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**Intergovernmental Oceanographic Commission**  
*Reports of Meetings of Experts and Equivalent Bodies*

**Second Expert Workshop on the Pilot Project  
of SEAGOOS on the Monsoon Onset  
Monitoring and its Social and Ecosystem  
Impacts (MOMSEI)**

Qingdao, China  
8-9 August 2009

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UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC  
(WESTPAC)**Second Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon  
Onset Monitoring and its Social and Ecosystem Impacts (MOMSEI)**

Qingdao, China, 8-9 August 2009

**Summary Report****1. OPENING**

1. The Second Expert Workshop of the IOC Sub-Commission for the Western Pacific (WESTPAC) on the Pilot Project of SEAGOOS on the Monsoon Onset Monitoring and its Social & Ecosystem Impacts (MOMSEI) was opened in the morning of 8 August 2009 in the First Institute of Oceanography (FIO), State Oceanic Administration (SOA) of China. The workshop was organized by the IOC Regional Secretariat for the Western Pacific (WESTPAC Secretariat) in collaboration with the First Institute of Oceanography. Mr. Gongke Tan, Director of International cooperation office of FIO, chaired the opening session.
2. At the opening ceremony, Dr. Fangli Qiao, Deputy Director General of FIO/SOA, China, welcomed experts from participating countries on behalf of FIO. He emphasized the need to strengthen the cooperation among member states in the region to better understand the role of ocean in the East Asian Monsoon, in view of its social and economic significance. Dr. Qiao wished this pilot project a success with the joint efforts of all member states of WESTPAC. He concluded his welcoming address by briefing on the FIO and expecting all participants to have a good stay in Qingdao.
3. On behalf of the IOC Sub-Commission for the Western Pacific (WESTPAC), Mr. Wenxi Zhu, Head of the WESTPAC Secretariat, thanked the FIO for co-organizing and hosting the workshop and extended special thanks to Dr. Weidong Yu, Project Leader of MOMSEI, Dr. Somkiat Khokiattiwong, Coordinator of SEAGOOS, for their efforts in preparing this event. He highlighted the recent progress of WESTPAC over the past two years in its revitalization, through strategic planning and initiating new regionally-rooted activities, to meet the requirements of member states in the region. While keeping in mind the unique role of Westpac in promoting marine science, observations and capacity building, he further expressed his appreciation to the FIO for its active involvement in the "UNESCO/IOC Regional network of Training and Research Centres in the Western Pacific" which aims to improve the regional capability on oceanography through the provision of regular training opportunities to all member states. By concluding his remarks, he encouraged the active participation of the member states in WESTPAC programmes and expected the project would generate more exciting results, not only in the scientific aspect, but also in the social and economic aspects.
4. Dr. Wannakiat Thubthimsang, Director of Phuket Marine Biology Center (PMBC) of Thailand, gave the opening address on behalf of PMBC. He congratulated the opening of this very important workshop, and expressed his sincere thanks to the organizers for inviting him to Qingdao. He further recalled the cooperation between PMBC and FIO, which formed a very solid foundation for the current MOMSEI project.

He highly praised the cooperation among different countries to share scientific resources and information and technologies. He also believed that this workshop would be held successfully.

5. Dr. Somkiat Khokiattiwong, Coordinator for SEAGOOS, expressed his appreciation to FIO, Dr. Fangli Qiao, Dr. Weidong Yu, and all the FIO people who are working for this workshop. He thanked Mr. Wenxi Zhu for his efforts in promoting the MOMSEI Project. He hoped SEAGOOS would move forwards as one of successful regional projects.

## **2. ADOPTION OF THE AGENDA**

6. Dr. Weidong Yu, Project Leader of MOMSEI, introduced the tentative agenda and invited participants to provide comments on it.

7. The meeting adopted the Agenda, which is attached as Annex I to this report.

## **3. INTRODUCTION ON THE MOMSEI SCIENCE PLAN**

8. Dr. Weidong Yu was invited to introduce the MOMSEI Science Plan.

### **3.1 Scientific background**

9. Dr. Yu introduced the scientific background of MOMSEI by analyzing the characters, origins, variability and social relevance of Asian Monsoon. Asian Monsoon exhibits strong seasonal, intra-seasonal and inter-annual variability. It was noted that the summer monsoon affects the precipitation of eastern and southern Asia. Dr. Yu emphasized that the Intra-Seasonal Oscillation (ISO) is the elementary brick of monsoon due to its close relevance with strong fluctuations in surface heat fluxes, thus significantly impacting regional rainfall, and in some years determining the pattern of rainfall for an entire season. Therefore, the monsoon simulation and prediction hinges on the ability to simulate ISO. To some extent, the Asian Summer Monsoon onset could be regarded as the first northward propagation ISO. He further emphasized the role of ocean for prediction of the Asian Monsoon as many of climate phenomena evidently are coupled with ocean thermodynamics and hydrodynamics. Meanwhile, Indian Ocean Dipole (IOD) and ENSO, two prominent ocean-atmosphere coupled mode, were mentioned as they had high correlation with Asian Monsoon variation though more studies are still needed.

