Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS)

Second Session

Nice, France
22–24 May 2006

UNESCO

Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS)

Second Session

Nice, France
22–24 May 2006

UNESCO 2006

ICG/NEAMTWS-II/3
Paris, 30 June 2006
English only

Abstract

The Second Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), established by the IOC Assembly during its 23rd Session in June 2005, through Resolution XXIII-14, took place in Nice, France, on 22-24 May 2006 at the Palais du Roi Sarde.

The Meeting, kindly hosted by the Conseil général des Alpes-Maritimes, was attended by approximately 70 participants from 17 countries, 5 partner organizations and observers.

The Meeting reiterated the urgent need to establish a tsunami warning system for the NEAM region and emphasized the necessity to ensure full and active participation of all Member States of the NEAM region and relevant organizations to establish the tsunami warning system, urging Members States to provide continuous support to the activities of the intersessional working groups and to the Secretariat for coordinating the process.

The ICG nominated or confirmed the following Chairs and Co-chairs of the intersessional Working Groups:

1. Working Group 1 on Hazard Assessment, Risk and Modelling: France and Spain;
2. Working Group 2 on Seismic and Geophysical Measurements: Italy and Germany;
3. Working Group 3 on Sea Level Data Collection and Exchange, including Offshore Tsunami Detection and Instruments: Spain and Algeria;
4. Working Group 4 on Advisory, Mitigation and Public Awareness: Portugal and United Kingdom.

The ICG adopted the terms of reference for the working groups and recommendations for the plan of action, based on their deliberations as well as the proposed three levels of functions for the architecture of the tsunami warning system, taking into account the experience of the PTWS and opened them for review at the Third Session.

These recommendations will form the basis for the formulation of a complete plan of action for the ICG/NEAMTWS that will be presented at Third Session of the ICG, to be held in Bonn, Germany, in January 2007.

The also Meeting stressed the need for the ICG/NEAMTWS to further explore opportunities of funding from the European Commission as well as modalities of cooperation with relevant global and regional organizations.

The IOC Executive Council at its 39th Session will be invited to endorse the recommendations for the plan of action formulated by the ICG and to provide further advice, support and resources for its implementation.

(SC-2006/WS/50)

TABLE OF CONTENTS

page

ANNEXES

1. OPENING

1 The Executive Secretary of IOC opened the meeting on Monday, 22 May 2006, at 10:30. He thanked the Conseil général des Alpes-Maritimes for hosting the meeting and the excellent logistic arrangements. He recalled a previous meeting held in Nice in 2005 where it was emphasized that in Europe and the Mediterranean there are no tsunami early warning and mitigation systems (TWS) in place and underlined the challenge to reduce the delay in the detection and warning process. This aspect appears particularly relevant in the Mediterranean region, where the density of the coastal population and infrastructure is growing. Today, a TWS for the NEAM region is promoted by scientists and experts —a community of knowledge— but more commitments are required by governmental agencies to support the process, including identifing focal points in charge of receiving and issuing tsunami warnings. It will be very important to set the requirements for such a TWS. He then gave the floor to Mr Lionnel Luca.

2 Mr Lionnel Luca, Vice President of the Conseil général des Alpes-Maritimes, intervened on behalf of Mr Christian Estrosi, Minister Delegate for Regional Development of the French Government, who could not attend due to an intergovernmental seminar. He conveyed his salutations to the meeting. Mr Luca recalled the tragedy that struck the Indian Ocean in December 2004 and reiterated the indispensable need to activate a European TWS, including the Mediterranean region, where there is a significant record of historic tsunamis, most notably due to the recent earthquake in Algeria that claimed 2,000 victims and that generated a tsunami wave that reached the Balearic Islands. The First Session of the ICG/NEAMTWS (Rome, 21–22 November 2005) set the stage for the creation of the TWS in the North-eastern Atlantic, the Mediterranean and connected seas, with the commitment of putting in place initial components of the system by December 2007. Several countries have committed themselves to this effort, most notably Italy, France, Spain, Portugal, and Greece. In France, a telecommunication system already exists that could support the TWS. He underlined the need to sensitize coastal populations who may be affected by tsunamis and to put in place preventive actions. In this context he emphasized that the French Government, the Conseil général des Alpes-Maritimes, Météo-France and the Seismic department in Paris are willing to significantly contribute to the ICG process. He stressed two main actions: (i) deepening the knowledge of tsunamigenic phenomena and (ii) improve preventive actions, including improved bathymetry maps (the full speech is available in Annex IV-A).

3 Professor Stefano Tinti, University of Bologna, Chairman of the ICG/NEAMTWS, thanked Mr Luca for the strong commitment expressed by France towards its contribution to a TWS for the Mediterranean, in a wider Euro-Mediterranean context, and the support to the ICG/NEAMTWS process. He emphasized the challenge of this Meeting to achieve the objectives and commitments taken at the First Session of the ICG/NEAMTWS.

2. ORGANIZATION OF THE SESSION

4 The Chairman of the ICG/NEAMTWS introduced this agenda item.

2.1 ADOPTION OF THE AGENDA

5 The Chairman of the ICG/NEAMTWS introduced the provisional Agenda prepared by the Secretariat (ICG/NEAMTWS-II/1 Prov.) and its annotation (ICG/NEAMTWS-II/2).

6 Israel proposed to add to the agenda the election of the officers of the working groups. The Chairman of the ICG/NEAMTWS explained that this would be discussed under Agenda Item 3.2.

7 Portugal thanked the French Government for hosting the meeting and then asked the organization for enough time to be given for the working groups and, in addition, emphasized the need to properly discuss Item 6 of the Agenda on Programme and Budget for 2006–2007 to foster the process to establish the TWS and in particular to ensure that milestones and timelines are associated with the recommendations and the according part of the action plan. The representative of Portugal asked the Chairman of the ICG/NEAMTWS to introduce in his plan of action the new elements that may emerge from the discussion of the working groups. He also called for assessments of national capacities of implementing the TWS and stressed that the next meeting should be convened after sufficient time to allow for intersessional activities.

8 Italy thanked France for organizing this meeting after the one in Rome and recalled the commitments taken by Italy for the TWS to be established in due time. Italy, too, emphasized the need to better define the programme and budget of the ICG process.

9 **The ICG approved** the Agenda as in Annex I.

2.2 DESIGNATION OF THE RAPPORTEUR

10 According to Rule of Procedure no 25.4, France proposed Greece as rapporteur in the person of Dr Papadopoulos from the National Observatory of Athens, and Germany endorsed the proposal. The ICG then elected Dr Papadopoulos, Greece, as Rapporteur of the Session to work with the Secretariat for the preparation of the Draft Summary Report (this document, ICG/NEAMTWS-II/3 Prov.).

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

11 The Chairman of the ICG/NEAMTWS explained that the meeting would include plenary sessions, for which simultaneous English-French interpretation would be available, and working group sessions. The four Working Groups would meet in three breakout sessions, each followed by a plenary session, with a view to adopt concrete decisions and recommendations to meet the ambitious objectives set at ICG/NEAMTWS-I. **The ICG adopted** the provisional Timetable (ICG/NEAMTWS-II/1 Prov. add.).

12 The Executive Secretary introduced the documentation for the session. The documentation, including the report of ICG/NEAMTWS-I and the terms of reference for the working groups, are available on the ICG/NEAMTWS website: (http://ioc3.unesco.org/neamtws/).

3. REPORT ON ICG/NEAMTWS-I AND INTERSESSIONAL ACTIVITIES AND FUTURE DIRECTIONS

13 The Chairman of the ICG/NEAMTWS introduced this agenda item.

3.1 OVERVIEW OF THE ACTIVITIES OF THE ICG/NEAMTWS AND FUTURE DIRECTIONS

14 The Executive Secretary provided a presentation of the NEAMTWS as part of a global system. He highlighted world tsunamigenic sources, including in the Mediterranean. A tsunami

generated in the Mediterranean will hit the adjacent coast in a few minutes; therefore countries will have to be prepared and rely on their own network, especially for local tsunamis. In 1965, the first ICG was established in the Pacific (ITSU, then PTWS, 25 countries); some of the Indian Ocean countries belong also to the Pacific system (Indonesia, Thailand). Approximately 40 times a year a major earthquake activates this system, but does not necessarily result in a tsunami. This system has been successfully creating awareness and operating for more than 40 years, backed by an extensive sea-level and seismic network. In the case of the Indian Ocean tsunami in December 2004 no regional TWS existed. In spring 2005, an interim TWS was established for the Indian Ocean, and later in June 2005 the IOC 23rd Assembly established three more ICGs: IOTWS, CARIBE-EWS and NEAMTWS. In global terms, the Mediterranean Sea represents 25 percent of tsunami events and the Atlantic, 12 percent. He underlined this by recapitulating the major historical tsunamis in the region. However, there is a general lack of public recognition of the actual threat to the coastal areas. The general opinion is still that a TWS is not required for the Mediterranean and the NE Atlantic.

15 In 2005 an interim TWS for the Indian Ocean was initiated with the assistance of the Japanese Meteorological Agency and the Pacific Tsunami Warning Centre in Hawaii. The process included the formal establishment of the IOTWS but also technical meetings, the creation of an action plan entailing the upgrade of seismographic and sea level networks to real time requirements as well as communication and warning systems. The initial system is based on 26/29 national warning centres (active 24x7) responsible for the national tsunami emergency system and plan. Through the post tsunami IOC/ISDR/WMO initiative, sixteen national assessments based on field missions requested by the countries in the IO region reviewed the national needs for an effective TWS in the context of ICG/IOTWS (a consolidated assessment report was released in December 2005). This provides the basis for a comprehensive implementation plan based on national activities and plans. This process could be replicated, with adaptation, in the NEAM region. Finally, the Executive Secretary stressed the need to ensure awareness and preparedness of people towards extreme events such as tsunamis: a recent drill in the Pacific Ocean and a post-mortem analysis of the recent earthquake in California showed the need to improve the downstream part of the TWS.

16 The Chairman of the ICG/NEAMTWS provided a summary of the main activities and results following ICG/NEAMTWS-I detailing the scope and directions for future TWS implementation and regional coordination (ICG/NEAMTWS-II/6). The First Session (Rome, 21–22 November 2005) was attended by 23 national delegations, 13 collaborating organizations, and numerous observers. The NEAM region is quite prone to tsunamis, in particular the Southern European coastline. He emphasized the lack of a regional TWS, the potentially disasterous effects of tsunamis due to intense coastal development, strong tourism and population growth. He also highlighted the different levels of resources and development required for establishing such a system in the region. He reviewed the terms of reference of the ICG, such as exchanging seismic, geodetic, and sea level information and developing national tsunami warning and mitigation capacities. The key objectives of the ICG are the formulation of an action plan (end of 2006) and the setting up of an initial system (end of 2007).

17 For Working Group 1, the Chairman of the ICG/NEAMTWS reported on the global sources of tsunamis (72% earthquakes, 10% mass movement, 5% volcanic activities, 2% meteorological, which are not considered by the ICGs, and other unknown sources). Countries most exposed are, Italy, Greece, Portugal and Turkey, including large cities (Heraklion, Istanbul, Lisbon, Messina, Naples, and Palermo). To be addressed is the lack of knowledge of tsunami sources, distinguishing between local tsunamis (hitting in a few minutes and requiring automated TWS and detection algorithms) and regional tsunamis (hitting at most in tens of minutes and

requiring a decision matrix based on location and magnitude). He provided examples from Messina and the Dead Sea fault and showed the PTWS decision matrix based on location, magnitude, potential and bulletin type, and called for a specifically adapted matrix for the NEAM region. As for landslides, the ICGs are not considering this problem, which is important for the NEAM region: identification, characterization, classification (e.g. Storega slide and events in the Corinth Gulf). Volcanic eruptions should be monitored on an individual basis, with specific local TWS's (e.g. on Stromboli). Concerning risk assessment, concepts need to be defined: vulnerability and risk indicators, hazards maps, inundation maps, risk maps, evacuation maps, building codes for tsunami prone coastal areas. Tsunami models need to be improved for high-resolution simulations and sources other than earthquakes, high resolution bathymetry and digital elevation models; techniques should be improved to compute tsunami forecast models and develop standard procedures and methods to produce and validate scenarios.

18 For Working Group 2, the Chairman of the ICG/NEAMTWS emphasized the good coverage of seismological and geophysical networks (VEBSN, Geofon/GFZ, MEDNET, CGPS), with some limitations for Northern Africa. However, these networks are not directly available to the TWS: a core subset of stations should be identified to form the backbone of the initial system, enhancing data quality, shortening delivery delay, transmission format, and network coverage near tsunami source regions.

19 For Working Group 3, the Chairman of the ICG/NEAMTWS reviewed the networks of sea level gauges (especially assembled by GLOSS, ESEAS and MedGLOSS) in the region. He emphasized that for coastal sea level monitoring there is a need to further define quality and data acquisition standards and achieve real-time transmission. For deep-sea sea level measurements, there is a need of multi-parameter ocean-bottom platforms to reduce costs, including ocean bottom seismometers as well as the use of hydrophone arrays, and upgrading existing buoy systems.

20 For Working Group 4, the Chairman of the ICG/NEAMTWS focused on the need to learn from other ICGs for policy advisory, the need for a general approach to strategic planning and integrated coastal zone management, and the need to tailor public preparedness programmes to the end users and acknowledge cultural differences.

21 According to the Chairman of the ICG/NEAMTWS, issues that seem to be uncovered at present by the ICG are capacity building and technology transfer, on a multilateral basis, and the general architecture of the ICG (TW centres, focal points, responsible agencies).

22 Portugal commended the presentations by the Executive Secretary and the Chairman of the ICG/NEAMTWS. He asked the Chairman of the ICG/NEAMTWS to introduce in his action plan the new elements that may emerge in the discussion of the working groups. Portugal also supports the proposal for assessments of national capacities and recommended the preparation of an informative paper to sensitize Member States on the need for a TWS.

23 Germany recalled the commitments taken in Rome as the appropriate schedule to follow. Given the limited progress so far he called for the next meeting to be convened in less than one year from now.

3.2 REPORTS ON THE ACTIVITIES OF THE WORKING GROUPS

24 The Chairman of the ICG/NEAMTWS reviewed the status of the co-chairmanships of the working groups:

25 Working Group 1 on Hazard Assessment, Risk and Modelling: France and Spain (nominated at ICG/NEAMTWS-I).

26 Working Group 2 on Seismic and Geophysical Measurements: Italy and Germany (proposal by the Chairman).

27 Working Group 3 on Sea Level Measurements: Spain and Algeria (proposal by the Chairman).

28 Working Group 4 on Advisory, Mitigation and Public Awareness: Portugal and Italy (nominated at ICG/NEAMTWS-I). Italy proposed to be replaced by the United Kingdom (Mr Russel Arthurton).

29 Portugal proposed that Professor Luis Matias would substitute for Professor Luis Mendes-Victor in Working Group 4 at this session.

30 Israel supported the chairmanship of Spain (Dr Begoña Perez). However, as the representative of Israel and MedGLOSS, he proposed himself as the co-chair of Working Group 3 jointly with the representative of ESEAS (represented at the session by Bente Lilji Bye).

31 Germany noted that only national representatives are eligible to chair working groups of an IOC subsidiary body.

32 The Chairman of the ICG/NEAMTWS underlined that MedGLOSS and ESEAS should cooperate with the working groups but reiterated the proposal that Algeria and Spain should co-chair Working Group 3, as the working groups should be chaired only by national authorities. He emphasized the need to maximize the participation of Northern African countries and that Algeria could provide an important contribution to the ICG process. He also reiterated that his proposal was aimed at an inclusive rather than exclusive approach.

