



United Nations  
Educational, Scientific and  
Cultural Organization



Intergovernmental  
Oceanographic  
Commission



National Oceanic  
and Atmospheric  
Administration



International  
Tsunami Information  
Center

## UNESCO – IOC / NOAA INTERNATIONAL TSUNAMI INFORMATION CENTER (ITIC) ITIC TRAINING PROGRAMME INTERNATIONAL (ITP-INTL)

### International Tsunami Symposium ITP-Peru: Tsunami Warning and Emergency Response Using the PTWC Enhanced Products for National Tsunami Threat Decision-Making Lima, Peru 27 November – 1 December 2017

#### Trainers

Marie Eblé, Deputy, NOAA Center for Tsunami Research, USA

Christa G. von Hillebrandt-Andrade, Manager, NOAA Caribbean Tsunami Warning Program (CTWP), USA

Dr. Charles McCreery, Director, Pacific Tsunami Warning Center (PTWC), USA

#### Training Overview

The training workshop will cover the tsunami warning operations and the use of the PTWC Enhanced Products for tsunami threat decision-making, with specific attention on the warning and emergency response plan and standard operating procedures (SOPs) of Peru. Topics will include warning and response SOPs and challenges, warning decision support tools, warning messages and alerting, evacuation concepts and planning, and awareness strategies. Over the last 10+ years, with improvements in data quality, quantity, and real-time availability, PTWC's response time has dropped significantly from an hour to 5-10 minutes for tsunami events. At the same time, with each great earthquake and tsunami since 26 December 2004 the scientific understanding has increased and better techniques have been developed to quickly characterize the earthquake and numerically model the tsunami. In 2014, the PTWC implemented Enhanced Products for the PTWS that now include wave amplitude forecasts in both text and graphical formats, and that require each country to explicitly assign Warning / Watch status in their own messages to their coasts. In addition, the Performance Based Community Recognition Program, Tsunami Ready, has been successfully piloted in the Caribbean and Pacific Basins giving Emergency Managers a tool to improve the readiness of coastal communities to respond in a timely and appropriate manner.

## PROVISIONAL AGENDA

Sessi on	Start Time	End Time	Topic	Speaker
<b>Day 1: Monday, November 27 2017</b>				
			<b>MORNING</b>	
			<b>Opening, ICG/PTWS, Tsunami Warning</b>	
	8:30	9:00	Registration	Peru – DHN
1.1	9:00	9:15	Opening Ceremonies speech Director of Hydrography of Navigation, Director of Pacific Tsunami Warning Center, Chair IOC ICG/CARIBE and Manager Caribbean Tsunami Warning Program	USA NOAA, IOC, Peru - DHN
1.2	9:15	10:00	Logistics and Administrative Items	Peru – DHN
	10:00	10:45	GROUP PHOTO, COFFEE / TEA BREAK	Peru - DHN
1.3	10:45	11:00	PTWS video: Tsunami Warning (Spanish)	Charles McCreery -
1.4	11:00	11:15	Course Overview, Introductions	Marie Eblé - NCTR
1.5	11:15	11:30	ICG/PTWS-XXVII Outcomes, PTWS Southeast Pacific Working Group	Charles McCreery - PTWC, PTWS SEP WG
2.1	11:30	12:30	Responding Rapidly and Effectively: Tsunami Warning and Emergency Response Requirements and Timeline-driven SOPs	Christa von Hillebrandt - CTWP
	12:30	13:45	LUNCH	
			<b>AFTERNOON</b>	
			<b>Tsunami Warning, Peru SOPs, Earthquake Science &amp; Hazard</b>	
2.2	13:45	14:25	Tsunami Warning Center Overview: What do Tsunami Warning Centers (TWCs) provide to Tsunami Emergency Response (TER) agencies? Challenges in Detection and Tsunami Threat Assessment Needs images	Charles McCreery - PTWC
2.3	14:25	14:50	Peru Tsunami Warning and Emergency Response (TWC-TER) SOPs using PTWC Enhanced Products	C. de F. Luis Castañeda Di Natale Peru-DHN
3.1	14:50	15:30	Pacific Regional Tectonics and Seismicity, and Earthquake Hazard	Julio Martinez - IGP
3.2	15:30	16:00	Science of Earthquakes for Tsunami Warning – I	Charles McCreery -
<b>Day 2: Tuesday, November 28, 2017</b>				
			<b>MORNING</b>	
			<b>Tsunami Science &amp; Hazard, Tsunami Emergency Response (TER)</b>	
3.3	9:00	9:45	Science of Tsunamis for Tsunami Warning – I	Marie Eblé - NCTR
3.4	9:45	10:30	Tsunami Hazard, and Historical Tsunamis Affecting the Region, including 1996, 2001, 2007, and 2010 tsunamis that affected Peru	Cesar Jimenez - Peru-DHN
	10:30	11:00	COFFEE / TEA BREAK	
4.1	11:00	11:30	Tsunami Emergency Response Overview: What do TER agencies provide to the Public? Challenges in Alerting, Evacuation, Safe-to-Return (All-Clear), and Preparedness	Christa von Hillebrandt - CTWP
4.2	11:30	12:30	Communication technologies for the transmission of tsunami warnings to local governments and communities – robustness, reliability, redundancy criteria for emergency communications, "Downstream" Communications	Christa von Hillebrandt - CTWP
	12:30	13:45	LUNCH	
			<b>AFTERNOON</b>	
			<b>Preparedness and Mitigation, PTWC SOPs</b>	
4.3	13:45	14:05	Reducing Risk and Building Resilience through Community Preparedness: International Tsunami Ready	Christa von Hillebrandt - CTWP
4.4	14:05	14:30	Preparing for Community Tsunami Evacuations: From Inundation to Evacuation Maps, Response Plans, and Exercises (TEMP training course)	Christa von Hillebrandt - CTWP
4.5	14:30	15:00	Building Awareness & Community Preparedness – Exercise Pacific Wave (PacWave) and Community Exercises	Marie Eblé - NCTR

