbean Sea (but not the Gulf of Mexico).

Dr Udintsev observed that the greatest difficulty was to distinguish between unconsolidated and compact continental sediments. In that connection, Winterer proposed the use of different conventions to indicate the thickness of sediments down to the acoustic basement, and right down to the geological basement.

Thickness of Sediments - Pacific

Isopach maps of the Japan-Australia area, including the South China Sea (compiled by Zorina and her colleagues), the north-west Pacific, including the Sea of Okhotsk (compiled by Gnibidenko), depth to the Moho (2 versions) (compiled by Popov) and the thickness of the first layer (6 sheets 1:10 million) (compiled by Golovinsky and his colleagues) were presented. The maps were accepted and passed to Winterer for use in compiling the general map. Gnibidenko also handed over material obtained by the Far East Science Centre - approximately 15,000 miles of continuous seismic profiling.

Dr Winterer reported that he had selected as a base for compilation the Lamont-Doherty Geological Observatory map. On that map, however, only L-DGO data had been used and it would therefore need to be supplemented with further material. He expected the map to be ready by the end of the year.

Winterer proposed the compilation of an isochron map of the Central Pacific and an isopach map of the outer areas. This was agreed; either could be used provided an explanation is given.

Dr Uyeda agreed to obtain and supply a copy of the Geological Society of America/American Geophysical Union publication on the Nazca Plate (Main Editor, Vernon Kulm).

Deep-sea Drilling

Drs Winterer and Montadert reported that the positions of boreholes would be shown on the sediment thickness maps for both oceans. Columns would be featured on separate pages on a vertical scale of 1 cm: 100 m. Lithology would be shown by signs and age with colour and symbols.

Igneous Rocks - Atlantic

Mr Scott reported that Dr W.G.Melson (Smithsonian Institution, Washington DC) had agreed to act as Counterpart Curator for this section; he would work direct with Dr Dmitriev.

Dmitriev pointed out that when the Igneous Rocks map was completed, it would have to be harmonised with some of the other maps (e.g. bathymetry, magnetic anomalies). The map was at present being compiled as a map of factual material, without any interpretation.

Work had been carried out in the Vernadsky Institute but no material had as yet been received from Melson. Following contact with Melson and H.Bougault (COB, Brest), regions of Special Study had been defined: FAMOUS Area; Gorringe Bank; Romanche Trench; and Cayman Trench. The maps of these areas would be prepared and transmitted by the time of the International Geological Congress. Factual data maps had now been prepared from the data of some 500 points and 3,000 analyses. After interpretation, a map of the composition of the second layer, with zoning by type of rock and with an indication of island rock, would be prepared.

The age of the rock would be indicated by symbols - Montadert observed that great care would be needed in that respect. The preliminary maps could possibly be compiled by the time of the International Geological Congress, during which the compilers would discuss the legends.

Dr A.N.Savelyev reported on methods of mathematical processing of material.

Winterer suggested that Dmitriev should contact Batiza, in order to harmonise the presentation of material for both atlases.

Igneous Rocks - Pacific

Dr I.N.Govorov reported that material published during the period 1940-83 had been summarized. The work had been carried out in the Far East Science Centre and, more recently, in the Institute of the Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry of the USSR Academy of Sciences. The final version would be compiled in October in Vladivistok.

The following maps would be presented: Base maps showing factual material, and derived from them would be maps showing the bedrock type (on a morphological basis) and petrological maps; Inset maps of Shatsky Rise, an equivalent part of the eastern Pacific Ocean, Tonga-Kermadec-Samoa region and a map of metamorphic rocks.

Winterer reported that Batiza had achieved considerable progress with his work but was experiencing difficulties in the transcription and transmission of material. Udintsev reported that he had received information from Scheka who had had an exchange of correspondence with Batiza in March. Batiza would be in Vladivistok and Nadhodka in October and possibly at the International Geological Congress in August where he would be provided with the maps of Govorov and Scheka.