33 ESEAS supported the need to give support to Northern African representation in the process.

34 The Executive Secretary noted that ESEAS is a strong programme on sea level data exchange that can provide an essential contribution to the ICG goals. He also emphasized that networks such as ESEAS and MedGLOSS are already parts of GLOSS; therefore, they are already part of this global effort. However, every country will have to designate proper governmental institutions to participate in the process. He also noted that the process of designation of national focal points is proceeding slowly.

35 Portugal emphasized the intergovernmental nature of the ICG, which remains open to collaborations, but representatives in the working groups should be governments, with representatives designated by Member States. He also called for a balance between Mediterranean and Atlantic, North and South for a better representation and sustainability of the process.

36 Algeria noted the relevance of its country from the standpoint of tsunamigenic events. Algeria just completed the mapping of their ocean margins and supported the idea that Algeria should be one of the important partners of the regional ICG process. The population of Algeria is concerned following the 2003 earthquake.

37 The Chairman of the ICG/NEAMTWS proposed that during the session Working Group 3 should be co-chaired by Spain (Dr Begoña Perez) and Israel (Mr Don Rosen), with an agreement that the sessional chairmanship be brought to the Plenary by the Working Group 3 itself.

38 Following the proposal by Israel to elect the Chair and Co-chair of Working Group 3 in consultation with ESEAS and MedGLOSS, the Chairman proposed that Spain and Algeria would be chairing the Working Group until the next Session.

39 MedGLOSS and ESEAS were willing to support the nominations.

40 **The ICG adopted** the proposal of the Chairman of the ICG/NEAMTWS.

41 The Co-chairs of the four working groups then provided reports on progress achieved during the intersessional period.

42 Working Group 1. Dr François Schindelé, Chairman of WG1, gave an overview of the group objectives, goals and progress for the Tsunami Hazard Assessment, Risk and Modelling, starting from the terms of reference of the ICG/NEAMTWS-I, and focused on the collection of information on local and distant tsunami inundation maps and the estimation of coastal areas susceptible to tsunami flooding. Considerations concerning earthquakes, landslides and volcanic activities monitoring and recommendations for modelling, vulnerability and risk assessment have been pointed out. Existing arrangements, with regard to tsunami hazard assessment, risk and modelling, had been listed as National and International Programmes, list and reference of Tsunami database (ITDB Developed by Russia as ICG/PTWS and USA Programmes distributed by Russia and IOC, WDC Tsunami Database, Countries Database), Post-Tsunami Survey (International Team –ITIC Documentation, IOC Guide), Paleotsunami research and Numerical Modelling. It is important to facilitate data sharing, including access and development of databases, incorporating exposure, tsunami hazard and vulnerability and to facilitate capacity building, including knowledge transfer, in the form of workshops, training programmes and case studies for risk assessment.

43 Working Group 2. In his presentation on Working Group 2, Dr Alessandro Amato, Director of the “Centro Nazionale Terremoti Istituto Nazionale di Geofisica e Vulcanologia” (INGV) of Rome, highlighted some discussion points such as the status and the need for improvement in national and trans-national seismic networks, the status and the progress of multi-sensor stations (weak/strong-GPS), real time and latencies of BB stations as well as Sea-bottom BB (and DPG) sensors. The discussion focused moreover on the nature of information, both automatic and expert-driven, and on the maintenance and training of the network and the analysis centres.

44 Working Group 3. Dr Begoña Pérez presented the status of sea level networks, mainly MedGLOSS and ESEAS, which represent a densification of GLOSS in Europe and the Mediterranean respectively. These networks receive sea level data from many different national institutions; most have severe national data policy restrictions. In most cases data sampling rates are not adequate for tsunami warning systems. MedGLOSS was established in 1996 and sponsored by CIESM (Mediterranean Science Commission) and IOC. Actually MedGLOSS comprises 42 stations, of which 15 stations deliver data in near real time but not better than once an hour. ESEAS (European Sea Level Service) was initiated with a view on Operational Oceanography in 2001, and encompasses the collaboration of organizations in 23 European countries and is closely collaborating with MedGLOSS. During the presentation, the need for operational systems was highlighted. Conclusively it has been pointed out that there is an urgent need to integrate North African tide gauges in the existing networks to share data and benefit

from common developments. Nevertheless, most tide gauges are far from ready to meet tsunami warning system requirements and need significant upgrades.

45 Mr Dov Rosen, Israel, presented the MedAlert project, a MedGLOSS project proposal to GCOS for a Regional Action Plan for the Mediterranean Basin. The presentation is available at http://ioc3.unesco.org/neamtws/.

46 Working Group 4. In his presentation Mr Russell Scott Arthurton focused on the proposal to develop *IOC Guidelines for mainstreaming marine-related hazards and risks mitigation in Integrated Coastal Area Management (ICAM), with special emphasis on the Mediterranean*. IOC's role in mitigation of marine-related hazards is to facilitate and/or deliver capacity of its Member States about the key activities recognized by Working Group 4 at the Rome meeting, such vulnerability assessments, strategic planning in the coastal zone and the promotion of the research required to better understand the human factors contributing to vulnerability. Types of marine-related hazards to be covered by the guidelines are extreme events, such catastrophic hazards, and long-term, incremental hazards. The assessment of the risk should focus on the incidence of hazard events at local to regional scales, the susceptibility of coasts to inundation and the vulnerability of coastal population. Assuming awareness of the risk, the response should focus on reducing susceptibility to inundation with the scope of sustainable improvements, and reducing vulnerability of coastal communities both in emergencies and over the long-term through strategic measures. The hazard mitigation strategies should include a checklist of the risk assessment (credibility and improvement of effectiveness) and of the response (suitability, feasibility, affordability and sustainability). Countries do not necessarily have effective emergency responses, and strategic planning and development are key responses in reducing vulnerability. There is the need for a continual monitoring and maintenance of standards of protection and the TWS must be in place from global to local scales. Emergency plans must be tested and resourced, and need to be implemented.

3.3 REPORTS FROM OTHER UNITED NATIONS ORGANIZATIONS

47 Mr Edgard Cabrera, Chief, Ocean Affairs Division, World Meteorological Organization (WMO) provided a report on their involvement and contribution to the ICG/NEAMTWS. He informed the Session that nearly 90 percent of natural disasters were weather-, climate- and water-generated. He stressed the importance of a well-functioning "end-to-end early warning system" capable of delivering accurate information to the population at risk, in a consistently timely manner. It is a fundamental challenge for the warnings to be delivered to the government authorities, risk managers and the public at risk in a manner in which they canfully understand and utilize it. The role of the National Meteorological and Hydrological Services (NMHSs) is to exchange warnings and messages among appropriate organizations. In this regard WMO is collaborating with other key agencies of the United Nations system (IOC, ISDR, and the World Bank) to put into operation the TWS of the Indian Ocean. WMO is also providing support for natural disasters and the implementation of a comprehensive global multi-hazard warning system. Another area of support concerns maritime safety at IMO (the full speech in available in Annex IV-B).

4. WORKING GROUP MEETINGS

48 The Chairman of the ICG/NEAMTWS introduced this agenda item.

4.1 TERMS OF REFERENCE

49 The Chairman of the ICG/NEAMTWS introduced the terms of reference for the four working groups: (i) Hazard Assessment, Risk and Modelling; (ii) Seismic and Geophysical Measurements; (iii) Sea Level Measurements; and (iv) Advisory, Mitigation and Public Awareness.

50 The following comments were made on the terms of reference:

51 Germany proposed that the terms of reference be revised to identify action lists with possible budget information and requested that the existing terms of reference not be amended at every meeting.

52 Croatia suggested taking other tsunamigenic sources like meteorological phenomena into account.

53 The I-GOOS Chair underlined the need to cooperate for identifying which requirements are specific to the Mediterranean and the Eastern Atlantic

54 The USA suggested that coordination should be ensured with information centres in other regions, such as ITIC.

55 The UK representative emphasized that there is a need to ensure that the terms of reference of the Working Groups should be more result-orientated while ESEAS noted that the ToR of Working Group 3 may not be correct and should be revised.

56 The Executive Secretary commented that the proposal from the UK was the most reasonable and that the working groups themselves should consider the terms of reference and eventually present specific proposals to the Plenary.

4.2 BREAK OUT SESSIONS

57 The four working groups met separately in three sessions, with a view to elaborate on proposals for concrete actions and recommendations in line with the elements of the ICG Plan of Action.

4.3 REPORTING IN PLENARY

58 Discussions, results, proposals and recommendations from the working group sessions were presented in three instances to the plenary session by the respective chairs. The detailed reports from the working groups, including summaries of discussion, recommendations and elements for the plan of action, are contained in Annex II-2.

59 Working groups 2, 3 and 4 proposed also to amend their terms of reference, as indicated in Annex II-1.

60 Then Member States made comments about the presentations of the working groups.

61 Italy commented on the results of the Bonn conference on early warning and the important role of local authorities; however, this has not been considered in Working Group 4 and should be done.

62 France suggested that the ICAM guidelines proposed by Working Group 4 be built on existing products of the IOC.

63 The Chairman of the ICG/NEAMTWS suggested that the initial tsunami warning system should focus on regional events of high magnitude and not on local tsunamis. This should be reflected in the plan of action to be developed in cooperation with the working groups.

64 The Chair of Working Group 4 noted that hazard assessment as addressed by WG 4 should be considered in a synergetic way with the work done by WG 1. In the following discussion the UK representative emphasized the need to closely coordinate activities with ICAM, while WMO addressed the ICG to take the multi-hazard perspective and the outcome of the interagency workshop on multi-hazard coordination in Geneva into account.

65 The UK and France expressed their concern and view on a proper wording for the future tsunami bulletins distributed, depending on their function. According to the sovereignty of Member States on their territory, regional centres should only deliver tsunami advisories or alerts while the actual warning can only be disseminated through the responsible national 24/7 tsunami focal points.

66 France stressed the need for interoperability during the intersessional work of the working groups.

67 Greece noted that the architecture of the TWS had not been discussed yet.

68 Germany and France expressed their concern about the timeframe and that for the intersessional work and activities of the WG it would be very helpful to have the draft outline and structure of the regional TWS ready by mid June so that the IOC Executive Council would be able to endorse.

69 During the following discussion on a possible TWS structure, France emphasized focusing on functions and not on centres.

70 The Chairman of the ICG/NEAMTWS stated that the next semester should see the identification of a framework for the architecture, including the definition of one or more regional or subregional centres. Based on the fact that several Member States do not have the mandate to decide upon the future structure of the NEAMTWS the chairman proposed establishment of an ad hoc Working Group, consisting of the ICG officers and the working group chairpersons, to draft the TWS architecture to be endorsed by the next ICG session in Bonn.

71 Greece noted that the recommendations of Working Group 1 requested excessive actions from the countries while data availability is an important issue since some of these data are of a sensitive or confidential nature.

72 The Chair of Working Group 1, in representation of the ad hoc Working Group, presented a proposal of the architecture of the tsunami warning system (Annex II-3), based on three levels of functions that parallel the architecture of the PTWS. The proposal will be reviewed at the Third Session.

5. OTHER BUSINESS

73 The Chairman of the ICG/NEAMTWS urged the Member States to nominate their national tsunami focal points.

6. PROGRAMME AND BUDGET FOR 2006–2007

74 The Chairman of the ICG/NEAMTWS emphasized that the only identified funding is the financial coverage of the organization of the Third Session by Germany and stressed the need to support developing countries, particularly from Africa, to participate in the work of the ICG. The Chairman of the ICG/NEAMTWS will coordinate with Germany for ensuring significant participation of developing countries in the next session.

75 The Chairman of the ICG/NEAMTWS recalled that the Executive Secretary had reminded the Session that several research projects concerning tsunamis are being funded by the European Commission. A European consortium submitted a proposal to the European Commission (DG INFSO) to develop tsunami-related research in the Mediterranean and the Indian Ocean. The Chairman emphasized the need to further explore funding possibilities from the European Commission and requested that the Executive Secretary explore such possibilities with the support of countries holding presidencies of the European Union.

76 Israel informed the Session that CGOS submitted a proposal to the European Commission concerning climate change and that this may involve the installation of new tide gauges in Algeria and other North African and Middle East countries.

77 The Chairman of the ICG/NEAMTWS informed the Session of his intention to submit proposals to the European Commission to fund activities of the ICG/NEAMTWS.

78 The representative of ESEAS informed the Session about a white paper on Sea Level Measurements that will be offered as an information document to the ICG/NEAMTWS.

7. DATES AND PLACE FOR ICG/NEAMTWS-III

79 The meeting received offers to host the next session from Portugal, Greece and Germany. The Chairman of the ICG/NEAMTWS asked the countries to present a concerted position on this.

80 Portugal suggested that before taking the decision it would be important to assess progress with the work of the ICG, in particular at the level of the working groups. Portugal demanded that a collective view be given of the status of the ICG implementation to then decide when best to organize the next meeting in view of the work to be produced.

81 Greece stated that the next session could be organized by Germany by early 2007, then by Portugal around June 2007, and finally by Greece by the end of 2007 or early 2008.

82 The Chairman of the ICG/NEAMTWS stated that the process was slow due to organizational problems and that based on this meeting the intersessional work would advance well and more efficiently than in the past. Therefore, the next session could be held in six to seven months from now.

83 The Chairman of the ICG/NEAMTWS expressed appreciation for the German offer for the next session in Bonn in January 2007.

84 Portugal expressed support for the offer of Germany to have the next session in Germany in January.

85 **The ICG accepted** the offer of Germany to host the next session in January 2007. The subsequent sessions will be in Portugal in September 2007 and in Greece at the beginning of 2008.

8. ADOPTION OF DECISIONS AND RECOMMENDATIONS

86 Based on the reports of the working groups and the discussions at the plenary sessions, **the ICG adopted** Recommendation NEAMTWS-II.1 (see Annex II).

9. CLOSING

87 The Chairman of the ICG/NEAMTWS thanked the Government of France and the Conseil géneral des Alpes-Maritimes for hosting the meeting and the excellent organization. He closed the meeting on Wednesday, 24 May 2006, at 15:30.