10. He also pointed out that the current knowledge of the ocean-atmospheric interaction is limited as a result of lack of ocean data, particularly the data relevant to the fast variability of temperature, salinity and currents in the mixed layer. Future research to understand the ocean-atmosphere interaction will place a high reliance on observations. In this sense, he mentioned the gaps to be filled in SEAGOOS region, considering the rapid progress of the observation capability in the Indo-Pacific region, especially the TAO/TRITON in the Pacific and RAMA in the Indian Ocean.

### **3.2 Scientific Frontier 1**

11. Two scientific frontiers were identified by Dr. Yu in relevance of the MOMSEI project, one on the role of ocean-atmosphere interaction for monsoon onset, and the

other on the social and ecosystem impacts of inter-annual variability of monsoon onset.

12. The abrupt seasonal transition from winter to summer is one of the salient features of the Asian Monsoon. However, it is not yet well understood what processes are responsible for the earliest onset at regional scale over Bay of Bengal (BoB) and its vicinity. Dr. Yu quoted the sensitive experiments of Atmosphere General Circulation Model (AGCM) forced by different boundary conditions of topography and SST configurations to illustrate the spring SST warming in BoB played a major role to trigger the onset there.

13. Dr. Yu further briefed on the new observation evidence from the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA), which clearly indicated the oceanic preconditioning of the monsoon onset over Bay of Bengal through the establishment of the SST maximum before the monsoon onset. He stressed that there are several key questions remaining open, including: i). mechanism of the BoB SST maximum in mid-April; ii). mechanism for the northward propagation of the first ISO into BoB, particularly its relation with the meridional SST gradient and PBL moisture gradient.

### **3.3 Scientific Frontier 2**

14. Dr. Yu argued, since the monsoon onset time changes from year to year, the inter-annual variability would have potential effects on the society, by causing the flooding/drought disasters, and on the local ecosystem, especially the coral reef.

15. He raised one example of the coral reef system in the Andaman Sea, where the coral reef bleaching has a strong seasonality. It normally occurs in the local hot season, say during March and April. The coral reef will face the high risk of bleaching if the ocean water temperature exceeds 30.5°C and this temperature lasts for over two weeks. Late monsoon onset over BoB and Andaman Sea will bring about the long-standing high temperature (over 30°C) and hence could increase the risk of coral reef bleaching.

### **3.4 Process study of the monsoon onset**

16. Dr. Yu further outlined the process study on the monsoon onset as the core activity of MOMSEI project as an initial step to identify the linkage between the SST maximum and the northward propagating ISO. To this end, cruises were proposed to be carried out simultaneously in Bay of Bengal and the equatorial eastern Indian Ocean.

17. Ms. May Khin Chaw, from Myanmar, was invited to introduce the relevant monsoon study in Myanmar. She briefed the meeting on the seasonal cycle associated with the monsoon onset and withdraw in Myanmar and the corresponding synoptic conditions. Wide interests were aroused on a clear decline trend of monsoon strength in Myanmar from 1955 to 2008.

### **3.5 Long-term monitoring requirements and implementation**

18. To complement the process study, two long-term monitoring buoys were proposed to be deployed under MOMSEI, which would help monitor the monsoon onset in real time and help assess the monsoon impacts on the society and

ecosystem. It was also suggested that some scientifically critical sites be selected, one in the north of Bay of Bengal and the other in the Andaman Sea.