Volcanoes - Atlantic

Dr G.P.Avdeiko presented a 1:30 million scale map which was then handed over for transmission to Professor H.-U.Schmincke, the Counterpart Curator; he said that Professor Schmincke had already been sent the legend. In his reply, received recently, he had stated that he was not very far advanced with the work and hoped to discuss progress during the International Geological Congress.

Scott said that Schmincke had informed him that three 1:10 million maps would be compiled: terrestrial and submarine volcanoes; fracture zones; and rift zones.

Dmitriev concurred with the proposal that the maps of Igneous Rocks and Volcanoes be combined.

Volcanoes - Pacific

Dr G.P.Avdeiko presented a 1:30 million scale map and a number of inset maps (Kurile Chain, Esmeralda Volcano, Kovachi Submarine Volcano, etc.) which were then handed over for transmission to Dr D.Clague, the Compiler Curator.

Winterer recommended that Clague should examine the material submitted by Avdeiko and prepare a more comprehensive selection of inset maps, including, for instance, a map of the Loihi Volcano off Hawaii over which intensive new studies have been carried out recently. These insets should reflect various types of submarine volcanoes - guyot with sedimentary cover; an active volcano; an extinct volcano, etc.

Geothermal Data

Dr Ya.B.Smirnov displayed four sheets for the Atlantic and three for the Pacific. Dots had been used to indicate the density of heat flow measurements at end-1983. The Pacific Ocean maps have been contoured to show approximately equal heat flow values; the isolines could be modified after examination by western scientists.

The three Pacific sheets and a list of geothermal 'polygons' were handed over to Professor Uyeda for his approval and comments.

Copies of the Atlantic sheets were also handed over for transmission to Dr Marcus Langseth should he agree to take on the task of Compiler Curator for this section.

The 1:30 million scale maps of the Pacific Ocean would be ready by the end of 1984; the completion date for the 1:10 million scale sheets would depend on the western Curator.

Seismicity - Atlantic

Dr Anatoly V.Drumea presented maps showing: i. Epicentres and focal mechanisms of major earthquakes (magnitude $\geq$ 4); and ii. Epicentres of observed seismic 'activities'. Seismic stations would be shown on the maps. A table has been prepared showing the focal mechanisms of earthquakes and indicating the type of tectonic movement to which they correspond. A copy of the map of 'Epicentres of observed seismic activities' was made available to Dr Uyeda for review of the methods used in its construction.

For some parts of the Mid-Atlantic Ridge, the main sea-floor spreading features had been identified; by the end of the year such maps would be compiled for the entire ridge. It was decided that these maps would be included in the atlas.

Large-scale maps of the Caribbean and the South Sandwich arc area had also been compiled; copies were requested for Montadert and Barker respectively for their Special Studies.

Mr Scott passed on from Dr Lilwall (Counterpart Curator) eight base sheets (scale: 1:10 million) showing earthquake epicentres in the Atlantic, and two large-scale plots of earthquake mechanisms in the South Sandwich arc area. He reported that Dr Roy Lilwall had now moved to a new post and had regretfully had to withdraw from the GAPA project; he had asked that Dr Drumea take over as Compiler Curator for this section.

Dr Drumea asked whether he could be supplied with a copy of the Bulletin of the International Seismological Research Centre at Newbury, United Kingdom. Mr Scott agreed to investigate the possibility; provision of the catalogue would depend on cost.

Seismicity - Pacific

Dr Drumea presented maps of epicentres showing episodes at 0, 70 and 300 kilometres depth. For most events, M $\geq$ 5.5 had been selected as the lower limit. In a number of important tectonic zones, events of lower magnitudes would also be shown. It was suggested that data on the mechanisms of foci should be shown on these maps.

A map showing the epicentres of major earthquakes (M $\geq$ 7), covering the period 1900-80, on a scale of 1:30 million, was also presented.