ANNEX I

AGENDA

1. OPENING

2. ORGANIZATION OF THE SESSION

2.1 Adoption of the Agenda
2.2 Designation of the Rapporteur
2.3 Conduct of the Session, Timetable and Documentation

3. REPORT ON ICG/NEAMTWS-I AND INTERSESSIONAL ACTIVITIES AND FUTURE DIRECTIONS

3.1 Overview of the Activities of the ICG/NEAMTWS and Future Directions
3.2 Reports on the Activities of the Working Groups
3.3 Reports from other United Nations Organizations

4. WORKING GROUP MEETINGS

4.1 Terms of Reference
4.2 Break Out Sessions
4.3 Reporting in Plenary

5. OTHER BUSINESS

6. PROGRAMME AND BUDGET FOR 2006–2007

7. DATES AND PLACE FOR ICG/NEAMTWS-III

8. ADOPTION OF DECISIONS AND RECOMMENDATIONS

9. CLOSING

ANNEX II

Recommendation NEAMTWS-II.1

DEVELOPMENT AND IMPLEMENTATION OF THE INTERGOVERNMENTAL COORDINATION GROUP FOR THE TSUNAMI EARLY WARNING AND MITIGATION SYSTEM IN THE NORTH EASTERN ATLANTIC, THE MEDITERRANEAN AND CONNECTED SEAS

The Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas,

Having met in Nice from 22 to 24 May 2006 at its Second Session,

Expressing its gratitude to the French Government and the Conseil général des Alpes-Maritimes for hosting this Session,

Reiterating the urgent need to establish a tsunami warning system for the NEAM region,

Emphasizing the need to ensure full and active participation of all the Member States of the NEAM region and relevant organizations to establish the tsunami warning system,

Nominates or confirmes the following Chairs and Co-chairs of the intersessional Working Groups:

- Working Group 1 on Hazard Assessment, Risk and Modelling: France and Spain;
- Working Group 2 on Seismic and Geophysical Measurements: Italy and Germany;
- Working Group 3 on Sea Level Data Collection and Exchange, including Offshore Tsunami Detection and Instruments: Spain and Algeria;
- Working Group 4 on Advisory, Mitigation and Public Awareness: Portugal and United Kingdom;

Adoptes:

(i) the amended terms of references proposed based on the deliberations of the Working Groups (Annex 1 to this Recommendation);

(ii) the recommendations for the plan of action proposed by the Working Groups (Annex 2 to this Recommendation); and

(iii) the proposed three levels of functions for the architecture of the TWS, taking into account the experience of the PTWS, open for review at the Third Session (Annex 3 to this Recommendation);

Acceptes the kind offer of Germany to host the Third Session in Bonn, in January 2007;

Invites the Executive Council at its 39th Session to endorse the recommendations for the plan of action;

Urges Members States to provide continuous support to the activities of the intersessional working groups and to the Secretariat for coordinating the process;

Requests the Executive Secretary to explore funding opportunities with the European Commission for ICG/NEAMTWS activities;

Requests the Executive Secretary to explore opportunities and modalities of cooperation with other UN and relevant organizations involved in aspects of relevance to the ICG in the NEAM region, in particular, UNEP's Mediterranean Action Plan and the International Standard Organization.

Identified funding:	Germany: for the organization of the Third Session
Unidentified funding:	For the activities of the working groups and the Secretariat

Annex 1 to Recommendation NEAMTWS-II.1

TERMS OF REFERENCE FOR THE WORKING GROUPS

Working Group 2 – Seismic and Geophysical Measurements

The working group will be responsible for defining, based on existing organizations and functions, a transnational seismic network as part of early warning tsunami detection instruments in seismically active coastal areas and providing recommendations on the according data processing and analysis.

Working Group 3 – Sea Level Measurements

The Working Group proposes to change the title to Sea level data collection and exchange, including offshore tsunami detection instruments.

The working group will be responsible for developing and deploying a network of real time sea level networks for the international tsunami warning system and to supplement regional tsunami warning centres.

These terms of reference remain to be discussed and possibly modified

Working Group 4 – Advisory, Mitigation and Public Awareness

The working group will review existing practices for mitigation response (emergency and planning) to tsunami and other marine-related hazards with special attention to advisory messages, identifying shortcomings and making recommendations for response procedures appropriate to the region within the context of integrated coastal area management. It will assess perceptions of risk in respect of marine-related hazards, examine the human impacts that contribute to the vulnerability of coastal communities, and make recommendations on how vulnerability could be reduced. It will also promote tsunami education and awareness programmes in the region.

Annex 2 to Recommendation NEAMTWS-II.1

RECOMMENDATIONS FROM THE WORKING GROUPS

Sessional Working Group 1 – Hazard Assessment, Risk and Modelling

Chairman: Schindelé, F.
(CEA-DASE, France)

Rapporteur: Gonzalez, M.
(Universidad de Cantabria, Spain)

Introduction

During the plenary session of ICG/NEAMTWS, it was decided that Working Group 1 would be responsible for collecting and exchanging information on local and distant tsunamis from existing historical data, including seismic data, sea level data, and deep-sea pressure measurements, in view of assessing tsunami hazard, vulnerability and risk. This would also comprise tsunami modelling, including bathymetry and inundation mapping and prediction and scenario development using internationally accepted numerical model methodologies. Estimates of coastal areas susceptible to tsunami flooding will be available from a network of modellers and data managers who will be sharing community modelling tools via the Internet.

Discussion

Working Group 1 (WG1) focused on the main topics of 1) assessment of hazard, vulnerability and risk associated with tsunamis and 2) of tsunami modeling, with the main purpose to identify the needs and requirements to support the implementation of an efficient tsunami warning and mitigation system in the area of the interest (AOI) of the ICG/NEAMTWS.

WG1 addressed the problem of the identification and characterization of the tsunamigenic sources. It has been stressed that most tsunamis are induced by earthquakes, but that also landslides (either submarine or subaerial) and volcanic activity may contribute to tsunami generation, and that the case of combined or multiple sources is not negligible, such as the occurrence of an earthquake that triggers a landslide, both being tsunamigenic. It has also been stressed that almost all the tsunamigenic sources of the AOI are located in the near-shore belt with the relevant consequence that tsunamis hit the nearest segment of coast within a very short time. There has been much progress in the understanding of seismicity and of the seismotectonic processes of the AOI, thanks to the advancement of seismology and the implementation of local, national and international seismic and geodetic networks. In spite of these efforts a lot of uncertainty persists in the identification of the seismic faults that were responsible for the major tsunami occurrences in the AOI, such as the 1755 “Lisbon” earthquake, the 1693 eastern Sicily earthquake, the 1627 south Adriatic shock, the 365 and the 1303 Hellenic Arc earthquakes, to name a few.

As regards the tsunami potential of submarine or coastal origin, it has been observed that marine geology and geophysics contributed to identify several areas in the AOI where sliding processes took place with high probability of having excited tsunami waves. But, it was further recognized that no systematic studies or surveys covering homogeneously the coastal margins and the volcanic submarine or island edifices have been conducted so far. The aim of the study would be

to make an inventory and a classification of the potential sources in terms of their stability, volume, possible run-out, potential for tsunami excitation, etc. It has been further observed that the landslide-generated tsunamis represent a very common phenomenon, ranging some order of magnitudes in volume and in the repeat time. It is recognised that in the AOI the landslide generation problem has specific features as far as hazard, vulnerability and risk assessment are concerned, due to the specific active tectonic setting, the jagged coastline, the existence of many sub-basins and the high density of population and infrastructures on the coasts.

WG1 considered further that all present-day operational TWSs use a decision matrix that is only based on earthquake occurrences, and more specifically on 1) the epicenter position with respect to the coastline, 2) focal depth and 3) earthquake magnitude. The operational practice is that after an earthquake the three needed elements are evaluated and fit into the decision matrix in order to decide which kind of warning is to be launched. The marine sensor network is then used to validate or to disprove the tsunami occurrence, leading to an updated warning or to a warning cancellation. This practice proved to be appropriate for very many cases of tsunamigenic earthquakes in the Pacific, but it has relevant limitations that require corrections and improvements for its efficient implementation in the AOI, with two main drawbacks delineated as follows:

1. The first consideration concerns the coastal sources. Very local tsunamis hit in a short time and do not leave time for a precise determination of the decision matrix parameters, which calls for different criteria to identify local tsunami generation.
2. Second, for very large tsunamigenic earthquakes, which pose the highest level of threat, knowledge of the fault geometry (and especially length, position and strike) and kinematics is needed in order to characterize the tsunami generation and propagation, taking into account the typical tsunami directivity.
3. In order to cover the case of non-seismic sources, presently, the decision matrix is extended in such a way that an alert is launched also in the absence of seismic signals, provided that an anomalous, large and sudden, change of the sea level is detected by some marine sensors. The efficiency of the method is not proven, since no warning has ever been launched so far only based on this condition. What can be observed, however, is that today's marine sensor networks are not configured with the scope of capturing tsunamis produced by landslides, which means that very probably a tsunami induced by a landslide (associated either with gravitational instability or with instability due to seismic loading) either would pass totally undetected or would be detected too late. This underlines the importance of testing and deploying observational systems capable of detecting the landslide itself, and the quick determination of those parameters that are relevant for tsunami generation. In a sense, there is a need to specify a second type of decision matrix specific for the landslide generation mechanism. The set of parameters (landslide volume, thickness, front extension, acceleration, etc) is still to be identified, since the knowledge of the tsunami generation process by underwater body motion is not yet completely understood.

In view of the above considerations, the Working Group 1 agrees in providing the following set of recommendations.

Recommendations for Source Assessment

Earthquakes

- The high seismotectonic complexity of the NEAM region calls for the need to classify in a simple database the potential tsunamigenic seismic sources on the basis of their geographical distribution, focal mechanism, depth and distance from the closest coastal segments.

- For coastal segments threatened by earthquake generated “regional” tsunamis with travel times of no less than about 20 min, the same criteria as those implemented in the Pacific and the Indian Ocean could be applied. However, the magnitude threshold should be selected on the basis of the past tsunami history. In order to increase the efficiency of future early warning systems responding to regional tsunamis, there is a need to intensify seismic and sea level instrumental networks, particularly along the North Africa and Middle East coastal zones of the Mediterranean Sea.

- For tsunamis caused by “local” seismic sources, wave travel times range from a few minutes up to less than 20 min and, therefore, a very rapid timely warning has to rely on automated systems. In these cases, particular effort should be made to identify the best instrumentation that is the most appropriate to meet such a specific need.

- Development of a decision matrix to classify local, regional and basin wide tsunamis. This matrix should define and encompass criteria to distinguish and classify the different type of tsunami (local, regional and basin wide).

- More research effort is needed for seismic sources, whose tsunamigenic mechanism remains unknown or is little known or is still controversial, like, among others, the tsunamis observed in the Levantine Sea caused by strong earthquakes of strike-slip faulting occurring on land in association with the Dead Sea Fault System, the 1755 “Lisbon” earthquake, the 1693 eastern Sicily earthquake, the 1627 south Adriatic shock, the 365 and the 1303 Hellenic Arc earthquakes. Further research is also needed to understand why in a particular region (e.g. Rhodes in the east Hellenic Arc) some earthquakes cause tsunamis, but others of the same size do not.

- Development of a list of recent and historical tsunamis in order to derive benchmarks to validate numerical models. This benchmarking process needs to take into account the existing data (Lisbon 1755, Messina 1908, Greece 1956, Izmit 1999, Algeria 2003).

- Given the many different approaches that are in use for the determination of earthquake magnitude, a general recommendation that regards local and regional tsunamigenic seismic sources is that an effort should be made to standardize the procedure of earthquake magnitude determinations.

Landslides

- Given that no international experience exists for the early warning as regards landslide generated tsunamis, there is a need to identify the most characteristic and best studied tsunamigenic landslide sources (coastal zone and submarine) in the NEAM region, like the west Corinth Gulf, the Stromboli volcano, the Marmara Sea, the Balearic islands, the Canary islands and the Norwegian coasts, and on the basis of their features to investigate possible innovative ideas for the design of appropriate warning approaches.

– A parallel activity should focus on the better identification of potentially tsunamigenic submarine slumps that generated tsunamis in the past or that bear the potential to produce tsunamis in the future, with priority given to selected test-sites. Great advantage to the identification of past mass wasting will derive from detailed seafloor mapping.

– The classification and the characterisation of landslide mechanism are needed to infer the behaviour and the tsunamigenic potential of mass wasting.

– Given the smaller extent of the segment of coast affected by destructive tsunami waves, compared to the case of earthquake tsunami generation, hazard micro-zoning (based on the modelling of the wave approaching to the coast) will be extremely important.

– In order to implement precursors for potential tsunamigenic landslides the assessment of mass stability; encompassing different estimation tools, is essential. Monitoring of unstable masses would detect possible precursors.

Volcanic Activity

– Due to the several types of volcanic generation mechanisms, it is recognized that the application of an early warning system is directly dependent on the volcano activation and, therefore, on the capability of monitoring the volcanic activity. It is recommended that a few test-sites should be selected with the aim of developing possible scenarios of volcanic tsunami generation and in view also of designing and implementing local tsunami warning systems.

– Development of criteria to classify active volcanoes that can generate tsunami and those that cannot. This also encompasses the analysis of active submarine volcanoes.

– The aspect of metereological induced tsunami needs to be discussed in the future and it has to be decided whether this aspect and tsunami type should be considered in the warning system.

Recommendations for Modelling

– Numerical modelling simulation of possible tsunami waves is certainly useful, as the experience in the Pacific Ocean indicates, but much effort should be made in order to improve simulation codes used in such pre-computations because of propagation complexity.

– Particular attention should be given to the improvement of our knowledge about the earthquake fault dislocation as well as the bathymetry especially in shallow water. The efforts such as the compilation of the IOC-IHO-IBCM international bathymetric chart of the Mediterranean are to be encouraged.

– Particular attention should be also given to the identification of the role of coastal topography and structures and to the identification of the requirements needed for Digital Elevation Models (DEMs) to make them useful for pre-computation purposes.

– Tsunami generation mechanism by landslides and pyroclastic flows is very complex and as yet not fully understood and this reflects in non-standardization of numerical models, and in the difficulty in ascertaining their reliability and accuracy.

– There is a need of validation for numerical models used in tsunami simulation against the available observational data, such as coastal and open ocean sea-level observations, experimental data of coastal impact (run-up heights) and, when appropriate, physical model data.

Recommendations for Vulnerability and Risk Assessment

– Identification of vulnerable elements (such as built environment and people) and appropriate indicators to estimate and quantify the vulnerability of different elements at risk.

– More emphasis has to be given to identify vulnerability more comprehensively, encompassing the social, economic and environmental dimension.

– It would be useful to examine the potential to establish a standardized methodology for the pre-determination of vulnerability and of tsunami damage zones by combining experience from past cases, numerical modelling and inundation results with socioeconomic parameters, to be collected through ground-based, airborne-based and space-based techniques.

– Within the tsunami database, data on the impacts and damage of historical events is needed in order to provide a better picture of the damage patterns that could be used to identify appropriate vulnerability indicators.

– Of crucial importance is the time-dependence of tsunami risk on a particular coastal segment because of the seasonality of human activities (e.g. tourism) and of the daily variation of activities.

– In view of the above, it is recommended that an effort should be made for the step-by-step production of a tsunami resistance “Eurocode”.

– Restriction for coastal zone use and management will be a very effective means to reduce tsunami vulnerability.

General Recommendations

– The Working Group One on Hazard Assessment, Risk and Modelling has reviewed the ICG/NEAMTWS-I recommendations and proposed some additional issues. The ICG/NEAMTWS-II adopted the new version of listed recommendations.

– The Intersessional Working Group One on Hazard Assessment, Risk and Modelling should continue through the next intersessional periods.

– The Action Plan proposed by the WG1 was adopted by the ICG/NEAMTWS-II. The Action Plan includes the list of actions, timelines and responsibilities. For several actions all Members States must provide to the Chairman of the Group information and data related to these.

