



# TSUNAMI NEWS

Tsunami News  
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## Introduction



Bienvenidos a la sexta edición del boletín informativo de tsunami editado por la Comisión Oceanográfica Intergubernamental de la UNESCO. Este nuevo número coincide

con el lanzamiento del sitio Internet de tsunami remozado con versiones en ruso, francés, español e inglés. Gran cantidad de documentos en diversos idiomas están ahora disponibles a través del sitio Internet, así como también acceso directo a sitios Internet de las próximas reuniones y actividades. Como usuarios de este nuevo sitio ustedes podrán descargar o añadir nuevos documentos para uso de la creciente comunidad que gira en torno a los Grupos de Coordinación Intergubernamental.

Welcome to the sixth issue of the Tsunami Newsletter, prepared by UNESCO's Intergovernmental Oceanographic Commission. This new issue is contemporary to the launching of the revamped tsunami website, with language versions in Russian, French, Spanish and English. A wealth of documents in different languages is now available from that website, as well as direct links to meetings' websites and other activities. As users, you are welcome to download/upload documents for the benefit of the tsunami community

Soyez les bienvenus à cette sixième édition du bulletin Tsunami, produit par la Commission océanographique intergouvernementale de l'UNESCO. Ce nouveau numéro est concomitant avec le lancement du site internet de tsunami renouvelé, avec des versions en français, espagnol, anglais et russe. Il y a des quantités de documents en diverses langues ainsi que des liens directs aux sites internet des réunions et activités sur le tsunami. En tant qu'utilisateurs vous aurez la possibilité de télécharger et de déposer des documents pour bénéficier la communauté.

## The Intergovernmental Oceanographic Commission of UNESCO

<http://www.ioc-unesco.org/>  
<http://ioc-tsunami.org/>

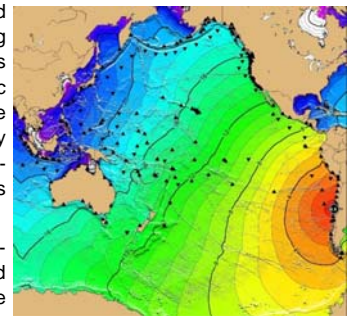
### Working towards global protection

- PTWS: Pacific Tsunami Warning and Mitigation System
- IOTWS: Indian Ocean Tsunami Warning and Mitigation System
- CARIBE-EWS: Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
- NEAMTWS: Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas

## Post-event assessments and projects

### PTWS post-event assessment after earthquake and tsunami in Chile, February 27, 2010

On Saturday, February 27, 2010 at 06:34 UTC a 8.8 Mw earthquake occurred offshore Maule 105 km, North of Concepcion. In addition to its devastating effects, the earthquake triggered a tsunami that strongly affected several cities in Chile and generated a widespread tsunami warning issued by the Pacific Tsunami Warning Center (PTWC). Near the epicenter, official accounts indicate over 100 fatalities due to the tsunami. Preliminary measures of a Rapid Survey Team deployed the week after the event by UNESCO showed run up measurements as high as 30 meters being the most common between 6 and 10 meters in the most affected area of the central-southern Chilean coast.



The UNESCO IOC Secretariat for the PTWS conducted a survey among Member States that have identified their Tsunami Warning Focal Points (TWFP) and Tsunami National Contacts (TNC) in order to assess the performance of the system and identify the actions undertaken by national institutions.

The [IOC Sea Level Station Monitoring Facility](#) performed as an important tool for sea level monitoring. The website received around 100,000 hits during February 27, which represents a number of hits more than 10 times superior to the average per day registered during the week previous to the event.

The PTWS Technical Secretariat appreciates the contribution of all Member States that answered the survey questionnaire and encourages the use of these results as basis for undertaking improvement initiatives at the national level through increased regional cooperation and training where required. The final version will be soon available at the new tsunami website (<http://www.ioc-tsunami.org>).

### Recover and Enhance Haiti's Early Warning Systems for Coastal Hazards



SEMAMAH Staff at the Guard Coast facilities in Port-au-Prince, Haiti.