Dr Roman Z.Tarakanov presented maps covering the following regions: Kurile-Kamchatka; Japan; the New Hebrides; Marianas; Philippines; and Tonga-Kermadec. Further maps will be prepared covering: the Solomon Islands; the Bismarck Archipelago; and Central America. Maps of epicentres and three cross sections would be compiled for each region. All maps were expected to be completed by the end of the year.

It was suggested that the maps of the Kuril-Kamchatka, Japan, Marianas and Philippines regions should be included with the Special Studies of these regions, rather than in Section 8 Seismicity.

It was decided that the fullest possible selection of profiles of the Benioff Zone should be presented in the atlas. Dr Uyeda agreed to obtain and supply literature on the Benioff Zone sections and maps.

Dr Drumea proposed that Drs Mizuho Ishida (Japan), Alberto Giesecke (Lima, Peru) and Nikolai Shebalin (Moscow) be invited to serve as co-Curators for the Seismicity section. This was agreed.

Dr Uyeda agreed to provide Dr Drumea with a set of Circum-Pacific project Plate Tectonics maps.

Types of Bottom Sediments - Atlantic

A set of maps prepared by Iljin, showing types of sediments, chemical composition and physical properties, fractional distribution, etc., was presented and accepted by the Board for inclusion in the atlas.

Mr Scott reported that, owing to lack of the necessary funding, Dr Floyd McCoy would be unable to prepare a map in time for inclusion in the atlas. Udintsev suggested that he be asked to produce such a map, whenever it might become possible.

Types of Bottom Sediments - Pacific

Mr Scott presented maps which had been prepared by McCoy for inclusion in the Circum-Pacific Atlas (four maps on a scale of 1:10 million and one on a scale of 1:17 million). These were accepted by the Board for inclusion in the atlas.

It was reported that the map being prepared by Egiazarov would be ready by August.

Deep Seismic Sounding

In view of Zverev's absence at sea, Udintsev provided information on the progress of work on this section in the Soviet Union.

Scott reported that Purdy considers that the historical data set gives a false view of the structure of the ocean. He suggests, however, that it be included in the atlas to allow users to make their own judgment. He recommends that the available data are treated in two ways: i. the historical data, the bulk of which is of lower quality, can be used to give a cursory view of the structure but no detailed descriptions should be given and it is not appropriate to tabulate the data; and ii. about 30 or so really good experiments which have been carried out in the Atlantic over the last 10 years should be selected, and detailed reviews of the data should be carried out using sound seismic theory.

The historical material prepared by Purdy was presented in the form of three sheets of the Atlantic on a scale of 1:10 million, eleven maps of areas of detailed research, computer print-outs and other related documentation. This was passed over for closer examination. The material relating to the second part of the presentation would be ready in two months time and would be made available at the International Geological Congress.

Dr Irena P.Kossinskaya proposed that the principles put forward by Purdy should be given further consideration, together with the feasibility of their being applied to the selection of data from the Pacific Ocean.

Palaeogeography

Mr Scott presented palaeogeographical material he had received from Dr Jörn Thiede (Kiel). Following discussion, the Board decided that they were too interpretative for inclusion in the atlases.

3.4 ATLANTIC OCEAN SPECIAL STUDIES

FAMOUS Area

Dr Montadert reported that work on this section is in hand and would be ready by the International Geological Congress in August.

Iceland and Surrounding Areas

Mr Scott reported that Dr D.Voppel (DHI, Hamburg) had been invited to serve as the Compiler Curator for this section; he had made known his interest in the work but was unable to take a final decision until he was sure of obtaining some additional technical assistance. Talwani had already passed to Voppel some material which had been prepared by Alan Nunns (Gulf Oil); Dr Gudmundur Palmason (Reykjavik) had agreed to assist. Scott would be contacting Voppel again shortly.

Walvis Ridge

Dr Montadert reported that Sibuet had compiled a set of maps; he would update them using any new data that might become available and bring them to Moscow when he attends the International Geological Congress.