Plan of Action

No.	*Action*	*Timeline*	*Responsibility*	*Required budget*
1	Compilation of Data Base	December 2006	G. Papadopoulos (Greece) A. Maramai (Italy) F. Schindelé (France)	
2	Decision Matrix to classify local, regional and basin tsunamis (criteria in magnitude, depth, focal mechanism)	December 2006	G. Papadopoulos (Greece) A. Maramai (Italy) F. Schindelé (France)	
3	Research on seismic sources 363 1693 1856	 End of 2008 End of 2006 End of 2007	 Greece Italy Algeria Israel	
4	Compilation of references and Data Base Stromboli,Vulcano, Izmit 1999 Corinth Gulf 1963, 1956 Balearic Islands, Canary	 September 2006 September 2006 September 2006	 A. Maramai (Italy), S. Tinti (Italy) G. Papadopoulos (Greece) Spain	
5	List of island, submarine and coastal volcanoes in activity, with their characteristics of activity (effusive, explosive, etc.)	NEATWS III January 2007	Member States (Italy, Spain, Greece, Portugal)	
6	Model review and collection			
6.1	Design template for questionnaire and distribution	End June 2006	M. Gonzalez (Spain) / J. Behrens (Germany)	
6.2	Model collection and assessment of documentation	1 Month before NEAMTWS-III	Whole community / National Representatives	
6.3	Define a standard output (kinds of data) for a model that goes into NEAMTWS system – proposal for next meeting	NEAMTWS-III	Chair of intersessional WG1	
7	Input data requirements			
7.1	Provision of data of the historical seismic and tsunami events (seismic parameters, topo-bathymetry, sea level data, run-up....) Portugal 1755, Messina 1908, Greece 1956, Izmit 1999, Algeria – Balearic 2003	End of September 2006	WG3 (Sea level) Portugal, Italy, Greece, Turkey, France, Algeria, Spain	

No.	*Action*	*Timeline*	*Responsibility*	*Required budget*
7.2	Credible scenario for all other areas	NEAMTWS-IV	Member States F. Schindelé (France) M. Gonzalez (Spain)	
7.3	Inventory of available bathymetries (emphasis on shallow water < 100 m)	NEAMTWS-III	Ifremer	
7.4	Inventory of available topographies and land usage maps	NEAMTWS-III	Member states, IGN	
7.5	Make topo-bathymetric data available	NEAMTWS-IV	National Authorities/National representatives	
8	Model simulation			
8.1	Benchmarks case computation	NEAMTWS-III	B. Feignier (France)	
8.2	Sensitivity analysis	NEAMTWS-III	G. Bellotti (Italy)	
8.3	Preliminary hazard assessment (examples, priority regions, etc.)	NEAMTWS-III	WG1 Member States	
8.4	Define sea level data measurement locations (based on model sensitivity)	After October 2006		
9	Provision of Impact and damages input for data base Portugal 1755 Messina 1908 Greece 1956 Izmit 1999 Algeria – Balearic 2003	December 2006	 Portugal Italy Greece Turkey France, Algeria, Spain	
10	Methodology of coastal vulnerability assessment	December 2006	A. Cavalletti (Italy)	

<u>Sessional Working Group 2</u> – Seismic and Geophysical Measurements

Officers:

Alessandro Amato (Italy) - Chair
Winfried Hanka (Germany) - Co-chair

Participants:

J. Acosta (Spain)
Remy Bossu (EMSC, France)
Bruno Feignier (France)
Cemil Gurbuz (Turkey)
M. Harmel (France)
Gerassimos Papadopolus (Greece)
Jean Virieux (France)
Ulrich Wolf (IOC Secretariat)

Terms of reference *(modified)*

The working group will be responsible for defining, based on existing organizations and functions, a transnational seismic network as part of early warning tsunami detection instruments in seismically active coastal areas and providing recommendations on the according data processing and analysis.

Summary of discussion during the breakout sessions

In order to clarify the scope and responsibility of the working group, attendees agreed to specify their mandate on regional tsunamis which per definition endanger several countries in a region or basin. Thus there is obviously the need for the ICG to decide on an architecture of the TWS which takes into account that at least one or a set of a few tsunami processing center(s) is required to provide information and primary warning guidance to the national tsunami warning centers. This working group will focus on specific functions for earthquake detection and characterisation for tsunami warnings and related issues.

The group discussed possible seismic networks which can be used for a NEAMTWS. For broadband seismic waveforms ORFEUS (Observatory and Research Facilities for European Seismology) currently coordinates real-time data of European broadband seismic stations while EMSC collects and disseminates earthquake information. For seismic (BB) networks on the trans-national level mainly GEOFON, MedNet, GEOSCOPE and CTBTO were recognised as natural contributors to a future TWS. Especially for the Mediterranean Sea several national networks with different data transmission means are in place. Data availability (e.g. format, minimum latency, open access, real-time data transmission and station-maintenance) is a major issue which needs to be addressed.

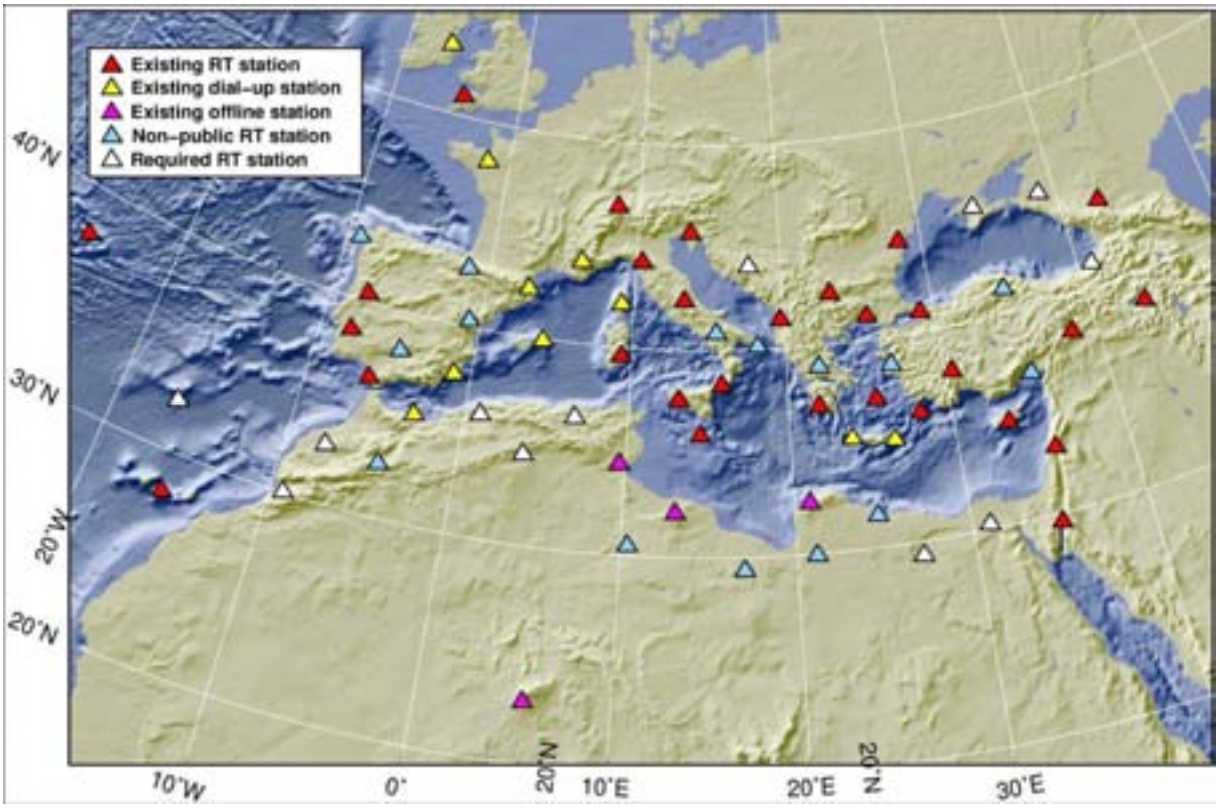


Fig.: Possible NEAMTWS Backbone Seismic Network for the Med (68 Stations) Availability of data and their real-time transmission are essential for timely warnings.

Seismic stations should consist of high dynamic range broadband seismometers and digitizers with accelerometers added for all stations close to source regions. Real-time high sampling rate CGPS instruments should be included. Future real-time broadband OBS should be included, especially those near source regions to improve location accuracy and faster detection.

VSAT is recommended as the backbone for the data transmission of the seismic network while alternative telecommunication means like ADSL internet connections are required for redundancy.

Reliability of the system is critical from the seismic stations to the warning dissemination.

The group discussed how automatic seismic data processing and analysis should be used and when expertise of seismic personnel is needed. It was agreed upon that the first earthquake information useful for potentially tsunamigenic earthquakes based on automatic analysis of seismic data should be launched within 5min. But, upgraded messages should be evaluated by seismic experts in the processing centers.

An extensive discussion on the required accuracy for the localisation of an earthquake led to the recommendation of less than 20km both, vertical and horizontal, for tsunami warnings on the regional scale.

Magnitude estimations are essential for tsunami warnings. Magnitude scales related to the seismic moment are required. Due to time constraints the **Mwp** estimation is encouraged when possible.

Actions and recommendations:

For the establishment of an optimized TWS the completeness of geographical coverage of the backbone broadband seismic network needs to be ensured.

The working group expresses the need for long term funding for such things as upgrading the instrumental network, ensuring the operational costs and financing training of operational staff, and asks the Executive Secretary of IOC to investigate funding possibilities with regional donors and the European Commission.

To ensure possible synergies and collaboration between ongoing related activities and projects the working group confirms the need to coordinate planning and implementation of the regional TWS with other ICG's and to follow up with projects like SAFER, TRANSFER, NERIES and GITEWS.

The working group emphasizes the importance of free data exchange and close cooperation between seismic centers for the NEAMTWS process.

As an essential part of the NEAMTWS it is recognized that for the data processing center(s) data redundancy, the robustness of the data transmission system and homogeneous procedures have to be ensured while VSAT is recognised as the preferred data transmission backbone for the final system.

Due to the geographical setting and vicinity of possible source zones and endangered coastlines in the region, the working group strongly recommends in the case of an earthquake with a

tsunamigenic potential to ensure the initial bulletin of a future TWS to be delivered within 5minute after the event and to upgrade the given information after 10 to 20 minutes.

The working group confirms that frequent training of operational personnel in data processing and national warning centers as well as communication drills are an essential part of a sustainable TWS.

In terms of a long term strategy on upgrading an existing system and incorporation of new technology and procedures, research on fast magnitude estimation and seismic rupture tracking needs to be encouraged and fostered.

Plan of Action

No.	*Action*	*Timeline*	*Responsible*	*Required budget*
1	Networks inventory and check of real time data availability: invite countries contributing to the backbone	September 2006	R. Bossu (France)	None
2	Define the backbone network of real-time linked BB stations - priority: North-Africa	November 2006	W. Hanka (Germany)	None
3	Possible implementation of data exchange through internet or other links	June 2007	R. Bossu (France)	Limited funding available (EERWEM)
4	Any additional seismological real-time data available will be considered	Ongoing	All WG members	None
5	Exploring possibilities and “best practice” for earthquake location and magnitude determination	January 2007	A. Amato (Italy), W. Hanka (Germany), R. Bossu (France), B. Feignier (France)	None
6	Technical scheme for the VSAT backbone and required budget	January 2007	W. Hanka (Germany)	None
7	Description and demonstrations of near real-time OBS	January 2007	J. Virieux (France), A. Amato (Italy), C. Gurbuz (Turkey)	None

Sessional Working Group 3 – Sea Level Measurements

Chair: Begoña Pérez
(Harbours Authority, Spain)
Co-chair: Dov Rosen
(Israel Limnological and Oceanographic Institute, Israel)

Recommendations

Sea level gauges

- There is a need to establish a new standard to enhance sea level stations to operate in real-time, with higher frequency rates.
- Upgrading of all required sea level gauges is necessary in order to meet new requirements and standards in measurement and telecommunications. There is an immediate need for specific gauges (at least 10 sites) to become fully operational by the end of 2007. All other required sea level gauges must be fully operational in the medium term.
- A more comprehensive network of sea level gauges has to be designed and implemented with consideration for at-risk areas to complement the existing system.

Offshore instrumentation for monitoring sea level

- Existing buoys of national networks and existing fixed offshore platforms must be reviewed and evaluated with respect to their potential for contributing to a tsunami early warning system and, as necessary, upgraded to address the needs for tsunami monitoring and tsunami early warning.
- There is a need for the establishment of deep ocean buoys with ocean bottom pressure sensors and seismometers, specifically designed for tsunami monitoring.
- Cable based systems and sea floor monitoring networks should also be explored.
- These measurements are important for slumping events, landslides or other events that are not seen in seismic measurements.

Other instrumentation

- GPS data are useful for quick determination of the earthquake characteristics and should be part of the tsunami warning system. CGPS stations located close to existing sea level gauges should also provide data in real time to the seismological processing centres.
- Future technological advances will be taken into account as they become available for the operational phase.

Telecommunications

- Secure and redundant transfer of data from the instrument to the operators should be guaranteed to ensure that communication links remain operational after earthquakes, floods, etc.
- Advantage should be taken of existing and evolving systems. This is especially the case of WMO GTS that the WMO has even offered to upgrade to account with the requirements of the system, and others as IP networks, satellite communications, VPN internet, etc.
- There is a need to identify best practices in other systems as the IOTWS for the Indian Ocean or the PTWS for the Pacific, taking into account the particular more demanding requirements the NEAMTWS area may have.

– There is a need to communicate such requirements to telecommunications standards development organizations such as ITU.

Analysis and processing centres

– The ICG needs to address the establishment of centres that process, validate, analyse and interpret the incoming data. These centres should be operational with 24/7 capabilities.
– The regional components of GLOSS in the area, MedGLOSS and ESEAS, should be explored concerning their capability of providing the adequate platform for reception and assessment of sea level data, in accordance with the conclusions reached at the ICG/NEAMTWS-I.
– Collaboration is needed with existing bodies active in the coordination of deep-sea observation networks mostly for operational oceanography, such as MedGOOS, IBI-ROOS, NOOS, BOOS (regional components of GOOS in the Euro-Mediterranean region) and MOON.

For the whole system

– Immediate, free and open distribution of raw data from the observing systems in real time must be acknowledged as a founding principle for all national, regional and global tsunami warning systems.
– A sustained and reliable NEAMTWS network will require responsible national and international actions and cooperation, including investment and commitments.
– The sustainability of the observing system, including cost effectiveness and efficiency will be enhanced with a technological implementation that allows integration in a multi-purpose system. Adressing several hazards with the same infrastructure, and delivering other types of routine operational and long-term products would save a lot of money.
– New algorithms for tsunami detection and high frequency rates automatic quality control have to be developed.
– Standards on data format and data transmission protocols should be adopted from already existing systems (ex. XML, GTS).

Plan of Action

No.	*Actions*	*Timeline*	*Responsibility*	*Comments*
1	First list of sea level stations for the ITWS	Beginning of June 2006	B. Pérez (Spain)	In collaboration with WG1
2	Completion of survey on data transmission of existing sea level stations in NEAMTWS region	June 2006	Bente Lilja Bye	Completion of the survey initiated by IOC/GLOSS
3	Report on initial sea level stations status and needs of upgrade	September 2006	B. Pérez (Spain)	After second action is completed
4	Final requirements on the priority of the sites	June 2006	To be identified	Request to WG1
5	Existing offshore instrumentation report	End of July 2006	D. Rosen (Israel) / V. Rigaud (France)	To be provided to WG1

Sessional Working Group 4 – Advisory, Mitigation and Public Awareness

Chair: Russell Arthurton
(formerly British Geological Survey, United Kingdom)
Co-chair: Luis Matias
(University of Lisbon, Portugal)

Specific Tasks Identified

The Working Group identified the following objectives to be undertaken:

1. Review of emergency response procedures

a) Existing practices within regions, Pacific, Indian Ocean and Caribbean TWS proposals; ISDR; ICRC, etc.
b) Shortcomings in existing systems for marine-related hazards (consider especially the translation of warnings received to emergency action).
c) Proposals/recommendations for the region to cope with marine-related hazards (practice exercises, responses to be triggered by all felt earthquakes in coastal areas).
d) Review appropriate communication systems for tsunami warning from the national centres to the coastal communities and authorities, in liaison with the Safety Telecom Forum organised by the European Commission (DG-INFSO).
e) Testing and training for the operation of the pilot TWS.
f) Review the format and content of advisory messages.