UNESCO has undertaken the project "Recover and Enhance Haiti's Warning Services for Coastal Hazards" with initial funding from the Swiss Agency for Development and Cooperation and the Government of United States of America. The project aims at installing a sea level station in cooperation with the Haitian National Maritime Service (SEMAMAH), the University of Hawaii Sea Level Center (UHSLC) and the Puerto Rico Seismic Network (PRSN). In addition, a National Data Centre will be established in cooperation with the Preparatory Commission for the Comprehensive Nuclear-test Ban Treaty Organization (CTBTO) and the Bureau of Mines and Energy in Haiti (BdME). Furthermore, in liaison with PRSN the project will ensure that BdME has access to real time seismic data from available seismic stations within the Caribbean.

Moreover, it is intended to develop Standard Operating Procedures (SOPs) for tsunamis and storm surges in cooperation with the Directorate for Civil Protection, National Center for Meteorology, SEMAMAH and BdME.

Two preparatory missions have been conducted. A UNESCO staff will be deployed in Haiti from October 2010 to coordinate the project based in UNESCO Port au Prince and in cooperation with the local partner institutions.

Other news



**The Third Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG)**, was held in Lisbon, Portugal, on 5-6 May 2010, hosted by the Portuguese Instituto de Meteorologia, under the chairmanship of Mr. Sang-Kyung Byun (IOC Vice-chairman). During the meeting, the group agreed that the performance and capacity of delivery of GTS for tsunami purposes needs to be addressed by WMO. In addition, the group admitted the need for a Compendium of Definitions and Terminology on Sea Level related Hazards.

Moreover, the group declared that IOC should raise the data requirement at the policy level in order to demonstrate the need for real time data directly to governments. The group convened to focus on real-time data and to ask ICGs to provide sensitivity studies about data availability and establish a TOWS-WG Task Team to synthesize the results of the studies provided by the ICGs. The group also agreed to solicit from IODE a report on implementation of the IOC Oceanographic Data Policy indicating which data type is less or not fully exchanged. It further agreed to solicit from CTBTO to provide similar analysis for seismic data.

IOC Tsunami Unit Website



Visit the new Tsunami Website at:

<http://www.ioc-tsunami.org>

Latest developments

IOTWS-VII

The **Seventh Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-VII)** was held in Banda Aceh, Indonesia, 14-16 April 2010. The meeting was attended by 85 delegates from 13 Member States, 5 Observer States and 12 UN agencies and other organisations. Just over 5 years after the Indian Ocean tsunami, it was timely to hold the ICG meeting in Banda Aceh, the community worst affected by the tsunami. The delegates were reminded of the importance of their work in protecting vulnerable communities and of the progress that has been achieved since 2004.

An important outcome of the meeting was the restructuring of the Working Groups to reflect the workplan maturity and convergence of some of the old Working Groups, and the need to integrate scientific aspects with related areas across the IOC. Three new Working Groups (WG) were established with nominated chairs as follows: WG1 - Tsunami Risk Assessment and Reduction (Prof. Sam Hettiarachchi, Sri Lanka); WG2 - Tsunami Detection, Warning and Dissemination (Dr. Satheesh Shenoi, India); and WG3 - Tsunami Awareness and Response (Ms. Irina Rafiliana, Indonesia). The ICG encouraged the new WGs to also consider coastal inundation caused by storm surges and tropical cyclones within multi-hazard approaches and frameworks.

Following the success of the Indian Ocean Wave '09 exercise (IOWave09) in which 18 Member States took part on



14 October 2009, the ICG decided to conduct another exercise in late 2010 between Regional Tsunami Watch Providers (RTWP) and National Tsunami Warning Centres (NTWC) only. The objective of this exercise will be to familiarise the NTWCs with the watch products issued by the RTWPs as part of the transition process from the Interim Advisory Service (IAS) provided by JMA and PTWC.

The ICG adopted the 2010-2011 RTWP implementation workplan for WG2, which targets the completion of transition from the IAS to the Indian Ocean RTWP service by the second quarter of 2011. The ICG recognised that the timeline for completing the transition was very tight and encouraged the Member States to give full cooperation to WG2 as it implemented its workplan. A number of training workshops for NTWCs will be held in India and Kenya in late 2010, at which the RTWPs will present and explain their tsunami watch products. Workshops on Standard Operating Procedures for tsunami warning and emergency response will also be held in East Africa in late 2010.