Scott reported that Soviet continuous seismic profiling data which he had been given at the third meeting of the Board (May 1983) had been passed on to Sibuet.

a) Biscay

Dr Montadert displayed magnetic and gravity maps of the area. He reported that a new bathymetric map, largely based on Seabeam data, was being compiled. Seismic reflection profiles, from Seabeam data, and an area of detailed study would be shown.

A sea surface height map compiled by Rapp from satellite altimetry data (see para. 3.3.3 above), was presented and accepted for inclusion in this section.

Baltimore Canyon

Since Dr J.Grow had moved to another work area, it was now uncertain whether he would prepare this section. Winterer agreed to clear up the matter in the very near future.

Morocco/West Africa

Mr Scott reported that Professor Karl Hinz (Hannover) had offered material from the Morocco/West Africa region (28°-35° N.), comprising a structural map of the continental margin, a free-air gravity map and magnetic anomaly data. It was decided to include this additional Special Study in the atlas and Winterer agreed to serve as Compiler Curator. In so doing, he mentioned additional data, including French Seabeam data, Hayes (L-DGO) seismic reflection data and the North-west African Continental Margin Atlas - no.12 in the Woods Hole Ocean Margin Drilling Program Regional Atlas series.

b) Caribbean

Dr Montadert reported that maps showing bathymetry, magnetics, gravity and rates of sedimentation had been compiled. Rapp's sea surface height map (see para.3.3.3 above) would be included in this section. He then proposed the inclusion in the section of a relief map of the accretion prism of the Antilles arc, compiled from Seabeam data; this was agreed. He stated that the maps would be ready in time for the International Geological Congress.

Dr Oleg N.Korsakov presented magnetics and gravity maps of the Caribbean, on a scale of 1:5 million, compiled by Yuzhmorgeologia. These were handed to Montadert.

Professor Boulanger was asked to recompile the gravity map of the Caribbean, using data from the Hydrophysical Institute (Hidrofizin) and Yuzhmorgeologia. Material from the area east of the Antilles would be provided by Montadert.

c) Falkland-Agulhas Fracture Zone

Mr Scott reported that he was in possession of material left by Professor Simpson. This would be transmitted to Montadert so that he could assess its degree of readiness. However, it was proposed that the size of the area be reduced and that it be limited to the eastern part of the feature.

Scotia Sea

Mr Scott reported that Barker had prepared a set of maps, on an azimuthal projection, showing bathymetry, magnetics, earthquake epicentres and a pattern of tectonic development. He displayed preliminary versions of these maps.

Professor Barker was asked to convert the projection used to Mercator, to bring it into line with all the other maps in the atlas. The Board decided that the tectonic development map was too interpretative for inclusion in the atlas. It was noted that the magnetic map could be used to amend the main smaller scale map of magnetic field anomalies.

Angola-Brazil Geotraverse

It was reported that this section would consist of reduced continuous seismic profiles of magnetic and gravity anomalies. Scott reported that he had asked Mouzo to bring the material being prepared by Asmus; he regretted that due to his absence, this was not immediately available.

Professor Korsakov presented a magnetic field map, on a scale of 1:1 million, covering the eastern part of the geotraverse. It was agreed that this would be included in the section.

Sierra Leone Rise

A map showing thickness of sediments, prepared by Beresnev and Efimov, was presented.

3.5 PACIFIC OCEAN SPECIAL STUDIES

a) Marianas and Philippines

Mr Scott presented demonstration material and proposals from Hayes. He had suggested that his six maps from the Atlas of South-east Asia be used to compile two new maps; he could not undertake this task himself but would send suggestions and additional material by the end of the summer. He also proposed the inclusion of four east-west cross-sections suitably spaced across the region. These proposals were agreed.

b) Sea of Okhotsk and Kuril-Kamchatka

It was agreed to combine these two sections.