2. Review of strategic planning response procedures

a) Vulnerability mapping, zoning, setback, regulation, enforcement, standard setting, in collaboration with WG1.
b) Planning for population and environmental change over the longer-term.
c) Balancing socio-economic opportunity against perceived risk.
d) Conclusions/recommendations for the region to incorporate hazard risk in strategic planning.

3. Education and awareness

a) Reviewing existing approaches and products for tsunami education and familiarity with warning systems.
b) Assessment of perceptions at national and municipal level of risks from tsunamis and other marine-related hazards.
c) Promoting tsunami education and awareness programmes taking into account cultural differences; and the need to cope with uncertainty.
d) Promoting Codes of good practice (ideally standards to be developed over the longer-term in collaboration with the relevant authorities and organisations) through the involvement of all stakeholders (local authorities, universities, private sector, NGOs, civil protection) to implement tsunami response actions and incorporate them into integrated coastal area management.

4. Human impacts contributing to vulnerability

a) Review human behaviour and activities relating to emergency responses and strategic planning.
b) Proposals/recommendations on how vulnerability could be reduced.
c) Coping with population (seasonal and long term) and environmental changes.

5. Producing IOC guidelines

a) Development and production of consolidated IOC guidelines on "Mainstreaming awareness and mitigation of marine-related hazards and risks in ICAM" (project proposal by IOC).

6. Supporting the operations of WG4

a) Establish a communication mechanism amongst WG members to exchange views and results.
b) Develop collaboration with potential partners.

Recommendations

– In order to implement its activities in an effective way and to avoid duplication of efforts, the ICG should establish collaborative links with the Barcelona Convention, and its Mediterranean Action Plan (MAP), in particular on the issues of ICAM Protocol for the region; also with other regional processes.

– Linkages should be established with other ICGs in order to share experience and possibly use or adapt existing approaches and materials for mitigation, education and awareness in this region. A mechanism for interaction and exchanges amongst ICGs should be defined, possibly in the form of a web-based tool.

– The roles of Local Authorities and Municipalities should be emphasized as key actor in developing and implementing emergency and planning responses to Marine related Hazards. In this respect, ICG/NEAMTWS should ensure that it reaches out to decision-makers at this level.

– Local actors, including the private sector operating in coastal areas (industry, tourism, insurance) and representatives of civil society (NGOs) should be invited to participate in the implementation of the ICG/NEAMTWS WG4 activities.

Plan of Action

No.	*Activity*	*Timeline*	*Responsibility*	*Required Budget*
6.a)	Establish a website to facilitate interactions amongst WG4 members to develop its activities, hosted by IOC	August 2006	IOC	USD 3,000
6.b)	Establish contacts with potential partners (Barcelona Convention, MAP/UNEP, WB/METAP, ISO)	August 2006	IOC	N/A
1; 2; 5.	Undertake reviews of emergency response procedures and technologies, including communication, advisory messaging, and strategic planning procedures	6 months	IOC	USD 10,000
3.b	Assessment of user needs (national and local authorities, individuals), including perceptions of risks, through a questionnaire sent to MS focal points	December 2006	IOC	N/A
3.	Education a) Critical review of existing education materials developed in other ICGs and ITIC to the needs of the region b) Adaptation of these materials to the needs of the region and MS	December 2007	IOC Member States	USD 5,000
3.d)	Organize a workshop on stakeholder participation in marine related hazards mitigation programmes	May 2007	Portugal	To be defined
5	Develop IOC guidelines for mainstreaming consideration of tsunamis and other marine-related hazards into ICAM plans and programmes	December 2007	IOC Member States	USD 100,000 (30,000 from IOC; 70,000 to be identified)
4	Compilation of case studies on human behavior in the event of tsunamis and other extreme events in the coastal area	December 2007 or before	IOC	USD 5,000
	Testing and training for the operation of the pilot component of the TWS	Second semester of 2007 (jointly with other WGs)	Member States	To be defined and addressed at the next ICG
Total		US$ 123,000 ($30,000 from IOC, $93,000 from extra-budgetary sources to be identified		

Appendix (Sessional WG4)

Proposal for
IOC Guidelines for mainstreaming awareness and mitigation of marine-related hazards and risks in Integrated Coastal Area Management (ICAM)

With special emphasis on the Mediterranean

Rationale

The 2004 Indian Ocean Tsunami event reaffirmed the notion that the protection of coastal communities from marine-related hazards is not just dependant on the existence of an effective technological warning system and communication network. These tragic events highlighted widely across the region the high vulnerability of coastal communities, infrastructure and ecosystems in coping with such high pressures. This lack of effective response can be attributed to several causes which may vary from one country to another: i.e. poor spatial planning practices in the coastal areas, the lack of a regulatory framework or master plan for the development of coastal settlements; the degradation of natural barriers (mangroves, coral reefs) due to anthropogenic activities; and generally a lack of capacity for developing and enacting mitigation strategies in a coastal management context.

As well as tsunamis, coastal populations are impacted by a variety of other natural hazards, relative to space-time contexts, including erosion, saltwater intrusion, subsidence, and floods due to both storm surges and swollen rivers. Exposure to such natural hazards is expected to increase due both to growth in population density in low-lying coastal areas and the effects of global climate change (e.g., sea-level change and possible increases in the frequency of extreme weather such as tropical cyclones). Some of the coastal management responses that are relevant to tsunamis apply similarly to the mitigation of these other hazards.

Following the recent creation of Intergovernmental Coordination Groups for the Indian Ocean, the Mediterranean, NE Atlantic; and the Caribbean; working groups have been established to develop activities that should strengthen the mitigation capabilities of coastal states. During its first meeting, the IGC/NEAMTWS (Working Group 4) recognized that IOC has an important role in facilitating and/or delivering capacity of its Member States in mitigation of marine-related hazards, in particular in the following areas:

- Vulnerability assessments for coastal communities, their infrastructure and their supporting ecosystems in the context of ICAM.

- Strategic planning in the coastal zone in the context of ICAM with a view to minimizing vulnerability of coastal communities, their infrastructure and supporting ecosystems.

- Promoting research required to better understanding the human factors contributing to vulnerability in communities under potential or actual stress from marine-related hazard impacts.

Objectives

As a direct response to the needs expressed by the ICG/NEAMTWS and other ICGs (Indian Ocean, Pacific and Caribbean), IOC, through its ICAM programme, is proposing to develop a set of guidelines on *Mainstreaming awareness and risk mitigation of natural hazards in Integrated Coastal Area Management (ICAM).*

- Based on the recommendations of the Working Group on Advisory Mitigation and Public Awareness of ICG/NEAMTWS-I concerning vulnerability assessment, spatial planning and human contributions to vulnerability, the objectives of such guidelines would be to:

- Provide a review of good and bad practices in the application of mitigation techniques in the context of ICAM, drawing from case studies;

- Review existing knowledge and methodologies for assessing coastal risks and vulnerability and handling uncertainties, and in particular:

  – How to assess current and future risks in the coastal zone;

  – How to define coastal vulnerability (human/ecosystem) to natural hazards;

  – How to assess current and changing socio-economic conditions in the coastal zone; (including an overview of physical and socio-economic pressure and state changes in the coastal zone and their expected trends over the next 25-50 years)

  – How to communicate risks assessment to coastal stakeholders (government, local authorities, general public);

  – How to define/identify information and products needs for coastal management agencies/users and decision-makers;

  – How to make best use of scientific information and technology for risks and vulnerability assessment.

- Provide a methodological approach for scoping and designing mitigation strategy in ICAM context, including the identification of spatial planning techniques and technology;

- Recommendations and guidelines for best practice in ICAM context, including establishing and maintaining communication with, and between, coastal stakeholders over the short- and long-term.

Type of Marine-related Hazards to be covered by the guidelines

Catastrophic events

– Tsunamis

– Storm surges

– Extreme wind-driven waves

Progressive events

– Predicted sea-level rise

– Coastal erosion

Activities and Timing

It is proposed to establish a dedicated Expert Group that would be activated through IOC. The group would be composed of high-level experts (about 8-10 experts) in the field of ICAM, disaster management, coastal engineering, geosciences, and social sciences.

The group would be activated for a duration of 18 months, with the objective to deliver a final set of guidelines towards the end of 2007. These guidelines would be published by IOC/UNESCO and widely disseminated among IOC Member States.

The experts will be selected by the IOC Secretariat. The Expert group will report progress on a regular basis to the IGC/NEAMTWS.

Budget

IOC/ICAM would provide core funding (US$15,000-20,000/year) for the activities of the expert group. Additional resources will have to be mobilized in the course of the activity. Other international organizations having an interest in these issues will also be invited to participate.

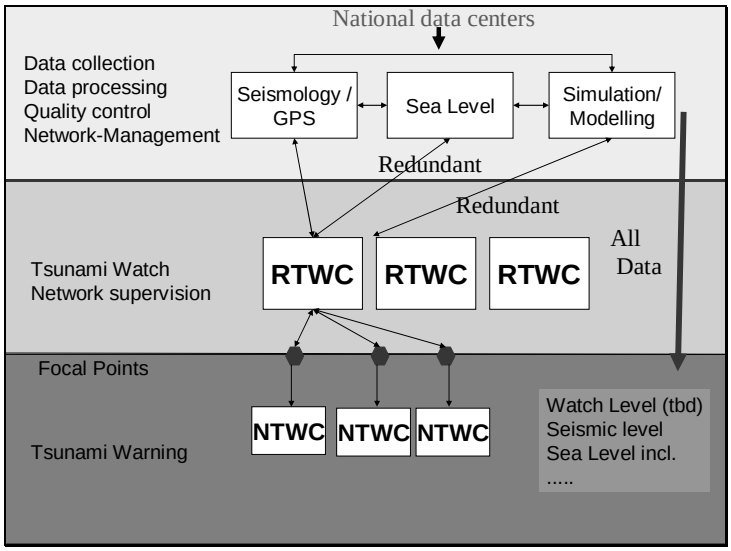
It is expected that over the 18 months period, 5 meetings of the Working Group would be organized. As far as possible, these meetings will be held back to back with ICG/NEAMTWS meetings in order to maximize resources.

Total budget

5 meetings of the WG (15,000USD each)	USD 75,000
Editing/Printing Costs	USD 15,000
Miscellaneous	USD 10,000
Total	**USD 100,000**

Annex 3 to Recommendation NEAMTWS-II.1

LEVELS OF FUNCTIONS FOR THE ARCHITECTURE OF THE TSUNAMI WARNING SYSTEM



Regional Tsunami Warning Centers (RTWC) functions

- Collection, recording, processing and analysis of earthquake data for rapid initial assessment (locate the earthquake, the depth, the magnitude, the origin time) as a basis for the alert system

- Computing the arrival time of the tsunami in the forecasting points listed in the Communication Plan

- Collection, recording, processing and analysis of sea level data for confirming and monitoring the tsunami or for canceling elements of the alert system.

- A decision making process in accordance with the Communication Plan to elaborate messages

- Dissemination to the Member States focal points (and national warning centers) of the messages in accordance with the Communication Plan, including the tsunami travel time, the amplitude and period of tsunami measured, and cancellation messages

National Focal Point functions

- Reception of the messages transmitted by the RTWC

- Transmission of the messages to the National Tsunami Warning Centers (NC)

- 24/7 Operation

National Tsunami Warning Systems (NTWS) functions

– Collection, recording, processing of earthquake data for the rapid initial warning (locate the earthquake, the depth, the magnitude, the origin time)

– Computing the arrival time of the tsunami in the national forecasting points

– Collection, record, processing of sea level data for confirming and monitoring the tsunami or for cancelling the warning

– Reception of the messages transmitted by the National Focal Points

– A decision making process in accordance with the National Emergency Plan to elaborate messages

– Transmission of the messages to the National Emergency Authorities

– 24/7 Operation

Warning centers strive to be:

- Rapid — providing warnings as soon as possible after a potential tsunami generation,
- Accurate — issuing warnings for all destructive tsunamis while minimizing false warnings, and
- Reliable — making sure they operate continuously, and that their messages are sent and received promptly and understood by the users of the system.

ANNEX III

LIST OF TSUNAMI CONTACTS AND FOCAL POINTS RECEIVED

ICG Tsunami Warning Focal Point (TWFP)

7x24 contact person, or other official point of contact or address, designated by an ICG Member State government for rapidly receiving and issuing tsunami event information (such as warnings). The Tsunami Warning Focal Point has the responsibility of notifying the emergency authority (civil defense or other designated agency responsible for public safety) of the event characteristics (earthquake and/or tsunami), in accordance with the procedures of the Tsunami Response Plan. The Tsunami Warning Focal Point receives international tsunami bulletins/alerts from regional warning centres.

Egypt
Finland
Georgia
Nigeria
Portugal
Syria

ICG Tsunami National Contact (TNC)

The person designated by an ICG Member State government to represent his/her country in the coordination of international tsunami warning and mitigation activities. The person is part of the main stakeholders of the national tsunami warning and mitigation system programme. The person may be the Tsunami Warning Focal Point, from the national disaster management organization, from a technical or scientific institution, or from another agency with tsunami warning and mitigation responsibilities.

Bulgaria
Finland
Georgia
Netherlands
Nigeria
Syria

ANNEX IV

OPENING ADDRESSES AND STATEMENTS

- A -
M Lionnel Luca, Vice-Président du Conseil général des Alpes-Maritimes

M. Patricio BERNAL, Sous-directeur général de l'UNESCO,

M. François GERARD, président du Comité national pour la Commission Océanographique Intergouvernemental (Unesco),

Professeur S. TINTI, président du Groupe Intergouvernemental de Coordination (GIC-SATANEM),

Professeur Jean VIRIEUX, Université de Nice, représentant de la France à la première session du GIC SATANEM à Rome,

C'est un réel plaisir pour moi, au nom de Christian ESTROSI, Ministre délégué à l'Aménagement du Territoire, Président du Conseil général des Alpes-Maritimes, de vous souhaiter la bienvenue sur la Côte d'Azur, dans le cadre prestigieux du Palais des Rois Sardes, propriété du Conseil général.

Christian ESTROSI, retenu par des obligations ministérielles, ne peut être parmi vous aujourd'hui et le regrette vivement.

Le 26 décembre 2004, un drame d'une ampleur inégalée raya de la surface de la planète, plus de 250.000 personnes.

Le Tsunami de l'Océan indien, par sa force destructrice, souleva une immense émotion de par le monde.

Face à la violence aveugle des éléments, face à la cruauté et à la tragédie, la communauté du monde a su répondre par un vaste élan de solidarité qui s'est exprimé avec une grande force.

Mais nous avons souhaité immédiatement réfléchir aux moyens qui pourraient être mis en place, non pas pour éviter de tels drames, puisque nous ne dominerons jamais les éléments, mais pour améliorer la sécurité des populations au travers d'une alerte adaptée.

La gestion délicate de l'alerte diffusée lors du séisme du 3 mai 2006 de Tonga dans le Pacifique démontre toute la difficulté de la tâche.

Christian ESTROSI a ainsi acquis la conviction que pour mieux prévenir les catastrophes naturelles, il était indispensable d'élargir notre démarche aux pays de la Méditerranée qui constituent, et personne ne peut le nier, une zone à risques en matière de sismologie et de tsunamis.

La Méditerranée est en effet l'une des mers qui a toujours connu des tsunamis catastrophiques.

J'évoquerai le séisme et les tsunamis de Grèce de 373 et 365 qui ont réduit à néant des cités entières et ceux de Messine en 1908 qui ont anéanti près de 100.000 vies.