The ICG thanked the Government of Indonesia and the Director General and personnel of the Agency for Meteorology, Climatology and Geophysics (BMKG) for hosting the 7<sup>th</sup> Session of the ICG/IOTWS-VII so successfully. At the invitation of the Government of Australia, the 8<sup>th</sup> Session of the ICG/IOTWS will be held in Melbourne in the 2<sup>nd</sup> quarter of 2011.

National Multi Hazard Early Warning System (NMHEWS) in Oman



Ahmed Al Harthy, Chief of Operation and Technical Services Department of Meteorology, Directorate General of Civil Aviation and Meteorology, Sultanate of Oman, and members of the UNESCO team

On 22 October 2009, UNESCO signed an MoU with the Ministry of Transports and Communications of the Sultanate of Oman which established the conditions of a self-benefiting Fund in Trust to set up a National Multi Hazard Early Warning System (SbFIT NMHEWS) in Oman. Technical missions conducted by the IOC on the request of Oman since 2005 had already addressed the existence of tsunami risk in Oman due to the Makran subduction zone, among other tsunami sources. The project aims to support the Direction of Meteorology of Oman (DGMAN) to build a brand new NMHEW Center focused initially on tsunami hazard. It is planned for a period of two years and covers 9 components: (i) NHMEWC staff Terms of Reference (ii) Sea Level Monitoring Network (iii) Seismic Monitoring Network (iv) Communication system for warning dissemination, (v) Education and public awareness, (vi) Bathymetry and Topography, Risk Assessment, (vii) Computers and hardware, (viii) Hazard and Modelling and (ix) IOTWS Coordination

The kick off mission for the project was conducted from 2-8 September, 2010. Not less than six new multipurpose sea level stations will be installed in the coast of Oman during the period 2010-2011. In addition, tsunami hazard maps will be developed.



Sea Level Monitoring Station in Muscat, Sultanate of Oman

## PTWS

The Pacific Tsunami Warning and Mitigation System (ICG-PTWS) Steering Committee meeting was held on 17 - 20 August 2010, in Honolulu, United States at the ITIC. The meeting reviewed briefly the actual status of the Medium Term Strategy 2009-2013 and the Implementation Plan.

The Director of ITIC presented the results of the Exercise Pacific Wave 08 (PACWAVE08). Taking into account the lessons learned from PACWAVE08, the group decided to conduct a multi-scenario exercise in October/November 2011. A dedicated Task Team (established by WG2 and 3) will elaborate the detailed scenarios. It was stressed that, based on the experience from 2008, the exercise could be conducted more effectively due to improved communication to national centres and incorporation of media, while still several shortcomings in the regional-national communication were detected.

Moreover, the PTWS-SC conducted a critical evaluation of the action of the PTWS during the most recent tsunami events. Furthermore, it was informed that the Government of China has agreed to host the PTWS-XXIV meeting in Beijing on May 2011.



## Advances from the Project: Adaptive Learning Mechanism on Tsunami Preparedness at Community Level in Colombia, Ecuador, Peru and Chile – DIPECHO VI



To date, the project has completed over 90% of the activities proposed. One of the most important phases has been the conduction during August and September 2010 of workshops to strengthen local preparedness and national emergency plan against tsunamis. Local and regional communities, especially school communities and social organizations located in areas at risk of tsunami, participated at the workshops. The analysis and discussions mainly focused on school safety plans and family security plans. Participants made the commitment to disseminate the knowledge they gained at the workshop to their families and communities.

In Chile 6 workshops involved 258 students, 59 teachers and 104 representatives of organizations belonging to the towns of Tome, Penco and Coronel in the Bío Bío Region.

In Peru, school principals and teachers of 11 institutions of the Callao Region participated at a workshop aiming to establish mechanisms to include disaster risk reduction strategies into school curricula. The workshop promoted the implementation of community-based disaster risk reduction plans and mainly focused on earthquakes and tsunamis. It is important to recall that the Callao Region is highly vulnerable to these natural hazards.

The final report of the project including the results of the four participating countries will be available later this year. More information about the project is now available on the [UNESCO website](#).



## NEAMTWS

The first NEAMTWS tsunami communication test exercise (NEAMTWS-CTE1) was conducted on 24 June 2010 with the National Observatory of Athens, Greece (NOA) as message provider.

The Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS) that met for its 6th Session in Istanbul, Turkey (11-13 November 2009) decided to conduct during 2010 Communication Test Exercises between the National Tsunami Warning Centres and the Tsunami Warning Focal Points. For this purpose, the ICG/NEAMTWS decided further to establish a Task Team on Communication Test Exercises (TT-CTE) to conduct and assess the Communication Test Exercises.

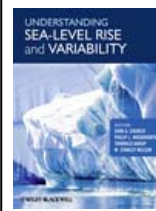
The NEAMTWS-CTE1 was organized per e-mail and also during the [meeting](#) held in Paris on March 2010 where the TT-CTE decided to conduct the exercise with the RTWC candidates in condition to participate. In a second phase, profiting from the experience gained, the exercises would be extended to all RTWCs and NTWCs/TWFPs of the NEAM region

The report of the exercise has been submitted to the TT-CTE for approval and it will be also reviewed by the Architecture Task Team. Final recommendations will be adopted during the seventh session of the ICG/NEAMTWS that will be held in November, 2010.

IOC started a revision process of the "Post-Tsunami Field Guide", **IOC Manual & Guides no. 37 published in 1998**. The experiences faced in the last years, particularly after the Indian Ocean Tsunami in 2004, the Samoan Tsunami in 2009 and the Chilean Tsunami in 2010 indicate the necessity of a revision of the guide.

The 1st Meeting of the Core Working Group for the revision of the guide was held on 10-11 August, 2010 during the AGU Americas meeting in Foz do Iguaçu, Brazil. The Core Working Group analyzed the recent activities of the International Tsunami Survey Teams (ITST) and decided the skeleton table of contents and the authors and contributing authors. The Core Working Group will hold a second meeting in San Francisco before the AGU Fall meeting (13 - 17 December 2010) to review and finalize the guide.

## BOOK



The book [Sea Level Rise and Variability](#) is now available from Wiley-Blackwell publishers. The book, an outcome of the World Climate Research

Programme workshop in 2006, identifies the research and observations required to reduce uncertainties in our understanding of sea-level rise so that more reliable future projections can be made.

## TRAINING

From Tsunamis to Water Pathogens: Understanding Ocean Hazards in the XXI Century - January, 2011

ASI XI "From Tsunamis to Water Pathogens: Understanding Ocean Hazards in the XXI Century" (<http://www.udec.cl/oceanoudec/oceanografia>) is the eleventh version of this educational activity and will consist of four courses:

- Understanding tsunamis and preparing to cope with
- Tectonics and recurrence of great subduction earthquakes
- Marine hazards to human health: Natural and anthropogenic
- The ocean carbon cycle: From ocean acidification to oil spills

Information and applications: S Pantoja, F Tapia, M Sorondo ([monica.sorondo@oceanografia.udec.cl](mailto:monica.sorondo@oceanografia.udec.cl))

## Training Activities

### UNESCO-IOC Workshops on Preparedness and Awareness of Makran Tsunami Hazards



UNESCO IOC has received funding from the UNESCAP Multi-donor Voluntary Trust Fund to conduct a project called "Assessment and Awareness of Makran Tsunami Hazards". The project was designed to build capacity in Iran and Pakistan for palaeotsunami studies of the Makran region and collect eyewitness accounts from the tsunami that impacted the Makran coast in 1945.

The project started with Preparedness and Awareness workshops in Iran and Pakistan. In holding the workshops, the ICG/IOTWS Secretariat worked closely with the host agency in the respective countries. The workshop in Iran was hosted by the Iranian National Institute of Oceanography (INIO) in Tehran, 1-5 May 2010, while the workshop in Pakistan was hosted by the Geological Survey of Pakistan (GSP) Karachi from 19-23 July 2010.

The aim of the 5-day workshops was to introduce the history of tsunamis in the Makran region, explore the potential for future events, and showcase some best practices in awareness and education which have been applied in other countries, such as Indonesia, Thailand, and others. The trainers for the workshop included international tsunami experts from India, Indonesia, Thailand, USA, and Yemen.

To follow on from the preparedness workshops, a field workshop along the Makran coast will be conducted in Iran, 9-20 October 2010. The field workshop will comprise of palaeotsunami survey and interview of eyewitness accounts of 1945 Makran tsunami. Results of the workshop will be incorporated into tsunami modeling studies, risk assessments and educational materials.