Dr Gnibidenko presented maps of the Sea of Okhotsk showing magnetics, thickness of sediments and depth of the Moho; these were accepted for inclusion in the section.

c) Japanese Region

Maps showing bathymetry, magnetics, gravity, thickness of sediments and geology had been prepared. Material was awaited from Murauchi and Shiki. The inclusion of the Japan Trench in this section was agreed.

It was decided that the gravity maps compiled by Stroev covering the Sea of Japan (see para.3.3.3 above) would be included in this section.

d) New Caledonia and New Hebrides

It was decided that this section should be extended to include the Solomon Islands and the New Hebrides. Dubois would be asked his views.

Dr Montadert was asked to enquire from Dubois about his progress with the work and to ask him to accept a deadline for completion.

Comparative Anatomy of Pacific Trenches

Dr Winterer presented, on behalf of Von Huene, a series of profiles for a selection of trenches (magnetics, gravity, etc.); he stated that either he or Von Huene himself would bring the final material to Moscow at the time of the International Geological Congress.

It was decided that profiles of the Kuril-Kamchatka Trench, being prepared by Gnibidenko, should also be included in this section.

Hydrothermal Activity

The position with regard to this section needed clarification. Dr Winterer agreed to ascertain from Malahoff whether he has this study in hand.

Dr Uyeda agreed to obtain and supply a copy of the Rona World Map of Hydrothermal Activities. He would also approach Dr Ken Macdonald for sets of maps and figures showing geothermal spots (Magma Chambers), and for permission for them to be reproduced in the atlas.

Dr Montadert would obtain a copy of the compilation of Hydrothermal Activities prepared by the Centre Océanologique de Bretagne, and pass it to Winterer.

Polymetallic Nodules

Dr Winterer reported that Piper was actively engaged in the work. He would be attending the International Geological Congress and hoped to be able to work with Egiazarov on the selection of a comprehensive set of photographs from both western and Soviet collections.

Hess Rise

Dr Winterer reported that he hoped to be able to hand-carry the material prepared by Kroenke to Moscow at the time of the International Geological Congress.

Obruchev Rise; Junction of Kuril-Kamchatka and Aleutian Trenches

Dr Winterer said that he would complete and bring his material on the Obruchev Rise with him when he attends the International Geological Congress, but the limit of his map ran through the axis of the trenches.

Udintsev suggested adding material prepared at the Institute of Physics of the Earth and the Far East Science Centre by Seliverstov and his colleagues.

4. OTHER MATTERS

Dr Karasik suggested including in the atlases interesting and basically new seismic research material on the East Pacific Rise and the Reykjanes Ridge, showing the existence of Magma Chambers (see para. 3.5.3 above) - American work. It was suggested that the authors of the published articles be requested to provide good copies of their material.

5. APPROVAL OF THE COMPLETE ATLAS PROGRAMME AND THE TIMETABLE FOR THE SUBMISSION OF MAPS TO THE MAIN ADMINISTRATION OF GEODESY AND CARTOGRAPHY

A Complete Atlas Programme and Timetable for the submission of maps to the Main Administration of Geodesy and Cartography was considered in some detail, drafted (Annex III) and approved.

In so doing, the Board recognised that there were still some uncertainties which it was hoped would be resolved during the coming year. For this reason, the programme and timetable had to be considered a guideline rather than a rigid structure which could not be adjusted to meet changed circumstances.

6. DATE AND PLACE OF THE NEXT MEETING OF THE CENTRAL EDITORIAL BOARD

The next meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans (GAPA) will be held in Moscow or Leningrad from 20 to 24 May 1985.

7. APPROVAL OF THE SUMMARY REPORT

The Summary Report was approved in general terms, on the understanding that the written report, when circulated, could be amended as necessary.

8. CLOSURE OF THE MEETING

The Chairman closed the meeting at 16.00 on Friday 11 May 1984.

