



INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
COMMISSION OCÉANOGRAPHIQUE INTERGOUVERNEMENTALE
COMISIÓN OCEANOGRÁFICA INTERGUBERNAMENTAL
МЕЖПРАВИТЕЛЬСТВЕННАЯ ОКЕАНОГРАФИЧЕСКАЯ КОМИССИЯ
اللجنة الدولية الحكومية لعلوم المحيطات
政府间海洋学委员会

UNESCO - 1, rue Miollis - 75732 Paris Cedex 15
cable address: UNESCO Paris - telex: 204461 Paris - fax: (33) (0)1 45 68 58 12 - contact phone: (33) (0) 1 45 68 39 83/84
E-mail: w.watson-wright@unesco.org

IOC Circular Letter No. 2460
(Available in English only)

IOC/TA/BA/ba
Paris, 7 December 2012

- To :** ICG/PTWS Tsunami Warning Focal Points (TWFP)
ICG/PTWS Tsunami National Contacts (TNC)
ICG/PTWS Chair and Vice-Chairs
- cc. :** Official National Coordinating Body for liaison with IOC in IOC Member States
Permanent Delegates/Observer Missions to UNESCO of IOC Member States
National Commissions for UNESCO in IOC Member States
Directors of UNESCO and IOC Regional Offices in the Asia/Pacific Region
Regional Organizations cooperating with UNESCO/IOC
Director, Pacific Tsunami Warning Center
Director, International Tsunami Information Center

Object : PTWC Start of Issuance of Pacific Experimental Products, 1 February 2013;
PTWS Pacific-wide Tsunami Exercise "PacWave13", April 2013

At the Twenty-fourth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXIV) held in Beijing, China 24–27 May 2011, Member States approved the development of improved tsunami procedures and products by the Pacific Tsunami Warning Center (PTWC), and the conduct of Exercise Pacific Wave 2011 (PacWave11) on 9–10 November 2011 to introduce and obtain feedback on the new products (Recommendation ICG/PTWS-XXIV.3, in attachment I). From 21 to 23 May 2012, the PTWS Working Group 2 Task Teams on PacWave11 and Enhancing Products convened to evaluate the PacWave11 findings and to compile a list of feedback improvements that would allow PTWC to further refine its draft new products. Subsequently, the PTWS Steering Committee (SC) convened on 24–25 May 2012 (see attachment II) to review progress on the PTWS's inter-sessional activities; it endorsed the Enhancing Products Task Team recommendations and approved the timeline for the implementation of the PTWC new products. The planned date for the changeover from the PTWC current products to its new products will be in early 2014, upon the formal approval of Member States at the next ICG/PTWS-XXV session to be held in Vladivostok, Russian Federation, in September 2013.

.../...

Chairperson

Dr Sang-Kyung BYUN
Principal Research Scientist
Climate Change & Coastal Disaster
Research Dept.
Korea Institute of Ocean Science
and Technology (KIOST)
787 Haeanlo
Ansan 426-744
REPUBLIC OF KOREA

Executive Secretary

Dr Wendy WATSON-WRIGHT
Intergovernmental Oceanographic
Commission — UNESCO
1, rue Miollis
75732 Paris Cedex 15,
FRANCE

Vice-Chairpersons

Prof. Peter M. HAUGAN
Director, Geophysical Institute
University of Bergen
Allegaten 70
5007 Bergen
NORWAY

Dr Atanas PALAZOV
Director, Institute of Oceanology – Varna
Bulgarian Academy of Sciences
P.O. Box 152
Varna 9000
BULGARIA

Capt. Frederico Antonio SARAIVA
NOGUEIRA
Directorate of Hydrography
and Navigation
Rue Barão de Jacaguai, s/nº
Ponta da Armação
Niterói, Rio de Janeiro
CEP 24.048.900
BRAZIL

Prof. Yutaka MICHIDA
University of Tokyo
Member of National Committee for IOC
Kashino 5-1-5
Kashiwa 277-8564
Chiba
JAPAN