4.6	15:00	15:45	International Building Code (IBC 2018) - Tsunami-resistant Building Design, including use of Probabilistic Tsunami Hazard Analysis for inundation depth and flow velocity	Marie Eblé - NCTR
5.1	15:45	16:30	Pacific Tsunami Warning Center SOPs - Overview: Earthquake and Sea Level Monitoring, Threat Analysis, Forecasting, Dissemination, Final	Charles McCreery - PTWC
	16:30	17:30	Visit Peru NTWC	
<b>Day 3: Wednesday, November 29, 2017</b>				
			<b>MORNING</b>	
			<b>PTWC Enhanced Products, Earthquake Analysis</b>	
5.2	9:00	9:45	Pacific Tsunami Warning Center (PTWC) New Enhanced Products - Overview - What, Why, Criteria, Formats, Staging	Charles McCreery - PTWC
5.3	9:45	10:05	PTWC Enhanced Products - Explanation of Each Product: Text, Forecast Polygon Map, Graphical Deep-Ocean Energy, Coastal Forecast, Forecast Tables, K&MZ file	Charles McCreery - PTWC
5.4	10:05	10:35	Real-Time Tsunami Inundation Forecast Study in Chimbote City, Peru	Nabilt Moggiano - Peru-
	10:35	10:50	COFFEE / TEA BREAK	
	10:50	11:20	PTWC Enhanced Products - Explanation of Each Product cont'd	Charles McCreery -
5.5	11:20	12:00	Science of Earthquakes for Tsunami Warning – II, TWC Operations: Real-time Earthquake Detection and Fast Source Characterization – Methods to determine Magnitude	Charles McCreery - PTWC
5.6	12:00	12:30	Science of Earthquakes for Tsunami Warning – III, TWC Operations: Real-time Earthquake Detection and Fast Source Characterization – Methods to characterize earthquake source W-phase CMT, finite faulting	Charles McCreery - PTWC
	12:30	13:45	LUNCH	
			<b>AFTERNOON</b>	
			<b>Decision Support Tools, Tsunami Analysis</b>	
5.7	13:45	14:25	Demonstration: Decision Support Tools for Monitoring, Detection, Assessment – Earthquake: Real-time Earthquake Display (CISN), USGS web site (CMT, ShakeMap, PAGER), URLs	Christa von Hillebrandt - CTWP
5.8	14:25	15:00	TWC Operations: Sea Level Monitoring (Coastal and DARTs) – Use, Instruments, Limitations, Challenges	Marie Eblé - NCTR
5.9	15:00	15:45	Demonstration: Decision Support Tools for Monitoring, Detection, Assessment – Tsunami: Sea Level Monitoring (IOC web site, TideTool with Tsunami Travel Times), URLs	Christa von Hillebrandt - CTWP
5.10	15:45	17:00	Science of Tsunamis for Tsunami Warning – II, TWC Operations: Travel Time Forecasting - Methods, including TTT, Limitations, Uncertainty, Sensitivity Studies (Location, Depth, Magnitude)	Marie Eblé - NCTR
<b>Day 4: Thursday, November 30, 2017</b>				
			<b>MORNING</b>	
			<b>Tsunami Analysis, Enhanced Products Guidance, Group Activity</b>	
5.11	9:00	9:45	Science of Tsunamis for Tsunami Warning – III, TWC Operations: Wave Amplitude Forecasting – Methods, including RIFT and SIFT, Limitations, Uncertainty, Sensitivity Studies (Location, Depth, Magnitude)	Charles McCreery - PTWC
5.12	9:45	10:30	TWC and TER Guidance on how to use PTWC New Enhanced Products for National Warnings and Evacuation – Land and Marine Threats and Public Safety: Flow Charts, Criteria Tables, Timeline-driven SOPs, Message	Christa von Hillebrandt - CTWP
	10:30	11:00	COFFEE / TEA BREAK	
6.1	11:00	11:30	Exercise Peru Wave 2017 (EPW-17) - Decision-making using PTWC Enhanced Products - Introduction, Format, Conduct, Groups	Christa von Hillebrandt - CTWP
6.2	11:30	12:30	Exercise Group Activity: Developing Country SOPs for the PTWC Enhanced Products - Warning Communications Flow Chart, Criteria Tables, Timeline-driven SOP	Christa von Hillebrandt - CTWP
	12:30	13:45	LUNCH	