ANNEX I

AGENDA

1. Opening of the meeting
2. Adoption of the Agenda
3. Reports by Curators on Progress with their Sections
   - 3.1 General
   - 3.2 Introductory Section
   - 3.3 Main Atlas Sections
   - 3.4 Atlantic Ocean Special Studies
   - 3.5 Pacific Ocean Special Studies
4. Other Matters
5. Approval of the Complete Atlas Programme and the Timetable for the Submission of Maps to the Main Administration of Geodesy and Cartography
6. Date and Place of the next meeting of the Central Editorial Board
7. Approval of the Summary Report
8. Closure of the meeting

ANNEX II

BIBLIOGRAPHY, SOURCE REFERENCES AND AUTHOR ATTRIBUTION

The above information should be provided by the Compiler Curators for each section. All scientists and institutes providing material for incorporation in the atlases, whether for direct reproduction without alteration or as an input to the maps being compiled elsewhere, should be invited to submit any such information they would wish to appear in the atlases as an acknowledgment to the origin of the material they have provided.

The following guidelines have been prepared to assist persons compiling this information:

Each atlas will contain a Reference List to all sources used in the preparation of the maps. Curators are responsible for obtaining and supplying a list of these references with their maps - the format of the Geological Society of America should be used.

In addition, sources of maps and data illustrations of all kinds are to be clearly indicated on the face of each map/illustration, i.e. who did the work, not just who did the compilation, with a cross-reference to the detailed reference in the main Bibliography/Reference List.

Furthermore - Every map borrowed from the literature must have a reference;
Each compilation should have a small index map;
Some information will be used directly and other will be modified - this should be made clear; modified data should be notated 'after ....'.
Where published material are used, a general reference to source listings accompanying that material may be made, e.g. Acknowledgment will be made to GEBCO and the source listings appearing on the sheets of the series and in the supporting volume (the source listings will not be repeated in the atlases).

ANNEX III

REVISED LIST OF COMPILER AND COUNTERPART CURATORS FOR THE GEOLOGICAL/GEOPHYSICAL ATLASES OF THE ATLANTIC AND PACIFIC OCEANS (GAPA)

Revised during the fourth meeting
of the Central Editorial Board
Yalta, 8-11 May 1984

No. of Pages					Deadline for final compilation
	Introduction				
1	Common	Photographs of Ships, etc. Historical - before 1943 i.e. Since 'Challenger' and possibly earlier if appropriate	Ships which have made significant scientific observations in the past	Scott Fisher Udintsev	end-1984
	Appropriate Ocean	1943-present i.e. Since the first scientific use of the deep echo-sounder	Ships which have contributed to these atlases in some significant way		
4	Appropriate Ocean	Reproduction of a specific area from different editions of GEBCO to show the improvement in knowledge of the morphology of the sea-floor during the twentieth century Other historical bathymetric maps		Scott Zhiv	end-1984
1	Common	Selection of bottom photographs to illustrate a spectrum of sea bed features, including pictures of such features shown up by new techniques e.g. Gloria, Seabeam		COB, Brest Searle (IOS)	end-1984
	Common	Development of New Techniques			
10		i. Seabeam; Gloria; Deep Tow; Sea Mark; etc.		COB, Brest	VIII/84
		ii. Multi-channel Seismics (to include multi-ship extended spread type of work)		Montadert (IFP, France)	VIII/84
		iii. Submersibles		Renard (COB)	VIII/84
		iv. Heat Flow		Langseth (L-DGO)	?
		v. Gravity		Boulanger (SGC, USSR)	?
		vi. Satellite Altimetry		Rapp (Ohio State)	VIII/84
		vii. Magnetics		Karasik (Leningrad)	X/84
		viii. Seismicity		Lilwall (IOS, UK)	Complete
		ix. Deep Seismic Sounding by refraction methods		Purdy (WHOI, USA)	VIII/84
		x. Progress in Navigation		Cooper (IHB)	Complete

ATLANTIC OCEAN

(Names underlined indicate assignment accepted)