Prof. Adoté Blim BLIVI
Chef de Recherche
Head of CGILE
Ministère de l'Enseignement
Supérieur et de la Recherche
University of Lomé,
B.P. 1515
Lomé 228
TOGO

To effect a smooth transition from the current PTWC tsunami products to its new products, the PTWS SC approved three milestone transition activities for 2013:

- **PTWC will begin issuing its New Products in trial experimental mode starting on 15 February 2013.** The products will be issued live and in parallel with the current existing products, but only via email to the designated PTWS Tsunami Warning Focal Points (TWFP).
- **Exercise Pacific Wave 2013 should be conducted in April 2013 by Member States to validate PTWC's New Products.** It is recommended that Member States conduct a table-top exercise in order to measure the understanding and interpretation of the Enhanced Products and their use for national tsunami warning threat assessment. The PTWS Task Team on PacWave11 Exercises, chaired by Dr Laura Kong of ITIC and Jo Guard of New Zealand, at the request of the PTWS SC, is planning and overseeing the conduct of PacWave13 under its existing Terms of Reference.
- The International Tsunami Information Center (ITIC) and the Secretariat will work together to make training available on the PTWC New Products to ensure that the products are understood, and that Member States know how to modify their Tsunami Warning Standard Operating Procedures accordingly. To better assess training needs, **PTWS Member States are requested to inform the PTWS Technical Secretary (b.aliaga@unesco.org) and ITIC Director (laura.kong@noaa.gov) if they will require training in 2013 and/or 2014.**

PTWS PTWC New Products

The PTWC New Products, which include forecasts and graphical formats, were approved for development through Recommendation ICG/PTWS-XXIV.3 (May 2011). The new products establish four levels of tsunami wave amplitude threat to assist National Tsunami Warning Centres in assessing their national threat for subsequent issuance of national tsunami warnings to their populations. The New Products will provide general guidance on impact, and are expected to greatly reduce the number of areas warned unnecessarily, while still remaining conservative to protect lives. Exercise Pacific Wave 2011 introduced the new products, and provided feedback on the first drafts of the new products. Further feedback was received through a number of PTWS meetings and IOC/ITIC tsunami trainings in 2011 and 2012. PTWC has incorporated this feedback in the revised new products that will be used in PacWave13.

Exercise Pacific Wave 2013

Accordingly, PacWave13 will be an important warning centre milestone preparedness activity and we trust that you and your country authorities will support this exercise.

Exercise Aim

The aim of PacWave13 is to validate the understanding and use of PTWS-PTWC New Products.

Date and Conduct of table-top exercise

PacWave13 should take place during the month of April 2013, so that the post-exercise evaluation questionnaire can be returned by 30 April 2013. PacWave13 will simulate Pacific countries being placed into an ocean-wide major tsunami threat level, and will require Member State decision-making to assess their national threat. The exercise is suggested to be a table-top exercise and is not required to be conducted down to community levels. PacWave13 will include multiple scenarios to enable Member States to select a distant or regional event that will cause the greatest impact to their country.

Exercise Documents

The PTWC New Products Users Guide and PacWave13 Exercise Manual will be distributed electronically on **15 January 2013**. The PTWC New Products Users Guide will document procedures, criteria, products, and provide guidance on the interpretation and limitations of the forecast products. The Exercise Manual will contain details on the scenarios, the Master Schedule of Events List (MSEL) for the PTWC, WC/ATWC, and NWPTAC, the post-exercise evaluation questionnaire, and guidance on how countries may want to conduct their table-top exercise. All exercise documents, including the actual exercise messages, will be posted at <http://www.pacwave.info>. For further exercise guidance, Member States should consult IOC Manuals and Guides, 58 "How to Plan, Conduct and Evaluate Tsunami Exercises" (2012, English, Spanish) available on the PacWave13 website.