19. The Science Plan received broad support in terms of its scientific background provided and objectives to be addressed.
20. Dr. Somkiat Khokiattiwong emphasized the importance of the proposed MOMSEI activities in their science essence and social contribution. He also mentioned that the present FIO-PMBC collaboration on buoy observation provided a good basis for MOMSEI in its further development.
21. Mr. Michael Atrigenio from Philippines welcomed the proposed monsoon study. He mentioned that Philippines had set up several meteorological observation stations and the data could be used in the monsoon study. The experience of Philippines in the ecosystem response to monsoon forcing could be also shared with other countries.
22. Prof. Fredolin Tangang from Malaysia explained that the rainfall in Malaysia is closely related to the winter monsoon and its intra-seasonal oscillation. He indicated that Malaysia could contribute and benefit as well from the study of the coral reef ecosystem response to the monsoon onset variability. He also mentioned that the monsoon climate study is very important and the outcomes should be included in the coming IPCC AR5, which would be an excellent direction that MOMSEI project could follow.
23. The meeting highly appreciated the science plan prepared by Dr. Weidong Yu and expressed their support for this project and their interest in participation. Extensive discussion was also made on the long term vision, expected outputs, and so on.
24. **Action 1.** The meeting invited Dr. Weidong Yu, in close collaboration with Dr. Khokiattiwong to further revise the Science Plan with due considerations to the discussions made and inputs provided, and submit it to the Third Expert Workshop of MOMSEI which was scheduled for 25-26 November 2009 in Manila, Philippines.

### **3.6 Capacity building requirements for better science and social benefits**

25. Dr. Yu introduced this agenda by proposing three activities, namely summer school, training through cruise and regular training courses provided within the framework of "UNESCO/IOC Regional Network of Training and Research on Oceanography in the Western Pacific".
26. The meeting emphasized the importance of building capacity of young scientists in the member states and would explore various possibilities to maximize the benefit of this project
27. **Action 2.** The meeting invited Dr. Yu, Mr. Zhu, Dr. Khokiattiwong to keep close communication with interested member states on the organization of the annual summer school in 2010 and circulate the information as widely as possible.

### **3.7 Outreach**

28. The meeting agreed outreach was one of the most important components of MOMSEI project, which was discussed in further details under agenda item 7.2.

#### **4. IMPLEMENTATION OF THE FIRST CRUISE IN APRIL 2010**

29. Dr. Yu briefed the meeting that the first cruise of MOMSEI in April 2010 was primarily based on the bilateral collaboration between FIO and PMBC with one moored buoy to be deployed in the Andaman Sea to monitor the monsoon onset there. It will promote the general scientific cooperation on the research, training and education in the field of climate change, tropical marine ecology. Under MOMSEI, this first cruise will mark the project kicking off.
30. Dr. Khokiattiwong introduced the vessel arrangement for this cruise. He mentioned that PMBC will help with the necessary administration clearance from the Thai government.
31. Prof. Tangang raised the possibility of the training through cruise. Dr. Khokiattiwong explained that the training could be done if the vessel has enough space of accommodation.
32. Although the implementation of the first cruise is mainly based on the collaboration of FIO and PMBC, other MOMSEI participants can share the in situ data from the cruise and the moored buoy and join in the post-cruise study.
33. The following-on cruises in the Bay of Bengal and tropical eastern Indian Ocean, expected from 2011, will be implemented on the basis of multi-nation participation.

##### **4.1 Cruise plan**

34. Dr. Khokiattiwong informed the meeting that PMBC would try their best to help make this cruise possible. In addition to the PMBC's own research vessel, he would also seek the ship time of research vessels in other organizations as an alternative in case their own vessel would be in maintenance at that time.

##### **4.2 Ship and equipment**

35. The meeting noted that PMBC would provide ship time and FIO would provide the equipment for the first cruise.
36. The meeting also discussed the possibility of using Thai and Indonesian research vessels simultaneously in the process study, and highly appreciated the willingness of Dr. Khokiattiwong and Mr. Adi to help check the availability of their research vessels, FIO expressed her willingness to provide the equipments for the process study and long-term mooring

##### **4.3 Participants**

37. The meeting encouraged the widest participation of the IOC/WESTPAC member states. Suggestion was made from the meeting that training-through-cruise opportunity could be provided to the young scientists from member states during the MOMSEI cruises. For the first cruise, Dr. Khokiattiwong clarified that, due to very

limited passenger capacity of the PMBC research vessel, it would be unlikely to provide seats to the scientists from other member states. However, the possibility of training-through-cruise could be further explored in the future cruises.

## 5. AVAILABLE SOURCES FROM PARTICIPATING COUNTRIES

38. It was emphasized that MOMSEI's success would depend definitely on the joint efforts from the participating countries.

39. The meeting further suggested that the MOMSEI science plan could be used, as a scientific guidance, to help scientists seek funding from their respective authorities for their research or activities at national level. To ensure the high quality of the science plan to be published, the meeting recognized the urgent need for each participating country to provide relevant information if any, covering the following questions:

40. i. Does the monsoon influence your country? And what impacts it loads on the society and ecosystem?;

41. ii. What are the relevant research interests on Monsoon variability at individual national level?;

42. iii. Which scientific issue of MOMSEI is most relevant to your national interests? If so, please give some ideas how to link your national studies to this project for mutual benefit?