Le séisme algérien de mai 2003, qui a fait près de 2 000 victimes, a également engendré un tsunami qui a touché les îles Baléares.

Nous ne sommes donc pas à l'abri, même si tous les scientifiques s'accordent à dire qu'un phénomène d'une ampleur comparable à celui qui s'est produit en Asie, est hautement improbable en Méditerranée.

Dans ce contexte, il est apparu naturel aux collectivités qui constituent l'arc latin de se mobiliser aux côtés des Etats, afin de prendre toutes leurs responsabilités dans la protection des populations dont elles ont la charge.

Christian ESTROSI, alors Président du Conseil général des Alpes-Maritimes a ainsi pris l'initiative d'organiser le 25 février 2005 un colloque international :"Pour un réseau d'alerte Tsunamis en Méditerranée occidentale", qui a réuni des participants venus de tout le pourtour du bassin méditerranéen

Cette réunion a permis d'initier les actions de mise en place des moyens de prévention et d'alerte en Méditerranée Occidentale déclinées selon trois composantes : l'évaluation du danger de tsunami, l'alerte, la prévention et la préparation.

Nous ne pouvons que nous féliciter, dès lors, qu'à l'occasion de son assemblée générale à Paris, la Commission Océanographie Intergouvernementale de l'UNESCO ait recommandé la création de trois groupes intergouvernementaux de concertation dont l'un sur l'ensemble méditerranéen en sus de celui du Pacific existant depuis plus de quarante ans.

L'accueil aujourd'hui ici des travaux de la deuxième session du groupe intergouvernemental de coordination pour un systemeréseau d'alerte tsunami Atlantique Nord Est et Méditerranée est la concrétisation de notre soutien.

Lors de votre première réunion à Rome le 21 et 22 novembre 2005, vous avez recommandé l'installation d'un système d'alerte, ou du moins sa première architecture, pour décembre 2007 sous l'impulsion de Patricio Bernal, Secrétaire Exécutif de la COI.

L'Italie, qui assume la présidence de ce groupe en la personne du Professeur S. Tinti de l'Université de Bologne, a confirmé cette ambition, ce dont nous nous réjouissons.

La France, par la voix de Christian ESTROSI, a souhaité accueillir la deuxième session et je suis heureux de vous accueillir dans ces murs chargés d'histoire.

Je salue aussi le Portugal et la Grèce qui ont aussi proposé les aides pour les prochaines réunions.

Nous voyons ainsi que l'ensemble des pays se sentent concernés.

Notre objectif ; votre objectif, est bien de définir ce système d'alerte pour décembre 2006 avec les contributions des uns et des autres et d'aboutir à sa mise opérationnelle en décembre 2007.

Afin qu'un tel système puisse fonctionner dans un temps assez court (de l'ordre d'une dizaine de minutes), il est important de définir les responsabilités et les domaines de compétence.

La France doit prendre toute sa place dans le dispositif.

Les administrations et organismes concernés sont nombreux : Météo France, Service hydrographique et océanographique de la Marine (SHOM), Institut de physique du globe de Paris, Commissariat à l'énergie atomique, Ministère de l'Intérieur et de l'aménagement du territoire, Ministère de l'écologie et du développement durable –qui organise demain après-midi une réunion à ce sujet–, ministère de la recherche.

Il ressort, concernant la France, que le point focal de l'analyse du phénomène sismique pourrait être le Commissariat à l'énergie atomique.

En effet, le CEA dispose d'un réseau de surveillance sismologique et d'un centre équipé pour ce faire à Bruyères-le Châtel qui héberge déjà le Centre sismologique euro-méditerranéen (CSEM).

Nicolas SARKOZY, Ministre d'Etat de l'Intérieur et de l'Aménagement du territoire, a d'ailleurs saisi récemment l'administrateur général du CEA afin d'appeler son attention sur l'importance de cette mission pour la France.

Le COGIC recevrait alors l'alerte qui serait répercutée à l'état-major de zone de défense sud et aux préfets concernés.

Au niveau des équipements scientifiques, les premières analyses montrent que le réseau de marégraphes existe déjà pour l'essentiel dans les ports sous la responsabilité du SHOM et que les systèmes de télécommunications existants ne nécessitent pas de modifications majeures pour transmettre les données concernant les tsunamis mais une mise à niveau pour le temps réel (remarque pour simplifier le paragraphe suivant on connaît déjà le coût faible JV).

Une expertise devra toutefois être menée afin de s'assurer de l'adéquation du réseau existant avec la nécessité d'envoyer en temps réel les données au centre d'alerte.

L'Europe doit jouer un rôle majeur dans la réalisation de ce projet, sous l'égide de la COI, afin d'harmoniser la coopération euro-méditerranéenne.

A ce titre, je ne doute pas que les chercheurs et industriels impliqués dans les pôles de compétitivité labellisés par l'Etat français et situés sur le territoire des Alpes-Maritimes puissent être mobilisés : je pense notamment au pôle à vocation mondial Solutions Communicantes Sécurisées (SCS) à Sophia Antipolis, au pôle Mer-Paca concerné au premier chef ainsi qu'au pôle Gestion des risques et vulnérabilité des territoires au travers d'Alcatel Alenia Space.

Une deuxième phase d'alerte est toutefois nécessaire avec confirmation d'excitation de la vague tsunami par des observations de capteurs en fond de mer, mais aussi de marégraphes côtiers dont il nous faut améliorer la capacité de transmission en temps réel. Ils ont fait cruellement défaut dans l'Océan Indien en décembre 2004.

Côté français, il conviendrait à cet égard d'équiper de stations en eau profonde les côtes d'Afrique du Nord, afin de détecter un tsunami induit dans cette zone à fort aléa sismique et qui pourrait menacer les côtes nord de la Méditerranée. Cet équipement ne pourra intervenir que dans un second temps du fait du coût important de ces bouées : 300 000 € chacune auquel s'ajoute un coût de maintenance de l'ordre de 50 000 à 100 000 € par an.

Il est par ailleurs fondamental de sensibiliser les populations à ces phénomènes rares mais dévastateurs. Un comportement préventif peut réduire les pertes humaines.

Il nous faut donc mobiliser tous les moyens pour que les populations permanentes et les populations en visite soient informées et prévenues.

La préparation d'une société à l'éventualité d'un risque majeur rassemble l'ensemble des actions concourant à la sauvegarde des vies humaines.

Partant du constat que le territoire des Alpes-Maritimes, de par sa position géographique, et sa morphologie, est soumis à des aléas géologiques (séismes et mouvements de terrain) importants, qui peuvent occasionner de nombreux désordres compromettant la sécurité des personnes et des biens, le Département des Alpes-Maritimes s'est ainsi engagé progressivement dans une politique adaptée visant une meilleure connaissance des phénomènes et le développement d'actions d'information et de sensibilisation des professionnels et du public.

Cette politique validée par l'assemblée départementale lors de sa session du 27 janvier 2006 se décline selon deux grands axes :

– Approfondir la connaissance des phénomènes notamment au travers du soutien au ReNass et à l'émergence d'une agence des risques naturels géologiques via le GIS CURARE que dirige le professeur Jean VIRIEUX

– Développer une culture du risque géologique au travers de la mise en place d'outils de sensibilisation des collégiens (Sismo des Ecoles qui se transforme en Sismo A l'Ecole en ce moment même au niveau français) mais aussi des professionnels en collaboration avec le CEA et le CSTB

Les stratégies de prévention sont donc essentielles et, bien sûr, des scénarii doivent être envisagés pour pouvoir aménager les côtes d'une manière adaptée: cela réclame des moyens de cartographie des fonds marins pour mieux modéliser les impacts des vagues.

L'effort à faire est immense et doit se faire dans la continuité par addition progressive des connaissances.

Il nous faut le concentrer sur nos côtes et intégrer les domaines marin et continental qui influent fortement dans le comportement de la vague agressante.

Il permettra, comme toutes les informations qu'apporteront les capteurs des systèmes d'alerte fonctionnant en continu, de mieux observer notre domaine littoral, de mieux le gérer et finalement de mieux respecter cet environnement fragile dans une optique de développement durable.

Pour cela, il nous faut partager cette information environnementale car nous avons un domaine commun qui est le bassin méditerranéen.

Ce territoire commun à tous les pays limitrophes est notre trait d'union.

Qu'il soit le siège de notre entente et entraide réciproque est notre vœu le plus cher.

Christian ESTROSI m'a chargé de vous assurer qu'il ferait tout ce qui est en son pouvoir pour qu'un système d'alerte tsunami voit le jour en Méditerranée et que celui-ci profite à la sécurité et au bien-être des populations.

Il n'est pas déraisonnable de penser qu'un premier système voit le jour en décembre 2007 et j'espère que vos travaux permettront de relever ce défi.

- B -

M. Edgard Cabrera, World Meteorological Organization[1]

Excellencies, Ladies and Gentlemen,

On behalf of the Secretary General of the World Meteorological Organization (WMO), Monsieur Michel Jarraud and my own, I wish to express our appreciation for the invitation to address the Second Session of the Intergovernmental Coordination Group for for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and connected Seas (ICG/NEAMTWS). I am grateful to the Government of France, for its support to WMO and its Programmes, particularly to its activities related to disaster reduction, and the Marine Meteorology and Oceanography Programme.

WMO has reinforced its partnerships with UNESCO's Intergovernmental Oceanographic Commission (IOC), the International Strategy for Disaster Reduction (ISDR) and other concerned organizations, to ensure and built upon to strengthening pre-disaster strategies, including the development of the tsunami early warning system. WMO is therefore very supportive of the initiative to develop the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and connected Seas.

Excellencies, Ladies and Gentlemen,

I would like to stress that a fundamental precondition for national disaster preparedness is a well-functioning "end-to-end early warning system", capable of delivering accurate information to the population at risk, dependably and in a timely manner.

The development of an end-to-end tsunami early warning system, encompassing from observations to community-level responses, should therefore be carried out following a multi-hazard, multi-purpose approach. The main synergistic advantage of such approach is the multipurpose use of observational and telecommunication systems. Successful national meteorological and hydrological experiences with early warning systems, such as those for severe weather, tropical cyclones, storm surges and flood warnings, can be applied to accelerate the development of an integrated, multi-hazard, early warning approach.

As regards tsunamis and other ocean-related hazards, the WMO's Global Telecommunications System (GTS) interconnecting the National Meteorological and Hydrological Services (NMHSs) of its Members holds tremendous potential for the timely and reliable exchange of related warnings and messages among the appropriate organizations. In fact, the Tsunami Warning System in the Pacific Ocean already utilizes the WMO GTS for the exchange of such warnings. WMO is actively joining forces to ensure contributions to the development of the global Tsunami Warning System (TWS) within a multi-hazard framework. This GTS implementation ensures observational data collection and the distribution of weather, water and climate data and products, including related early warnings. It has the capability to support high–priority distribution of Tsunami Warnings (within 2 minutes) and exchange of related information (e.g. parametric seismic data, tide gauges). Relevant operational arrangements have to be set-up (e.g. data routeing) and operational tests would be organized. The status of the GTS in the Region will be provided as a background document for the discussions in the appropriate working groups of the meeting.

---

[1] On behalf of the Secretary General, Secrétariat, 7 bis, avenue de la Paix, Case Postale 2300, CH 1211 Genève 2, Suisse, Tel.: +41 (0) 22 730 81 11, Fax.: +41 (0) 730 81 81, E-mail: wmo@wmo.int, Website: www.wmo.int.

Coordination and collaboration have been established with the other key agencies of the UN system, and in particular the Intergovernmental Oceanographic Commission (IOC) of UNESCO, and ISDR, in ensuring that WMO's telecommunication system and operational infrastructure through the NMHSs are available to accelerate operational aspects of the TWS in the Indian Ocean and in the other ocean basis at risk, as it is the case in the North Atlantic, Mediterranean and Caribbean seas. WMO's activities had also been focused on assessing needs for warning capacity and educational and public out reach needs of the NMHSs within a multi-hazard approach, marine warnings and capacities related to utilization of satellites.

Excellencies, Ladies and Gentlemen,

Before closing, I wish to thank you again for your invitation. Your presence speaks of your deep commitment to the development of the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and connected Seas.

I wish to assure you of WMO's commitment to continue working together towards a safer world and reducing the magnitude of such tragic disasters in the future.

Thank you.

ANNEX V

LIST OF DOCUMENTS

Working Documents

Doc. no.	Document title	Language
ICG/NEAMTWS-II/1 Prov.	Provisional agenda	E
ICG/NEAMTWS-II/1 Prov. Add.	Provisional timetable	E
ICG/NEAMTWS-II/2 Prov.	Provisional annotated agenda	E
ICG/NEAMTWS-II/3 Prov.	Draft Summary Report (this document)	E
ICG/NEAMTWS-II/4 Prov.	Provisional list of documents	E
ICG/NEAMTWS-II/5 Prov.	Provisional list of participants	E
ICG/NEAMTWS-II/6	Report of the Chairman on the scope and the activities of the ICG/NEAMTWS	E

Information Documents

Doc. No.	Document title	Language
ICG/NEAMTWS-II/Inf. 1	Information for participants (venue, hotels, airport bus) (http://ioc3.unesco.org/neamtws/index.htm)	E
ICG/NEAMTWS-II/Inf. 2	IOC Assembly Resolution XXIII-14 (http://ioc3.unesco.org/neamtws-i/documents/Resolution23_14.pdf)	E
ICG/NEAMTWS-II/Inf. 3	Summary Report of ICG/NEAMTWS-I (http://ioc3.unesco.org/neamtws-i/documents/NEAMTWS_I.pdf)	E
ICG/NEAMTWS-II/Inf. 3 Suppl.	Extracts of working groups recommendations and terms of reference from the Summary Report of ICG/NEAMTWS-I	E
ICG/NEAMTWS-II/Inf. 4	List of NEAMTWS National Contacts (*to be provided*)	E
ICG/NEAMTWS-II/Inf. 5	Template for sessional working group reports	E
CL 2191	Letter of invitation to ICG/NEAMTWS-II (http://ioc3.unesco.org/neamtws/documents/circularletter.pdf)	E

ANNEX VI

LIST OF PARTICIPANTS

MEMBER STATES OF ICG/NEAMTWS

Algeria

Mr A.K. YELLES
Director
CRAAG
Route de l'Observatoire B.P. 63
Bouzareah Alger
Tel: +213 21 90 44 67
Fax: +213 21 90 44 58
Email: kyelles@yahoo.fr

Bulgaria

Mr Hristo Dimitrov SLABAKOV
Institute of Oceanology Bulgaria
P.O. Box 152
Varna 9000
Tel.: +359 52 370 484
Fax: +359 52 370 483
Email: office@io-bas.bg

Cameroon

Mr Charles ASSAMBA ONGODO
Sub-Director of European Union Affairs
Ministry of External Relations
Yaounde
Cameroon
Tel.: +237 200 2804
Fax: +237 222 6262
Email: ongodo@voila.fr

Croatia

Dr Ivica VILIBIC
Institute of Oceanography and Fisheries
Setaliste Ivana Mestrovica, 63
Split 21000
Tel.: +385 21 358 688
Fax: +385 21 358 650
Email: vilibic@izor.hr

France

Mr Jean VIRIEUX (Head of Delegation)
Université de Nice
UMR Géosciences Azur - 250, rue Albert Einstein 06560 Valbonne
Tel.: +33 (0)4 92 94 26 51
Fax: +33 (0)4 92 94 26 10
Email: virieux@geoazur.unice.fr