Section	Compiler Curator	Counterpart Curator	No. of Pages	Deadline for final completion 1:10 M.	No. of Pages	Deadline for final completion 1:30 M. (and remarks)
1. Bathymetry	G.V.Agapova (Moscow)	D.Monahan (Ottawa)	8	Complete	2	Complete
2. Magnetics	E.M.Litvinov (Leningrad)	J.-C.Sibuet (Brest)	6+2(?)	Complete	2	Complete (1:50M. & North Sea)
3 a) Gravity	M.G.Kogan (Moscow) under the general direction of Yu.D.Boulanger (Moscow)	A.B.Watts (L-DGO)	6+2(?)	?	4	
b) Altimetry Geoid	R.Rapp (Ohio)	None	8	Complete		
c) Altimetry Gravity	W.F.Haxby (L-DGO)	None	1	?		
4. Thickness of Sediments						
a) North Atlantic	B.Tucholke (WHOI)	Yu.G.Kiselev (Leningrad)	4	?		
b) South Atlantic	L.Montadert (IFP)	Yu.G.Kiselev (Leningrad)	4	?		
? 5. Igneous Rocks	L.V.Dmitriev (Moscow)	W.G.Melson (Washington DC)	4	?	1	VIII/84 (+2 large scale)
? 6. Volcanoes	H.-U.Schmincke (Bochum)	G.P.Avdeiko (Kamchatka)				
7. Geothermal Data	M.Langseth (L-DGO)	Ya.B.Smirnov (Moscow)	3	Complete	1	Complete (+1 polygons ?)
8. Seismicity	A.V.Drumea (Kishinev)	R.C.Lilwall (IOS)	6+6	Complete	1 (profiles)	
9. Types of Bottom Sediment	A.V.Iljin (Moscow)	F.McCoy (L-DGO)			2	Complete +2 (1:45M.) +3 (1:60M.) +2 (1:90M.)
10. Deep Sea Drilling	L.Montadert (IFP)	V.A.Basov (Leningrad) and V.Krasheninnikov (Moscow)			2	XII/84

11. Deep Seismic Sounding	S.M.Zverev (Moscow)	G.M.Purdy (WHOI)			2 ? +3 (profiles and table)
12. Palaeogeography (to be decided later)	(P.P.Timofeev, Moscow)	None			2(?) ?
Special Studies					
1. FAMOUS Area	H.D.Needham & group (COB)	None	1	VIII/84	
2. Iceland and Surrounding Areas	D.Voppel (DHI) with support from A.Mumns (Gulf Oil) and G.Palmason (Reykjavik)	S.M.Zverev (Moscow)	2(?)	?	
3. Walvis Ridge	J.-C.Sibuet (Brest)	A.F.Beresnev (Moscow)	2	VIII/84	
4 a) Passive Continental Margins					
Biscay	L.Montadert (IFP)	A.A.Avdeev (Sevastopol) and V.P.Panaev (Gelendzhik)	4 +2	VIII/84	
Baltimore Canyon	J.Grow (USGS, Denver)	None	2	?	
Morocco/West Africa	E.L.Winterer (SIO) with support from K.Hinz (Hannover)	None	2	XII/84	
b) Active Continental Margin					
Caribbean	L.Montadert (IFP)	O.D.Korsakov (Gelendzhik)	8	VIII/84	
c) Sheared Continental Margin					
Falkland-Agulhas Fracture Zone	E.S.W.Simpson (UCT) (completed - work to be reviewed by L.Montadert (IFP))	None	1	XII/84	

5.	Scotia Sea	P.F.Barker (U.Birmingham)	A.M.Karasik (Leningrad)	2	VIII/84
6.	Angola-Brazil Geotraverse	I.S.Gramberg (Leningrad)	H.E.Asmus (Rio Grande, Brazil)	2	XII/84
7.	Sierra Leone Rise	A.F.Beresnev (Moscow)	None	1	VIII/84