PacWave13 National Contact Nomination

Member States are strongly encouraged to participate in the exercise. In order to ensure the commitment of participating countries is fully coordinated, we seek your nomination of a National Contact for PacWave13 with whom we will communicate about planning of the exercise. The designated PacWave13 National Contact will be expected to confirm the accuracy of existing points of contact for the receipt and dissemination of tsunami warnings downstream from the national tsunami warning centre. The designated PacWave13 National Contact will also be responsible for coordinating input to the exercise evaluation tool, which will be circulated as part of the Exercise Pacific Wave 2013 Exercise Manual.

I would be grateful if you could provide the details of your **National Contact for PacWave13 by 7 January 2013 to the ICG/PTWS Technical Secretary through email to b.aliaga@unesco.org, cc to laura.kong@noaa.gov**. You are also encouraged to further disseminate copies of this letter to appropriate organizations and authorities within your country. In the meantime I remain,

Yours sincerely,

[signed]

Wendy Watson-Wright
Executive Secretary, IOC
Assistant Director-General, UNESCO

Enclosures (3): Recommendation ICG/PTWS-XXIV.3, "PTWS Exercises"
ICG/PTWS Steering Committee Report, Actions on PacWave Exercises and
Enhanced Products
Exercise Pacific Wave 2013 Guidance

Attachment I

**Recommendation ICG/PTWS-XXIV.3
PTWS Exercises**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

Recalling Recommendation ICG/PTWS-XXIII.2,

Emphasising that 99% of deaths caused by tsunamis in the Pacific since the establishment of the PTWS is the result of local tsunamis,

Noting that during the inter-sessional period 2009–2011, three destructive and deadly tsunamis occurred in the Pacific, which placed PTWS countries in various levels of warning for distant tsunamis, and locally, five countries were impacted nearly immediately with people having only 10–30 minutes before the first large waves hit,

Recognizing all communities at risk need to be prepared for the next tsunami,

Recognising further that drills and exercises are an effective and important way to increase readiness and raise awareness,

Noting that the ICG/PTWS-XXIV agreed that PTWC should proceed with its development of improved tsunami procedures and products,

Decides to conduct Exercise Pacific Wave 2011 (PACWAVE 11) on 9 and 10 November 2011 and to continue with the PTWS Task Team on PACWAVE 11;

Decides further that:

1. The objectives of PACWAVE 11 will be to evaluate the readiness to respond to a local/regional source tsunami, and to also evaluate the understanding and use of new PTWC experimental products,
2. PACWAVE 11 will be conducted as a multi-scenario exercise with major tsunamis originating in various seismic zones of the Pacific to complement previous scenarios in other places,
3. The exercise manual including instructions to Member States regarding the exercise conduct and the evaluation instrument be prepared taking into account lessons learned and any need to collect additional information, provide feedback on the PTWC new products, and the recommendations of TOWS-WG Inter-ICG Task Team 2,
4. The exercise manual be distributed to Member States at least 90 days in advance of the exercise date,
5. An exercise guideline, How to Plan, Conduct, and Evaluate Tsunami Exercises be prepared in order to assist countries in preparing for PACWAVE 11 in collaboration with TOWS-WG Inter-ICG Task Team 2,
6. Participating Member States be asked to complete and return the evaluation instrument no more than 90 days following the exercise,
7. The PTWS Task Team on PACWAVE 11 and PTWS Task Team on Enhancing Products to meet after the exercise evaluation to compile a list of actions from the findings for consideration by the ICG/PTWS-XXV.

Financial implications: None

Attachment II

From ICG/PTWS-SC-III/3 report, 20 September 2012



**Intergovernmental Oceanographic Commission (of UNESCO)
Intergovernmental Coordination Group for the Pacific Ocean Tsunami Warning and
Mitigation System (ICG/PTWS)
Meeting of the Steering Committee, Honolulu, United States of America 24–25 May 2012**

MEETING REPORT
(excerpt)

PACWAVE11 Report

The co-chairs of the WG2 Task Team on PACWAVE11, Ms Jo Guard and Dr Laura Kong, reported back to the Steering Committee on the assessment of the exercise.