43. **Action 3.** The meeting invited Dr. Yu to communicate, together with some guidance for in the response, with each participant for their inputs for the above mentioned questions, and encouraged all experts to submit those information no later than the timeline required.

## 6. COORDINATION AND COOPERATION WITH OTHER RELEVANT PROJECTS

44. Mr. Zhu emphasized the importance of increasing the visibility of MOMSEI at international/regional level.

45. The meeting invited all participants to advertise this MOMSEI and help establish links with other on-going relevant international/regional programmes.

46. **Action 4.** The meeting invited Dr. Yu to seek for the endorsement from CLIVAR, Prof. Tangang to consider the inclusion of MOMSEI outcomes in the IPCC AR5 if possible, and Dr. Khokiattiwong to disseminate the MOMSEI information at various occasions of Global Ocean Observing System (GOOS).

## 7. ORGANIZATIONAL ARRANGEMENT FOR IMPLEMENTATION

### 7.1 Scientific Steering Group and its ToR

47. Dr. Yu explained the importance of the Scientific Steering Group (SSG)

48. Prof. Tangang welcomed the idea of SSG and he emphasized that SSG was very important for the program development.
49. The meeting recognized the need to establish the SSG for MOMSEI, which is responsible to provide scientific guidance on the planning, implementing of this project.
50. **Action 5.** The meeting agreed to form the SSG, ideally at the 3<sup>rd</sup> expert workshop, mainly based on the present experts and those to be nominated later. The meeting further invited Dr. Yu, Mr. Zhu and Dr. Khokiattiwong to prepare the Terms of Reference for this SSG and submit it to the Third Expert Workshop for adoption.

## **7.2 Secretariat and its ToR**

51. The meeting considered the need to have one MOMSEI Project Office with functions to coordinate the implementation of the project on a daily basis, including MOMSEI outreach activities, and finally decided to establish this Office within the WESTPAC Secretariat.
52. The meeting also expressed their appreciation to the Government of Thailand for hosting the WESTPAC Secretariat, and the facilities to be provided with future MOMSEI Project Office. Dr. Yu and Dr. Khokiattiwong indicated that they would positively consider contributing their personnel support in the Office.
53. In view of the pure coordination nature of the project office, it was decided that no specific TOR was needed for this office.
54. **Action 6.** The meeting invited Mr. Zhu to set up the MOMSEI project office in 2010 within the WESTPAC secretariat, with manpower support from the participating countries.

## **7.3 Webpage**

55. The meeting decided the MOMSEI website, among other outreach activities, would be initially developed and maintained by the MOMSEI Project Office in close collaboration with initial institutes of MOMSEI, FIO and PMBC.

## **7.4 Possible endorsement from external scientific bodies, such as CLIVAR SSG**

56. This item has been considered under agenda item 6.

## **7.5 Reporting procedures**

57. It was agreed that the MOMSEI project office will help set up the reporting procedures.

## **8. Contribution of MOMSEI to the 50th Anniversary of IOC**

58. Mr. Zhu introduced this agenda item by briefing the meeting on the a serial of activities to be carried out in 2010-2011 by member states of WESTPAC, China,

Japan, Indonesia, Thailand in contribution to the 50th Anniversary of IOC. Dr. Yu proposed that publishing Science Plan, first MOMSEI cruise would be regarded as contribution of MOMSEI to the 50th Anniversary of IOC.

59. **Action 7.** The meeting decided to contribute to the 50th Anniversary of IOC through publishing the MOMSEI science plan in 2010, carrying out the first MOMSEI cruise in 2010, and holding one workshop in the end of 2010.

## 9. Status on the Regional Ocean Observing System

60. Dr. Khokiattiwong briefly reviewed the history and development of SEAGOOS, with particular focus on the present status of the regional ocean observing system. Mr. Zhu emphasized that the status report would be of help in the identification of the gap between the present observing capability and the social, economic, as well as environmental protection needs of the region. It would be also serving as base line for the future development of SEAGOOS pilot project.

61. This initiative received wide support from participants. The meeting discussed the report framework and timeline of submission of available information from each country.

62. **Action 8.** The meeting decided to start the preparation of this status report as soon as possible, and invited Mr. Adi and Dr. Khokiattiwong to lead the efforts in preparing one user-friendly template and communicate with member states for their inputs. The meeting also encouraged the experts to identify the most suitable experts in their respective countries to join the preparations.