Mr René FEUNTEUN
Ministère de l'Ecologie et du Développement Durable
direction de la prévention des pollutions et des risques (DPPR)
20 avenue de Ségur
75007 Paris
Tel: +33 (0)1 42 19 15 63
Fax: +33 (0)1 42 19 14 79
Email:
Rene.FEUNTEUN@ecologie.gouv.fr

Mr François GERARD
Président du CN-COI
1 quai Branly
75340 Paris
Tel: +33 1 4556 7022
Tel: +33 6 8507 7334
Fax: +33 1 4556 7005
Email: francois.gerard@meteo.fr

Mr Jean-Marc GUERIN
Directeur de l'écologie et du développement durable
Conseil général des Alpes-Maritimes
BP n° 3007
06201 Nice Cedex
Tel: +33 4 97 18 73 60
Fax: +33 4 97 18 60 45
Email: jmguerin@cg06.fr

Mr Lionnel LUCA
Vice President Conseil général des Alpes Maritimes
14, rue Jean-Raimond Giacosa
06800 Cagnes Sur Mer
Tel: +33 49 718 74 12
E-mail: virieux@geoazur.unice.fr

Dr François SCHINDELE
Scientific Advisor
Département Analyse, Surveillance Environnement
B.P. 12
91680 Bruyères-le-Châtel
Tel: +33 1 69 26 50 63
Fax: +33 1 69 26 71 30
E-mail: francois.schindele@cea.fr

Germany

Dr Karsten HESS (Head of Delegation)
Federal Ministry for Science and Research, Bonn
Tel.: +49 1888 57 3722
Fax: +49 1888 57 8 3722
E-mail: Karsten.Hess@bmbf.bund.de

Dr Jörn Behrens
Alfred-Wegener-Institute for Polar and Marine Research Head of Tsunami Modeling Group
Am Handelshafen 12
27570 Bremerhaven
Germany
Tel: +49 - 471 - 4831 1781
Fax : +49 - 471 - 4831 1590
Email : jbehrens@awi-bremerhaven.de

Dr Winfried HANKA
Scientist, Head of Project Seismology for TEWS
Geoforschungszentrum Telegrafenberg
D-14473 Potsdam
Tel.: +49 331 288 1213
Fax +49 331 288 1277
Email: hanka@gfz-potsdam.de

Dr Peter KOLTERMANN
Head of Division
Bundesamt für Seeschifffahrt und Hydrographie (BSH), Hamburg
Tel.: +49 40 3190 3500
Fax: +49 40 3190 5000
E-mail: koltermann@bsh.de

Dr Jörn LAUTERJUNG
Head Scientific Staff
GeoForschungsZentrum Potsdam
Tel.: +49 331 288 1020
Fax: +49 331 288 1002
Email: lau@gfz-potsdam.de

Greece

Mr Vasilios LYKOUSIS
National Hellenic Centre for Marine Research
P.O. BOX 712
Anavissos 19013
Tel.: +30 229 10 76380
Fax: +30 229 10 76347
Email: vlikou@ath.chmr.gr

Dr Gerassimos A. PAPADOPOULOS
Research Director
Institute of Geodynamics
National Observatory of Athens
11810 Athens
Tel. +30 210 34 90165
Fax: +30 210 34 90165
Email: g.papad@gein.noa.gr

Ireland

Dr Brian McCONNELL
Geological Survey of Ireland
Beggars Bush
Dublin 4
Tel: +353 1 6782850
Fax: +353 1 6782559
Email: brian.mcconnell@gsi.ie

Israel

Dr Sergiu Dov ROSEN
Israel Oceanographic & Limnological Research
National Institute of Oceanography (IOLR)
POB 8030
Haifa 31080
Tel.: +972 4 856 5241
Fax: +972 4 851 1911
Email: rosen@ocean.org.il

Italy

Mr Stefano CACCIAGUERRA
RANGHIERI (Head of Delegation)
Ministry Foreign Affairs

Piazzale della Farnesina, 1
00194 Roma
Tel: +39 06 3691 5801
Fax: +39 06 3691 3479
Email: stefano.cacciaguerra@esteri.it

Dr Alessandro AMATO
Director
Italy National Earthquake Centre
Istituto Nazionale di Geofisica e Vulcanologia
Via di Vigna Murata, 605
00143 Roma
Tel: +39 06 51860414
Fax : +39 06 51860507
Email: amato@ingv.it

Ms Barbara BELFIORE
Ministry Foreign Affairs
Piazzale della Farnesina, 1
00194 Roma
Tel: +39 347 9771547
Fax: +39 06 36913479
Email: barbi.belfi@libero.it

Ms Laura BERANZOLI
Istituto Nazionale de Geofisica e Vulcanologia
Via de Vigna Murata 605
00143 Rome
Tel: +39 06 518 60418
Fax: +39 06 51 860 338
Email: beranzoli@ingr.it

Mr Ezio BUSSOLETTI
Italian Permanent Delegation UNESCO
MR3.17
1 rue Miollis
Paris 75015
France
Tel.: +33 (0)45 68 31 21
Email: e.bussoletti@unesco.org

Mr Federico CINQUEPALMI
Italian Ministry for the Environment and Territory
Via Capitan Bavastro, 174
00154 Rome
Tel.: +39 06 5722 3478
Fax. +39 06 5722 3486
Email: cinquepalmi.federico@minambiente.it

Dr Alessandra CAVALETTI
Italian Ministry of Environment & Territory
Via Cristoforo Colombo, 44
00154 Rome
Email: acavalletti@gmail.com

Mr Stefano CORSINI
APAT Agenzia per la protezione dell'ambiente e servizi tecnici
Via Vitaliano Brancati, 48
00144 Roma
Tel: +39 06 4442336
Fax:+39 06 50072916
Email: stefano.corsini@apat.it

Mr Goffredo CORTESI
Ministry Foreign Affairs
Piazzale della Farnesina, 1
00194 Roma
Tel: +39 06 3691 6288
Fax: +39 06 3691 3479
Email: goffredo.cortesi@esteri.it

Dr Alessandra MARAMAI
National Institute of Geophysics and Volcanology
Via di Vigna Murata, 605
Rome 143
Tel.: +39 06 5186 0210
Fax: +39 06 5186 0338
Email: maramai@ingv.it

Ms Marina PULCINI
Italian Ministry for the Environment and Territory
Via C. Colombo 44
00147 Rome
Tel.: +39 06 5722 3476
Fax: +39 06 5722 3486
Email: pulcini.marina@minambiente.it

Prof Stefano TINTI
University of Bologna
Viale Carlo Berti Pichat, 8
40127 Bologna
Tel.: +39 051 209 5025
Fax: +39 051 209 5058
Email: steve@ibogfs.df.unibo.it

Lebanon

Mr Alexandre SURSOCK
CNRS - Conseil National de la Recherche Scientifique
P.O.box 16-5432
Achrafieh 1100-2040
Beirut
Tel.: +961 4 981 885
Fax: +961 4 981 886
Email: asursock@cnrs.edu.lb

Monaco

Mr Michel BOISSON
Centre Scientifique de Monaco
16 Bd de Suisse
98000 Monaco
Tel: +377 93 15 86 60
Fax: +377 93 15 86 74
Email: mboisson@gouv.mc

Portugal

Prof Luis MATIAS
Centro Geofisica Univ. Lisboa
Campo Grande, ED C8
Piso 6
1749 016 Lisbon
Tel: +351 962 650 272
Fax: +351 217 500 977
Email: lmatias@fc.ul.pt

Prof Mario RUIVO
IOC Portugal
Av. Infante Santo 42-4°
1350-179 Lisbon
Tel.: +351 213 904 330
Fax: +351 213 952 212
Email: cointersec.presid@fct.mces.pt

Spain

Dr Juan ACOSTA-YEPES
Instituto Español de Oceanografía
C/ Corazón de María 8
28002 Madrid
Telf: +34 91 3473618
Fax: +34 91 413 55 97
Email. Juan.acosta@md.ieo.es

Mr Mauricio GONZALEZ
Profesor de la Universidad de Cantabria
Av de los Castros s/n
39005 Santander
Tel: +34 94 2201810
Fax: +34 94 2201860
Email: gonzalere@unican.es

Dr Begoña PEREZ
Head of Harbour Oceanography Division
Spanish Harbours Authority
Avda del Partenón, 10
Campo de las Naciones
28042 Madrid
Tel: +34 91 5245500
Fax: +34 91 5245504
Email: bego@puertos.es

Turkey

Prof Cemil GURBUZ
Bogazici University, Kandilli Observatory and Earthquake Research Institute
Cengelkoy, Istanbul
Tel: +90 216 3320242
Fax: +90 216 332268
Email: gurbuz@boun.edu.tr

United Kingdom

Mr Russell Scott ARTHURTON
Consultant
5A Church Lane - Grimston Melton, Mowbray
Leics LE14 3BY
Tel.: +44 (0) 1664 810024
Fax: +44 (0) 1664 810024
Email: r.arthurton@btinternet.com

United States of America

Dr David GREEN
NOAA Tsunami Program Manager
National Oceanic and Atmospheric Administration
SSMC-2 Rm-15426
1325 East West Highway
Silver Spring, Maryland 20910
Tel.: +1 301 713 3557 x 172
Fax: +1 301 713 0173
Email: David.Green@noaa.gov

ORGANIZATIONS/INSTITUTIONS

GSM

Gabriel SOLOMON
Director
GSM Association
71 High Holborn
London WC1V 6EA
Tel. 00 44 7956 257 352

UNU-EHS

Dr Joern BIRKMANN
United Nations University Institute for Environment and Human Security (UNU-EHS)
Goerresstr. 15
53113 Bonn
Germany
Tel: +49 228 85509
Email: birkmann@ehs.unu.edu

WMO

Mr Edgard CABRERA
Chief, Ocean Affairs Division
Applications Programme Department
World Meteorological Organization
7 bis, Avenue de la Paix
Case postale No. 2300
CH-1211 Geneve 2
Switzerland
Tel: +41 22 730 82 37
Fax: +41 22 730 81 28
Email: ecabrera@wmo.int

ESEAS

Ms Lilja Bente BYE
Norwegian Mapping Authority Geodetic Institute
Kartverksveien, 21
Honefoss 3511
Tel.: +47 32 11 81 00/303
Fax: +47 32 11 81 01
Email : bente-lilja.bye@statkart.no

OCEANOR

Ms Cathy PRIMROSE
Fugro OCEANOR
Pir-Senteret
N-7462 Trondheim
Norway
Tel: +47 7354 5200
Fax: +47 7354 5201
Email: c.primrose@oceanor.com

IOC/UNESCO Secretariat

Mr Patricio BERNAL
Executive Secretary IOC / ADG
1, rue Miollis
75015 Paris
France
Tel : +33 (0)1 45 68 39 83
Fax : +33 (0)1 45 68 58 12
E-mail : p.bernal@unesco.org

Mr Julian BARBIERE
Programme Specialist
IOC of UNESCO
1, rue Miollis
75015 Paris
France
Tel: +33 (0)1 45 68 49 45
Fax: +33 (0)1 45 68 58 12
E-mail: j.barbiere@unesco.org

Mr Stefano BELFIORE
Programme Specialist
IOC of UNESCO
1, rue Miollis
75015 Paris
France
Tel.: +33 (0)1 45 68 40 68
Fax: +33 (0)1 45 68 58 12
Email: s.belfiore@unesco.org

Ms Forest COLLINS
Tsunami Activity Coordinator
IOC of UNESCO
1, rue Miollis
75015 Paris
France
Tel: +33 (0)1 45 68 39 74
Fax: +33 (0)1 45 68 58 12
Email: f.collins@unesco.org

Mr Fabio LEDDA
Stagiaire
IOC of UNESCO
1, rue Miollis
75015 Paris
France
Tel: +33 68 6075167
Email: f.ledda@unesco.org

Ms Sue WILLIAMS
UNESCOPRESSE
7, Place de Fontenoy
75352 Paris 07 SP
France
Tel: +33 (0)1 45 68 17 06
Email : s.williams@unesco.org

Mr Uli WOLF
Programme Specialist
IOC of UNESCO
1, rue Miollis
75015 Paris
France
Tel.: +33 (0)1 45 68 39 29
Fax: +33 (0)1 45 68 58 12
Email: u.wolf@unesco.org

OBSERVERS

Dr Giorgio BELLOTTI
Università degli Studi L'Aquila/Roma Tre
Dipartimento di Scienze dell'Ingegneria Civile
Via Vito Volterra 62
00146 Rome
Tel: +39 347 6809066
Fax: 39 06 97257239
Email: bellotti@uniroma3.it

Dr Laura BERANZOLI
Istituto Nazionale di Geofisica e Vulcanologia
Sezione Roma 2
Unità Funzionale Ricerche InterDisciplinari GEomarine (RIDGE)
Via di Vigna Murata 605
00143 Roma
Italy
Tel: +39 06 5186 0418
Fax: +39 06 5186 0338
Email: beranzoli@ingv.it

Mr Etienne Bertrand
Chargé de recherche
ERA risques sismiques
CETE Méditerranée
56 bd Stalingrad
06359 Nice Cedex 4
France
Tel: +33 4 92 00 81 61
Fax: +33 4 92 00 81 39
Email: etienne.bertrand@equipment.gouv.fr

Mr Remy BOSSU
Secretary General
CSEM (EMSC)
C/o CEA, Bat. Sables
BP 12 91680 Bruyeres le Chatel
France
Tel.: +33 1 69 26 78 14
Fax: +33 1 69 26 70 00
Email: bossu@emsc-csem.org

Mr Pierre COCHONAT
IFREMER
155, rue Jean-Jacques Rousseau
92138 ISSY LES MOULINEAUX Cedex
France
Tel: +33 (0)1.46.48.22.1O / 06.07.25.47.65
Fax: +33 (0)1.46.48.22.24
Email: Pierre.Cochonat@ifremer.fr

Prof Paolo DE GIROLAMO
Università degli Studi L'Aquila/Roma Tre
Dipartimento di Scienze dell'Ingegneria Civile
Via Vito Volterra 62
00146 Rome
Fax: 39-06-97257239
Email: de girolamo@uniroma3.it

Mr Bruno FEIGNIER
DASE
Bt Sables - BP 12
91680 BRUYERES LE CHATEL
France
Tel: + 33 1 69 26 54 71 / 58 12
Email: bruno.feignier@cea.fr

Ms Catherine GUENON
Adjointe au Chef du Bureau Des Risques Majeurs
Ministère de L'intérieur et de l'aménagement du territoire
Place Beauvau
75800 Paris
France
Tel: +33 1 56 04 74 67
Fax: +33 1 56 04 71 85
Email: catherine.guenon@interieur.gouv.fr

Mr Alain HARMEL
Insititut Geographique National
2/4 avenue Pasteur
94156 Saint-Mande cedex
France
Tel: +33 1 43 98 85 58
Fax: +33 1 43 98 84 50
Email: alain.harmel@ign.fr

Mr Roberto INGHILESI
Executive Assistant
APAT Agenzia per la protezione dell'ambiente e servizi tecnici
Via Vitaliano Brancati, 48
00144 Roma
Italy
Tel: +39 06 4442 336
Email: roberto.inghilesi@apat.it

Mr Ronan LE ROY
Service Hydrographique et Océanographique de la Marine (SHOM)
13, rue du Chatellier, BP30316
29603 Brest Cedex
France
Tel: +33 02 98 22 15 89
Fax: +33 02 98 22 08 99
Email: rleroy@shom.fr

Mr Viktor MANOILOV
Student
University of Nice
47 rue Caftarelli
06000 Nice
France
Tel: +33 6 67 82 76 41
Email: sloncho2003@yahoo.com