			<b>AFTERNOON</b>	
			<b>Tsunami Exercise - Decision-making using PTWC Enhanced Products</b>	
<b>6.3</b>	13:45	16:00	Exercise Peru Wave 2017 (EPW-17) - Decision-making using PTWC Enhanced Products - Distant Pacific Scenario	Christa von Hillebrandt - CTWP
<b>6.4</b>	16:00	16:45	Exercise Peru Wave 2017 (EPW-17) – post-exercise evaluation (hot wash, wrap-up)	Marie Eblé - NCTR
	<b>Day 5: Friday, December 1, 2017</b>			
	<b>Lugar: Salón Caral del Hotel Meliá de San Isidro</b>			
			<b>MORNING</b>	
			<b>Tsunami Hazard Scenarios, TsuCAT, Group Activity</b>	
<b>6.5</b>	8:00	8:30	Tsunami Hazard Scenarios around the Pacific (RIFT)	Charles McCreery -
<b>6.6</b>	8:30	9:15	Tools for Quick Hazard Assessment, Exercise Scenario development, and Response Planning: Tsunami Coastal Assessment Tool (TsuCAT)	Marie Eblé - NCTR
<b>6.7</b>	9:15	9:45	Group Activity and discussion: Reliable and Unreliable Information	Christa von Hillebrandt - CTWP
<b>6.8</b>	9:45	10:45	Group Activity and discussion: Improving Response – What Happens When timeline? Local Scenario	Marie Eblé - NCTR, Charles McCreery -
			<b>Final Discussion, Closing</b>	
<b>6.9</b>	10:45	11:25	Final Discussion: Peru Readiness and Next Steps	Charles McCreery -
	11:25	11:45	COFFEE / TEA BREAK	
<b>7</b>	11:45	12:30	Admiral's closing speech Certificates and Closing Ceremonies	Peru, All