The overall assessment of the exercise was that it had been well organized and that the planning, conduct and style at all levels had been satisfactory. External relationships had been enhanced, and the experimental products were understood and useful. The exercise documentation had been found to be appropriate and easy to use. Areas that require improvement include: notification was received by most NTWCs within 15-20 minutes, which may not be quick enough in a local tsunami; the majority of NTWCs received messages by fax and email, which may be subject to failure in a local earthquake.

Over half of the agencies reported not having evacuation signage and requested assistance in scheduling exercises. Further assistance in developing SOPs is also required.

The evaluation form had been found easy to use but there were too many questions. The time period between the exercise and the return of the evaluation forms was too long and "Survey Monkey" may need to be upgraded to better manipulate the data. A contractor will be employed to process the data and prepare the final report.

The feedback received on the experimental products was that they were useful but that a User Guide is required. The most useful features were: the threat level map, the inclusion of wave heights, travel and arrival times, and forecast amplitudes.

Many suggestions for improvement of the PTWC experimental products were received and these would be passed on to PTWC and WG2 for review and assessment of feasibility.

The chair thanked the Task Team co-chairs for their report and enquired if an exercise was being planned for 2013. If so, it would be necessary to decide on the level of exercise. The purpose would be to validate the new products, not the entire system. Mr Coetzee recommended keeping the exercise as simple as possible and suggested setting a deadline for feedback.

Dr McCreery commented that it would be reasonable to target early 2013 for the publishing of a User Guide for the products developed and in use before the exercise, which should be held before the next session of the ICG

Dr Kong presented a proposal and a timeline for implementation of products:

- Start Experimental Products: Feb 1, 2013
- Conduct PacWave13: April 2013

- Evaluation forms returned: 30 April
- Evaluate PacWave13, validate PTWC new products and procedures by 31 May
- Review/approved by Steering Committee just prior to ICG

The Steering Committee requested the WG2 PacWave11 Task Team to continue until the 25th Session of the ICG/PTWS, to plan and conduct a PacWave Exercise in 2013 under its existing Terms of Reference, noting that the exercise will not be end-to-end and will focus on validation of the enhanced products.

The Task Team will decide on the number and format of exercise scenarios and recommend to the chair of WG2.

Potential new members of the Task Team are: Lt Willington Renteria Agurto (Ecuador), Dr Dominique Reymond (French Polynesia) and a member from Malaysia.

Task Team on Enhancing Products Report

Dr Chip McCreery, chair of the WG2 Task Team on Enhancing Products, provided a summary of the discussions that had taken place in the preceding Task Team meeting. He emphasized the key purposes of the proposed new PTWC products based on numerical forecast modelling that include: 1) improved advice regarding local tsunami threats, 2) reduced over-warning, 3) information to help distinguish between a marine threat, land inundation threat, and major inundation threat, and 4) threat information at a finer geographic scale.

The following points were discussed and taken into consideration:

- Past Recommendations of this Task Team
- TOWS Task Team Harmonized Product Recommendations
- Lessons learned from the recent Samoa, Chile, and Japan tsunamis
- PacWave11 feedback on the experimental products
- Scientific and technical capabilities and limitations of the :
 1. seismic data and analysis
 2. sea level data and analysis
 3. numerical tsunami forecast models

The following changes to the new products were agreed:

- Inclusion of latitude and longitude lines on maps for reference
- Inclusion of additional geographic features on plots for reference
- Geographical division of PTWC & JMA responsibilities in sea between Japan and Asian continent
- Scaled Green's Law approximation for small islands
- Harmonization of color palettes used for wave amplitudes in maps
- Levels of amplitude (0-0.3m, 0.3-1m, 1-3m, ≥ 3 m) with upper bound included in ranges.
- Add earliest arrival times in table of forecast zones
- Creation of Users Manual for new products
- Limit forecast in first product to domain of a few hours tsunami travel time
- Upgrade forecast based on earthquake mechanism
- Upgrade forecast based on sea level observations used as constraints
- The new products will only be distributed by email to the TWFPs during the experimental phase