PACIFIC OCEAN

(Names underlined indicate assignment accepted)

Section	Compiler Curator	Counterpart Curator	No. of Pages 1:10 M.	Deadline for final completion 1:10 M.	No. of Pages 1:30 M. (and remarks)	Deadline for final completion 1:30 M. (and remarks)
1. Bathymetry	G.V.Agapova (Moscow)	D.Monahan (Ottawa)	10	Complete	4	Complete
2. Magnetics	D.Handschumacher (Bay St Louis)	M.L.Krasny (Sakhalin) and N.Isezaki (Kobe)	10(?)	?	1 (1:50M.)	?
3 a) Gravity	A.B.Watts (L-DGO)	M.G.Kogan (Moscow) under the general direction of Yu.D.Boulanger (Moscow)	10	XII/84		
b) Altimetry Geoid	R.Rapp (Ohio)	None	10	Complete		
c) Altimetry Gravity	W.F.Haxby (L-DGO)	None	2	?		
4. Thickness of Sediments	E.L.Winterer (SIO)	Yu.G.Kisolev (Leningrad)	10	XII/84		
? 5. Igneous Rocks	R.Batiza (St.Louis)	S.A.Scheka (Vladivostok) and I.N.Govorov (Vladivostok)	8	XII/84		
? 6. Volcanoes	D.Clague (USGS, Menlo Park)	G.P.Avdeiko (Kamchatka)				
7. Geothermal Data	Ya.B.Smirnov (Moscow)	S.Uyeda (Tokyo)	3	Complete	2 (+1 polygons)	Complete
8. Seismicity	A.V.Drumea (Kishinev) and R.Z.Tarakanov (Sakhalin) with N.V.Shebalin (Moscow)	M.Ishida (Ibaragi-Ken, Japan) and A.Giesecke (Lima)	9	XII/84	6 (+2?)	XII/84

9.	Types of Bottom Sediment	F.McCoy (L-DGO) and B.Kh.Egiazarov (Leningrad).		4	VIII/84
10.	Deep Sea Drilling	E.L.Winterer (SIO)	V.Krasheninnikov (Moscow)	2	XII/84
11.	Deep Seismic Sounding	I.P.Kosminskaya (Moscow)	S.Murauchi (Chiba)	6 (+3?)	?

Special Studies

1. Island Arcs and Back-arc Basins

a)	Marianas and Philippines	D.E.Hayes (L-DGO)	A.G.Rodnikov (Moscow) and T.Shiki (Kyoto)	5	X/84
b)	Sea of Okhotsk and Kuril-Kamchatka	M.L.Krasny (Sakhalin) and B.I.Vasiliev (Vladivostok) and K.F.Sergeev (Sakhalin)	None	5	VIII/84
c)	Japanese Region	S.Murauchi (Chiba), B.Y.Karp (Vladivostok), I.I.Berzenev (Vladivostok), N.Isezaki (Kobe), F.R.Likht (Vladivostok) and P.A.Stroev (Moscow)	T.Shiki (Kyoto)	5	VIII/84
d)	New Caledonia New Hebrides	J.Dubois (Paris)	M.E.Artemjev (Moscow)	4	?

2. Comparative Anatomy of Pacific Trenches	R.von Huene (USGS, Menlo Park)	A.G.Rodnikov (Moscow)	5 (+1?)	VIII/83
3. Hydrothermal Activity	A.A.Malahoff (Rockville)	A.K.Popova (Moscow)	2	?
4. Polymetallic Nodules	V.McKelvey (Florida) and D.Z.Piper (USGS, Menlo Park)	B.Kh.Egiazarov (Leningrad)	2 (1:30M.)	?
5. Hess Rise	L.Kroenke (Hawaii)	None	1 (or 2)	VIII/84
6. Obruchev Rise Junction Kuril-Kamchatka and Aleutian Trenches	E.L.Winterer (SIO)	G.B.Udintsev (Moscow)	2	VIII/84

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