### ITIC Tsunami Capacity Building



*Samoa Earthquake and Tsunami Warning Center. Left to right: SMD Staff Lameko Talia and Malaefatu Leavasa, PTWC Director Dr. Charles McCreery*

The ITIC, a partnership between the UNESCO/IOC and NOAA, continued to assist countries in strengthening their national tsunami warning systems. Through support from USAID after the 29 September 2009 tsunami, Samoa received computers and equipment to stand up a real-time earthquake monitoring and tsunami warning center in its Samoa Meteorological Division, Ministry of Natural Resources and Environment. In May 2010, the ITIC helped to install and train its staff on the use of the CISEN earthquake monitoring and tsunami bulletin notification software, Tide Tool sea level monitoring and analysis tool, and TsuDig historical tsunami database and tsunami travel time tools. "The lead-time for issuance of warnings will be faster because we now have a dedicated system of computers, communications, and support equipment for earthquake and tsunami monitoring, and for issuing alerts. We greatly appreciate the continued support of the United States to assist in improving our analysis capabilities in tsunami warning and weather forecasting. This extension to our warning operations will allow our staff to more quickly respond to an event", said Acting Assistant CEO Salad Sagato Tuiafiso in its Press Release. The magnitude 8.0 earthquake 200 km SE of Samoa struck at 6:48 am local time on 29 September 2009 generating a local tsunami that struck in about 10 minutes with maximum runups in excess of 15 meters and killing a total of 191 persons in Samoa, American Samoa, and Tonga; property and infrastructure damage is estimated in excess of USD \$200 million.

In addition to support to Samoa in 2009 and 2010, with US support, the ITIC under its International ITIC Training Program (ITP-International) also provided tsunami warning system improvements in Tonga and Fiji, as well as to American Samoa, Guam, and the Commonwealth of the Marianas (CNMI). In 2009 and 2010, ITIC and PTWC briefed national representatives, including members of Parliament in July 2009, on tsunami hazards in the southwest Pacific and provided computers to the Tonga Meteorological Services and National Emergency Management Agency to monitor seismicity and sea levels in the Pacific. From August 24-27, 2010, through support from the US and NZ, the ITIC, PTWC, and the Samoa Principal Disaster Management Officer conducted a national tsunami warning and emergency response seminar that included 12 participants from the tsunami-stricken island of Niuaotupapu. From September 20-24, 2010, ITIC and PTWC provided and installed software at the Fiji Meteorological Service and Mineral Resource Department who are responsible for earthquake and tsunami warning in Fiji, and conducted a stakeholder tsunami seminar hosted by the Fiji National Disaster Management Office to support its national tsunami response plan. Trainings were also conducted in American Samoa in April-June, and in Guam and CNMI in July, 2010.

From 30 August to 10 September 2010, the ITIC conducted its annual ITIC Training Program in Hawaii (ITP-Hawaii). This year, 16 officials representing their warning centers or emergency response agencies from eight countries (Chile, Ecuador, Indonesia, Palau, Papua New Guinea, Saint Lucia, Tuvalu, USA (American Samoa, Guam, Marianas), and SOPAC, were selected from more than 40 applicants to attend. The training covered all aspects of tsunami warning and mitigation, using Hawaii as a working example of an end-to-end warning system and emphasizing standard operating procedures as a key component for successful, timely warning. Participants were self-funded or received support from the US contribution to the World Meteorological Organization Voluntary Contribution Fund, USAID, and the IOC and New Zealand contribution to the IOC Trust Fund.



*Tsunami warning decision support tools training held at Tonga Meteorological Service*

## Upcoming events

- Evacuation exercise, Tsunami Drill, 7 October 2010, Tumaco, Colombia
- Sixth Meeting of the ICG/NEAMTWS Task Team on Regional Tsunami Warning System Architecture , 7 - 8 October 2010
- Second Meeting of the ICG/NEAMTWS Task Team on Communication Test Exercises , 8 October 2010
- Assessment and Awareness of Makran Tsunami Hazards , 9-20 October 2010, Jask, Iran
- Mechanisms for Inter-Institutional and Regional Coordination on Tsunami preparedness and early warning system, October, 12 – 14, 2010, Santiago de Chile
- ICG/NEAMTWS-VII 23 - 25 November 2010, Paris, France
- Inter ICG Task Teams meeting 29 November - 1 December 2010, Seattle, United States

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