The following suggested changes will stay under consideration for later versions of the products:

- Zoomed in maps for all regions (some zoomed-in maps necessary now though, e.g., SCS)
- Addition of historical data in maps
- Estimated arrival times other than first wave
- Add seismic focal mechanism, finite fault

- Inclusion energy diagram as CISN and/or Google Earth layer files

The following suggested changes will not be implemented at this time:

- Forecast of inundation
- Special identification of tsunami prone areas (except through specific forecast points)
- Error bounds on forecasts (can give general guidance in Users Guide)
- Forecast number of waves
- Forecast time of maximum wave arrival
- Forecast time of last wave above threat threshold
- Use of local time in messages

The following issues are as yet unresolved:

- Review of coastal zone naming convention
- Involvement of Australia in discussions about enhanced warning products
- Which of the new products will be public and which will be restricted to the TWFPs/NTWCs.

The Task Team made the following **recommendation** to the Steering Committee:

The PTWC should continue with the development of its new products taking into consideration the information presented, discussions, issues raised, and advice of the Task Team during this meeting. PTWC should finalize procedures and software for an initial version of the products, including a Users Guide, and begin issuing the new products in an experimental mode in parallel with current products by February 1, 2013. Unresolved or new issues regarding the products during this development period can be addressed remotely by the Task Team and/or PTWS Steering Committee before the experimental period begins. In addition, the Task Team agreed that before full implementation there will need to be a comprehensive training program on the new products for PTWS Member States to ensure that the products are understood and that Member State SOPs are modified accordingly.

The Steering Committee noted the progress made by the Task Team and **endorsed** its recommendation. It also considered that training was of the utmost importance as many countries will have to revise their SOPs to deal with the new products.

In addition to the existing Task Team members already nominated, the following potential new Task Team members were identified: Dr Dominique Reymond (French Polynesia), Lt Wellington Renteria Agurto (Ecuador), Samoa (Filomena Nelson *pro tem*), Patricio Carrasco (Chile), Malaysia. The chair requested these candidates to obtain formal nomination from their TNCs and forward to the Secretariat as soon as possible.

10.2 DECISIONS, RECOMMENDATIONS AND ACTIONS ARISING FROM STEERING COMMITTEE MEETING

Action: Full review before the next ICG

Task Team on PacWave Exercises

- The Steering Committee requested the PacWave11 Task Team to continue until the 25th Session of the ICG/PTWS to plan and conduct a PacWave Exercise in 2013 under its existing Terms of Reference, noting that the exercise will not be end-to-end and will focus on validation of the enhanced products.

Task Team on Enhancing Products

- The Steering Committee noted the progress reported by the Task Team and requested that PTWC should continue with the development of its new products taking into consideration the information presented, discussions, issues raised, and advice of the Task Team during this meeting. PTWC should finalize procedures and software for an initial version of the

products, including a Users Guide, and begin issuing the new products in an experimental mode in parallel with current products by February 1, 2013. Unresolved or new issues regarding the products during this development period can be addressed remotely by the Task Team and/or PTWS Steering Committee before the experimental period begins. In addition, the Task Team agreed that before full implementation there will need to be a comprehensive training program on the new products for PTWS Member States to ensure that the products are understood and that Member State SOPs are modified accordingly.

Timetable for Implementation of PTWC Enhanced Products

- Announcement of PacWave13: Oct. 1, 2012
- Start trial of Enhanced Products: Feb. 1, 2013
- Conduct PacWave13: April 2013
- Evaluation forms back: by 30 April
- Evaluate PacWave13, validate PTWC new products and procedures: 31 May
- VC/teleconf for TT: as required
- Review/approved by SC just prior to ICG

Training on Enhanced Products

- The Steering Committee requested the Secretariat to work with ITIC and the Working Group chairs to document the record of training conducted and planned, leading up to and beyond the implementation date of the enhanced products.