Mr William MARTIN
Directeur Interministériel de la Défense et de la Protection Civile
Prefecture des Alpes-Maritimes
06286 Nice cedex 3
France
Tel: +33 4 93 72 23 00
Fax: +33 4 93 72 23 45
Email: william.martin@alpes-maritimes.pref.gouv.fr

Mr Hormoz MODARESSI
BRGM - Centre scientifique et technique
3, avenue Claude-Guillemin
BP 6009
45060 Orléans, cedex 2
France
Tel: +33 2 38 64 34 34
Fax: +33 2 38 64 35 18
Email: h.modaressi@brgm.fr

Dr Jacque MORELLI
CNRS
Chargé de Recherche
Université Nice
UMR 6012 ESPACE – Nice
98 bd Edouard Herriot
BP 3209
06204 Nice
France
Tel: +33 61 309 76 49
Fax : +33 4 93 37 54 64
Email: morelli@unice.fr

Mr Andre PATTE
Chargé de mission risques majeurs
Rectorat de Nice
15 Ruelle des Argeracs
Le Haut Sartoux
06560 VALBONNE
France
+33 6 60 67 25 49
a.patte@free.fr

Ms Monique RAGAZZI-CASON
Sous Directrice de l'Ecologie et du Développement Durable
Conseil général des Alpes-Maritimes
BP n° 3007
06201 Nice Cedex
France

Tel: +33 4 97 18 68 08
Fax: +33 4 97 18 60 45
Email: mragazzi@cg06.fr

Ms Claire Anne REIX
Optical Observation and Science Directorate
ALCATEL ALENIA SPACE
100 boulevard du Midi
06150 Cannes
France
Tel: +33 4 92 92 34 91
Fax: +33 4 92 92 74 50
Email: claire-anne.reix@alcatelaleniaspace.com

Mr Vincent RIGAUD
Director of Underwater Systems Dept.
IFREMER
Zone portuaire de Bregaillon
83507 LaSeyne/Mer
France
Tel: +33 49 430 4893
Fax: +33 49 430 4417
Email: vincent.ridaud@ifremer.fr

Dr Sergiu Dov ROSEN
MedGLOSS coordinator
Israel Oceanographic & Limnological Research
National Institute of Oceanography (IOLR)
POB 8030
Haifa 31080
Tel.: +972 4 856 5241
Fax: +972 4 851 1911
Email: rosen@ocean.org.il

Mr Henri SAVINA
METEO FRANCE
DPREVI/MAR
42 avenue Gustave Coriolis
31057 Toulouse
France
Tel: 05 6107 8291
Email: Henri.savina@meteo.fr

Mr Serge SOLAGES
Directeur Service Geologique Regional Paca
REGIONAL PACA
117 avenue de Lumigny
BP 168
13278 Marseille Cédex 9
France
Tel: +33 4 91 17 74 77
Fax: +33 6 20 75 09 40
Email: s.solages@brgm.fr

Ms Monique TERRIER
BRGM
3, avenue Claude-Guillemin
B.P. 6009
45 060 Orléans, cedex 2
France
Tel: + 33 2 38 64 34 34
Fax: + 33 2 38 64 36 89
Email: m.terrier@brgm.fr

ANNEX VII

LIST OF ACRONYMS

CIESM	The Mediterranean Science Commission
ESEAS	European Sea-Level Service
GCOS	Global Climate Observing System
GEOFON	German seismological network
GLOSS	Global sea level Observing System
GOOS	Global Ocean Observing System
GPS	Global Positioning System
ICAM	Integrated Coastal Area Management
ICG	Intergovernmental Coordination Group
INGV	Italian Institute of Geology and Vulcanology/Istituto Nazionale di Geofiscia e Vulcanologia
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IOTWS	Indian Ocean Tsunami Warning System
IOCARIBE	IOC Sub-commission for the Caribbean and Adjacent Regions
ISDR	International Strategy for Disaster Reduction (UN)
ITIC	IOC International Tsunami Information Centre
MedGLOSS	Mediterranean Network for Systematic Sea-level Monitoring in the Mediterranean and Black Seas - regional subsystem of Global Sea Level Observing System
MedNet	Italian telemetered seismic network
NEAMTWS	Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas
NMHS	National Meteorological and Hydrological Services
TWS	Tsunami Warning System
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
VEBSN	Virtual Earthquake Broadband Seismic Network
WMO	World Meteorological Organization

In this Series *Languages*

Reports of Governing and Major Subsidiary Bodies, which was initiated at the beginning of 1984, the reports of the following meetings have already been issued:

1.	Eleventh Session of the Working Committee on international Oceanographic Data Exchange	E, F, S, R
2.	Seventeenth Session of the Executive Council	E , F, S, R,Ar
3.	Fourth Session of the Working Committee for Training, Education and Mutual Assistance	E, F, S, R
4.	Fifth Session of the Working Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S, R
5.	First Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions	E, F, S
6.	Third Session of the *ad hoc* Task team to Study the Implications, for the Commission, of the UN Convention on the Law of the Sea and the New Ocean Regime	E, F, S, R
7.	First Session of the Programme Group on Ocean Processes and Climate	E, F, S, R
8.	Eighteenth Session of the Executive Council	E, F, S, R, Ar
9.	Thirteenth Session of the Assembly	E, F, S, R, Ar
10.	Tenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific	
11.	Nineteenth Session of the Executive Council, Paris, 1986	E, F, S, R, Ar
12.	Sixth Session of the IOC Scientific Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S
13.	Twelfth Session of the IOC Working Committee on International Oceanographic Data Exchange	E, F, S, R
14.	Second Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, Havana, 1986	E, F, S
15.	First Session of the IOC Regional Committee for the Central Eastern Atlantic, Praia, 1987	E, F, S
16.	Second Session of the IOC Programme Group on Ocean Processes and Climate	E, F, S
17.	Twentieth Session of the Executive Council, Paris, 1987	E, F, S, R, Ar
18.	Fourteenth Session of the Assembly, Paris, 1987	E, F, S, R, Ar
19.	Fifth Session of the IOC Regional Committee for the Southern Ocean	E, F, S, R
20.	Eleventh Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Beijing, 1987	E, F, S, R
21.	Second Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Arusha, 1987	E, F
22.	Fourth Session of the IOC Regional Committee for the Western Pacific, Bangkok, 1987	E only
23.	Twenty-first Session of the Executive Council, Paris, 1988	E, F, S, R
24.	Twenty-second Session of the Executive Council, Paris, 1989	E, F, S, R
25.	Fifteenth Session of the Assembly, Paris, 1989	E, F, S, R
26.	Third Session of the IOC Committee on Ocean Processes and Climate, Paris, 1989	E, F, S, R
27.	Twelfth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Novosibirski, 1989	E, F, S, R
28.	Third Session of the Sub-Commission for the Caribbean and Adjacent Regions, Caracas, 1989	E, S
29.	First Session of the IOC Sub-Commission for the Western Pacific, Hangzhou, 1990	E only
30.	Fifth Session of the IOC Regional Committee for the Western Pacific, Hangzhou, 1990	E only
31.	Twenty-third Session of the Executive Council, Paris, 1990	E, F, S, R
32.	Thirteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, New York, 1990	E only
33.	Seventh Session of the IOC Committee for the Global Investigation of Pollution in the Marine Environment, Paris, 1991	E, F, S, R
34.	Fifth Session of the IOC Committee for Training, Education and Mutual Assistance in Marine Sciences, Paris, 1991	E, F, S, R
35.	Fourth Session of the IOC Committee on Ocean Processes and Climate, Paris, 1991	E, F, S, R
36.	Twenty-fourth Session of the Executive Council, Paris, 1991	E, F, S, R
37.	Sixteenth Session of the Assembly, Paris, 1991	E, F, S, R, Ar
38.	Thirteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Baja California, 1991	E, F, S, R
39.	Second Session of the IOC-WMO Intergovernmental WOCE Panel, Paris, 1992	E only
40.	Twenty-fifth Session of the Executive Council, Paris, 1992	E, F, S, R
41.	Fifth Session of the IOC Committee on Ocean Processes and Climate, Paris, 1992	E, F, S, R
42.	Second Session of the IOC Regional Committee for the Central Eastern Atlantic, Lagos, 1990	E, F
43.	First Session of the Joint IOC-UNEP Intergovernmental Panel for the Global Investigation of Pollution in the Marine Environment, Paris, 1992	E, F, S, R
44.	First Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1992	E, F, S
45.	Fourteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Paris, 1992	E, F, S, R
46.	Third Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Vascoas, 1992	E, F
47.	Second Session of the IOC Sub-Commission for the Western Pacific, Bangkok, 1993	E only
48.	Fourth Session of the IOC Sub-Cornmission for the Caribbean and Adjacent Regions, Veracruz, 1992	E, S
49.	Third Session of the IOC Regional Committee for the Central Eastern Atlantic, Dakar, 1993	E, F
50.	First Session of the IOC Committee for the Global Ocean Observing System, Paris, 1993	E, F, S, R
51.	Twenty-sixth Session of the Executive Council, Paris, 1993	E, F, S, R
52.	Seventeenth Session of the Assembly, Paris, 1993	E, F, S, R
53.	Fourteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Tokyo, 1993	E, F, S, R
54.	Second Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1993	E, F, S
55.	Twenty-seventh Session of the Executive Council, Paris, 1994	E, F, S, R
56.	First Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Melbourne, 1994	E, F, S, R
57.	Eighth Session of the IOC-UNEP-IMO Committee for the Global Investigation of Pollution in the Marine Environment, San José, Costa Rica, 1994	E, F, S
58.	Twenty-eighth Session of the Executive Council, Paris, 1995	E, F, S, R
59.	Eighteenth Session of the Assembly, Paris, 1995	E, F, S, R
60.	Second Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1995	E, F, S, R

CONTINUED ON INSIDE OF BACK COVER

61.	Third Session of the IOC-WMO Intergovernmental WOCE Panel, Paris, 1995	E only
62.	Fifteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Papetee, 1995	E, F, S, R
63.	Third Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1995	E, F, S
64.	Fifteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange	E, F, S, R
65.	Second Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1995	E only
66.	Third Session of the IOC Sub-Commission for the Western Pacific, Tokyo, 1996	E only
67.	Fifth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, Christ Church, 1995	E, S
68.	Intergovernmental Meeting on the IOC Black Sea Regional Programme in Marine Sciences and Services	E, R
69.	Fourth Session of the IOC Regional Committee for the Central Eastern Atlantic, Las Palmas, 1995	E, F, S
70.	Twenty-ninth Session of the Executive Council, Paris, 1996	E, F, S, R
71.	Sixth Session for the IOC Regional Committee for the Southern Ocean and the First Southern Ocean Forum, Bremerhaven, 1996	E, F, S,
72.	IOC Black Sea Regional Committee, First Session, Varna, 1996	E, R
73.	IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Fourth Session, Mombasa, 1997	E, F
74.	Nineteenth Session of the Assembly, Paris, 1997	E, F, S, R
75.	Third Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1997	E, F, S, R
76.	Thirtieth Session of the Executive Council, Paris, 1997	E, F, S, R
77.	Second Session of the IOC Regional Committee for the Central Indian Ocean, Goa, 1996	E only
78.	Sixteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Lima, 1997	E, F, S, R
79.	Thirty-first Session of the Executive Council, Paris, 1998	E, F, S, R
80.	Thirty-second Session of the Executive Council, Paris, 1999	E, F, S, R
81.	Second Session of the IOC Black Sea Regional Committee, Istanbul, 1999	E only
82.	Twentieth Session of the Assembly, Paris, 1999	E, F, S, R
83.	Fourth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1999	E, F, S, R
84.	Seventeenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Seoul, 1999	E, F, S, R
85.	Fourth Session of the IOC Sub-Commission for the Western Pacific, Seoul, 1999	E only
86.	Thirty-third Session of the Executive Council, Paris, 2000	E, F, S, R
87.	Thirty-fourth Session of the Executive Council, Paris, 2001	E, F, S, R
88.	Extraordinary Session of the Executive Council, Paris, 2001	E, F, S, R
89.	Sixth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, San José, 1999	E only
90.	Twenty-first Session of the Assembly, Paris, 2001	E, F, S, R
91.	Thirty-fifth Session of the Executive Council, Paris, 2002	E, F, S, R
92.	Sixteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Lisbon, 2000	E, F, S, R
93.	Eighteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Cartagena, 2001	E, F, S, R
94.	Fifth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2001	E, F, S, R
95.	Seventh Session of the IOC Sub-commission for the Caribbean and Adjacent Regions (IOCARIBE), Mexico, 2002	E, S
96.	Fifth Session of the IOC Sub-Commission for the Western Pacific, Australia, 2002	E only
97.	Thirty-sixth Session of the Executive Council, Paris, 2003	E, F, S, R
98.	Twenty-second Session of the Assembly, Paris, 2003	E, F, S, R
99.	Fifth Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Kenya, 2002 (* Executive Summary available separately in E, F, S & R)	E*
100.	Sixth Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, St. Petersburg (USA), 2002 (* Executive Summary available separately in E, F, S & R)	E*
101.	Seventeenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Paris, 2003 (* Executive Summary available separately in E, F, S & R)	E*
102.	Sixth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2003 (* Executive Summary available separately in E, F, S & R)	E*
103.	Nineteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Wellington, New Zealand, 2003 (* Executive Summary available separately in E, F, S & R)	E*
104.	Third Session of the IOC Regional Committee for the Central Indian Ocean, Tehran, Islamic Republic of Iran, 21-23 February 2000	E only
105.	Thirty-seventh Session of the Executive Council, Paris, 2004	E, F, S, R
106.	Seventh Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2005 (* Executive Summary available separately in E, F, S & R); and Extraordinary Session, Paris, 20 June 2005	E*
107.	First Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Perth, Australia, 3–5 August 2005	E only
108.	Twentieth Session of the Intergovernmental Coordination Group for the Tsunami Warning System in the Pacific, Viña del Mar, Chile, 3–7 October 2005 (* Executive Summary available separately in E, F, S & R)	E*
109.	Twenty-Third Session of the Assembly, Paris, 21–30 June 2005	E, F, S, R
110.	First Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), Rome, Italy, 21–22 November 2005	E only
111.	Eighth Session of the IOC Sub-commission for the Caribbean and Adjacent Regions (IOCARIBE), Recife, Brazil, 14–17 April 2004 (* Executive Summary available separately in E, F, S & R)	E*
112.	First Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions (ICG/CARIBE-EWS), Bridgetown, Barbados, 10–12 January 2006	E only
113.	Ninth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Cartagena de Indias, Colombia, 19–22 April 2006 (* Executive Summary available separately in E, F, S & R)	E S*

114.	Second Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Hyderabad, India, 14–16 December 2005	E only
115.	Second Session of the WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology, Halifax, Canada, 19–27 September 2005 (Abridged final report with resolutions and recommendations)	E, F, R, S
116.	Sixth Session of the IOC Regional Committee for the Western Indian Ocean (IOCWIO), Maputo, Mozambique, 2–4 November 2005 (* Executive Summary available separately in E, F, S & R)	E*
117.	Fourth Session of the IOC Regional Committee for the Central Indian Ocean, Colombo, Sri Lanka 8–10 December 2005 (* Executive Summary available separately in E, F, S & R)	E*
118.	Thirty-eighth Session of the Executive Council, Paris, 20 June 2005 (Electronic copy only)	E, F, R, S
119.	Thirty-ninth Session of the Executive Council, Paris, 21–28 June 2006	E, F, R, S
120.	Third Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Bali, Indonesia, 31 July–2 August 2006	E only
121.	Second Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), Nice, France, 22–24 May 2006	E only