## 10. The Third Workshop ON MOMSEI, Manila, 25-26 Nov. 2009

63. Mr. Zhu informed the meeting that one side session for the MOMSEI Third Expert Workshop was scheduled for 25-26 November 2009 in Manila, Philippines in conjunction with the East Asian Seas Congress 2009. He explained that, to allow for substantial discussion and keep necessary continuity with previous two expert workshops, all participation in the event would be by invitation.

64. The meeting highly appreciated the efforts made by Mr. Zhu in coordinating the event with UNDP/GEF PEMSEA Project Office, and encouraged all present experts to attend and/or identify the most suitable experts in their countries to attend the Third Expert Workshop.

65. **Action 9.** It was agreed that the major agenda for the Third Expert Workshop of MOMSEI would cover: i. the establishment of SSG and adoption of its ToR; ii. the review of the progress made since the Second Expert Workshop; iii. the adoption of MOMSEI Science Plan; iv. the progress on the Status Report on the Regional Ocean Observing System.

## 11. OTHER MATTERS

66. No other matters were discussed under this agenda item.

## 12. CLOSURE

67. Dr. Yu gave a short summary of discussions and thanked all experts for participating in this workshop and expected to work closely with them in the near future.
68. Mr. Zhu thanked all the efforts made in the effective preparation and successful conduct of this meeting.
69. Dr. Somkiat also expressed his thanks to all the participants for their time, efforts and enthusiasm devoted to MOMSEI development.
70. The workshop closed at 12:00, on Sunday, 9 August 2009.

## ANNEX I

UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC (WESTPAC)

### **Second Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon Onset Monitoring and its Social and Ecosystem Impacts (MOMSEI)**

Qingdao, China, 8-9 August 2009

## AGENDA

### **8 August 2009**

1. OPENING
  - 1.1 Welcoming Remarks, Dr. Fangli Qiao, Deputy Director, FIO/SOA, China
  - 1.2 Opening Address by Mr. Wenxi Zhu, Head, IOC/WESTPAC Regional Secretariat
  - 1.3 Opening Address by Mr. Wannakiat Thubthimsang, Director of PMBC, Thailand
  - 1.4 Opening Address by Dr. Somkiat Khokiattiwong, SEAGOOS Coordinator
  - 1.5 Group Photo
2. ADOPTION OF THE AGENDA
3. INTRODUCTION ON THE MOMSEI SCIENCE PLAN
  - 3.1 Background science information, including (1) monsoon climate, (2) monsoon variability, (3) inter-annual coupled events such as IOD, (4) long-term trends
  - 3.2 Scientific frontiers 1: Ocean preconditioning and ocean-atmosphere interaction for monsoon onset
  - 3.3 Scientific frontiers 2: Inter-annual variations of monsoon (late or early) onset and its linkage with the risk of coral bleaching
  - 3.4 Process study of the monsoon onset
  - 3.5 Long-term monitoring requirements and implementation (taking advantage of the IndOOS implementation)
  - 3.6 Capacity building requirements for better science and social benefits
  - 3.7 Outreach
4. IMPLEMENTATION OF THE FIRST CRUISE IN APRIL 2010
  - 4.1 Cruise plan
  - 4.2 Ship and Equipments
  - 4.3 Participants

5. AVAILABLE SOURCE FROM PARTICIPATING COUNTRIES, SUCH AS FUNDING, EQUIPMENT, SHIPTIME, TRAINING
6. COORDINATION AND COOPERATION WITH OTHER RELEVANT PROJECTS
7. ORGANIZATIONAL ARRANGMENTS FOR IMPLEMENTATION
  - 7.1. Scientific Steering Group and its Terms of Reference
  - 7.2. Secretariat and its ToR
  - 7.3. Webpage
  - 7.4. Possible endorsement from external scientific bodies, such as CLIVAR SSG
  - 7.5. Reporting system Procedures

**9 August 2009**

8. CONTRIBUTION OF MOMSEI TO THE 50th ANNIVERSARY OF IOC
9. STATUS ON THE REGIONAL OCEAN OBSERVING SYSTEM
10. THIRD WORKSHOP ON MOMSEI, MANILA, 25-26 NOVEMBER 2009
11. OTHER MATTERS
12. CLOSURE

## ANNEX II

UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC (WESTPAC)

### **Second Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon Onset Monitoring and its Social and Ecosystem Impacts (MOMSEI)**

Qingdao, China, 8-9 August 2009

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