Attachment III

Exercise Pacific Wave 2013 Guidance

Exercise Aim and Objectives:

The aim of the Exercise Pacific Wave 2013 (PacWave13) is to validate the understanding of the new PTWS PTWC New Products. Participants should:

- Utilise and evaluate the PTWC experimental products, including forecast models and other science information, for timely national hazard assessment.
- Validate the process for issuance of tsunami advice from the PTWC and JMA/NWPTAC and WC/ATWC.
- Validate the process for receipt of tsunami advice by PTWS Tsunami Warning Focal Points.

Although not a primary objective, Member States may also take the opportunity to validate their readiness to respond to a distant/regional source tsunami. These include to:

- Validate the operational readiness of each national tsunami warning centre (NTWC). (or similar in-country function) and the National Disaster Management Office (NDMO).
- Validate that the dissemination of warnings and information/advice by NTWC to relevant in-country agencies and the public is accurate and timely.
- Validate the organisational decision-making process about public warnings and evacuations.
- Validate the methods used to notify and instruct the public.
- Validate the elapsed time until the public would be notified and instructed/advised.

PTWS PTWC Enhanced Products:

In response to Recommendation ICG/PTWS-XXIII.1 (Feb., 2009), the PTWC proposed new products for the PTWS based upon PTWC's improved capabilities in terms of its speed of response and growing ability to forecast impacts. The development of enhanced PTWC products was approved by Recommendation ICG/PTWS-XXIV.3 (May, 2011). The new products are being implemented through a phased process consisting of: 1) introduction in PacWave11, 9-10 November 2011; 2) feedback and improvement in 2012; 3) live issuance of both the current existing and new products starting 15 February 2013; 4) and official changeover to the new PTWC products and discontinuation of the current products in 2014. Training is being made available, on request, to Member States to ensure the products are understood.

The enhancement of PTWS international tsunami products is being guided the PTWS Task Team on Enhancing Products under Working Group 2 (Detection, Warning and Dissemination). It is working with PTWC to:

- Review the capabilities and plans of the international TWCs with respect to their operational products and product dissemination for the PTWS;
- Gather feedback from Member States regarding international TWC current and planned product content, format, and dissemination;
- Consider best practices based on social science as well as the experiences of the Member States;
- Consider the global harmonization of tsunami warning products and terminology;
- Develop recommendations to improve current products and /or develop new products.

Conduct of table-top exercise:

Exercise Pacific Wave 2013 (PacWave13) will simulate Pacific countries being placed into a ocean-wide major tsunami threat level, and require Member State decision-making to assess their national threat. Member States may also simulate further decision-making steps taken to just prior to public notification. These steps may be played during the exercise dates in real time or the following days.

In each scenario, the simulated tsunami will propagate in real time across the Pacific. An initial “Exercise Start Message” will be issued by the Pacific Tsunami Warning Center (PTWC), the Northwest Pacific Tsunami Advisory Center (NWPTAC), and the West Coast/Alaska Tsunami Warning Center (WC/ATWC). All message products, including both PTWC’s current and new products, will be made available through the PacWave13 website, <http://www.pacwave.info> and referred to in the Master Schedule of Events List within the PacWave13 Exercise Manual. It is recommended to download all products that will be used in the Table Top Exercise prior to the exercise date.

A key point is that the exercise is intended to validate the use of the PTWC New Products by National Tsunami Warning Centers and their key stakeholders. PacWave13 does not require conduct through to community level. Further, it is optional to exercise further levels of communication, such as public broadcasts and sirens, and coastal community evacuations.

Due care should be taken so as not to inadvertently alarm the public, and a conservative approach is recommended.