



**UNESCO/IOC – NOAA International Tsunami Information Center
ITIC TRAINING PROGRAMME (ITP) – INTERNATIONAL**

**Regional Training Workshop on Pacific Tsunami Warning Center
Enhanced Tsunami Products for ICG/CARIBE EWS**

**7–10 December 2015
Courtyard by Marriot, Bridgetown, Barbados**

Hosted by the Caribbean Tsunami Information Center (CTIC)

**Supported by UNESCO/IOC, the United States Agency for International
Development/Office for Foreign Disaster Assistance (USAID/OFDA) [through the
University Corporation for Atmospheric Research (UCAR)] and the Coastal Zone
Management Unit (CZMU), Barbados**

Trainers:

Dr. Laura Kong, Director, International Tsunami Information Center (ITIC)
Dr. Charles McCreery, Director, Pacific Tsunami Warning Center (PTWC)
Christa von Hillebrandt, Manager, Caribbean Tsunami Warning Programme (CTWP)

Organizers:

Alison Brome, Interim Director, CTIC
Bernardo Aliaga, Programme Specialist, Tsunami Unit, UNESCO/IOC
Dr. Laura Kong, Director, ITIC
Christa von Hillebrandt, CTWP

This four-day training workshop is intended to enable tsunami warning focal points (TWFPs), national tsunami warning centers (NTWC), and tsunami emergency responders (TERs) to effectively receive, analyse and take appropriate action in response to the Pacific Tsunami Warning Center (PTWC) enhanced tsunami forecast products for the Caribbean and its adjacent regions. This training workshop will cover tsunami warning operations and the use of the PTWC Enhanced Products for tsunami threat decision-making, with specific attention on the tsunami warning chain and their standard operating procedures (SOPs). 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 the 26 December 2004 Indian Ocean earthquake and tsunami helping to increase scientific understanding, better techniques have been developed to quickly characterize the earthquake and numerically model the tsunami. In the Pacific, the PTWS adopted use of the PTWC enhanced products based on numerical forecast models on 1 October 2014. For the Caribbean and adjacent regions, the changeover to PTWC's new enhanced forecast products was approved by the ICG/CARIBE-EWS VIII (2013), introduced in CARIBE WAVE 2013, and since October 26, 2015, are being issued in parallel with the existing products. The changeover to solely the new products is planned to take place on 1 March 2016.

PROVISIONAL AGENDA

Ses sion	Start Time	End Time	Topic	Speaker
1-3			Monday, December 7, 2015	
			MORNING	
			Opening, ICG/CARIBE-EWS-X, Tsunami Early Warning Systems	
	8:00	8:30	Registration	CTIC
1.1	8:30	9:00	Opening Ceremonies	CTIC, CZMU, CTWP, ITIC, PTWC, USA
	9:00	9:30	GROUP PHOTO, COFFEE / TEA BREAK	
1.2	9:30	9:50	Logistics and Administrative Items, Introductions	Alison Brome, CTIC
1.3	9:50	10:00	Regional Partner Support to the ICG/CARIBE-EWS Tsunami Early Warning System - Caribbean Institute for Meteorology and Hydrology (CIMH) and the DEWETRA Platform	CIMH
1.4	10:00	10:15	Course Overview	Christa von Hillebrandt- Andrade, CTWP
1.5	10:15	10:30	ICG/CARIBE-EWS-X Outcomes	von Hillebrandt- Andrade
2.1	10:30	11:15	Responding Rapidly and Effectively: Tsunami Warning and Emergency Response Requirements and Timeline-driven SOPs	Laura Kong, ITIC
2.2	11:15	12:00	Key Stakeholders: Tsunami Warning Center SOPs - What do Tsunami Warning Centers (TWCs) provide to Tsunami Emergency Response (TER) agencies? Challenges in Detection and Tsunami Threat Assessment	Charles McCreery, PTWC
	12:00	13:15	LUNCH	
			AFTERNOON	
			PTWC Enhanced Products, Country SOPs	
2.3	13:15	14:00	Key Stakeholders: Tsunami Emergency Response SOPs: What do TER agencies provide to the Public? Challenges in Alerting, Evacuation, and Safe-to-Return (All-Clear	von Hillebrandt- Andrade

3.1	14:00	14:45	Pacific Tsunami Warning Center (PTWC) New Enhanced Products Overview - What, Why, SOPs (Criteria, Formats)	McCreery
	14:45	15:00	COFFEE / TEA BREAK	
3.2	15:00	16:30	ICG/CARIBE-EWS Country SOPs - Readiness, Gaps, Actions	von Hillebrandt-Andrade
3-4			Tuesday, December 8, 2015	
			MORNING	
			PTWC Enhanced Products, TWC Operations - Earthquakes	
3.3	9:00	9:45	PTWC Enhanced Products - Staging	McCreery
3.4	9:45	10:30	PTWC Enhanced Products - Explanation of Each Product: Text, Forecast Polygon Map, Graphical Deep-Ocean Energy, Coastal Forecast, Forecast Tables, KMZ file	McCreery / Kong
	10:30	11:00	COFFEE / TEA BREAK	
3.5	11:00	11:45	PTWC Enhanced Products - Explanation of Each Product (cont'd)	McCreery / Kong
4.1	11:45	12:30	TWC Operations: Seismic monitoring in the Caribbean	von Hillebrandt-Andrade
	12:30	13:45	LUNCH	
			AFTERNOON	
			TWC Operations - Earthquakes, Tsunamis; Tsunami Warning Decision Support Tools	
4.2	13:45	14:30	TWC Operations: Real-time Earthquake Detection and Fast Source Characterization - Sparse networks, Magnitudes, W-Phase Centroid Moment Tensors – Techniques, Limitations, Challenges	Kong / McCreery
4.3	14:30	15:00	Demonstration: Decision Support Tools of Monitoring, Detection, Assessment – Earthquakes: Real-time Earthquake Display (CISN), USGS web site (CMT, ShakeMap, PAGER)	Kong
	15:00	15:15	COFFEE / TEA BREAK - Group Photo	
4.4	15:15	15:45	TWC Operations: Sea level monitoring in the Caribbean	von Hillebrandt-Andrade
4.5	15:45	16:30	TWC Operations: Sea Level Monitoring - Instruments, Limitations, Challenges	von Hillebrandt-Andrade
4-5			Wednesday, December 9, 2015	
			MORNING	
			TWC Operations - Decision Support Tools, Tsunami Forecasting, Country SOP Guidance for PTWC Enhanced Products	
4.6	9:00	9:45	Demonstration: Decision Support Tools of Monitoring, Detection, Assessment – Tsunams: TideTool with Tsunami Travel Times, IOC Sea Level Monitoring Facility web site)	Kong
4.7	9:45	10:30	TWC Operations: Travel Time Forecasting - Techniques, Limitations, Uncertainty, Sensitivity Studies	McCreery
	10:30	11:00	COFFEE / TEA BREAK	
4.8	11:00	11:45	TWC Operations: Wave Amplitude Forecasting - Techniques, Limitations, Uncertainty, Sensitivity Studies	McCreery
5.1	11:45	12:30	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 Templates	Kong
	12:30	13:45	LUNCH	

			AFTERNOON	
			Country SOPs for the PTWC Enhanced Products	
5.2	13:45	15:00	Activity: Developing Country SOPs for the PTWC Enhanced Products - Warning Communications Flow Chart, Criteria Tables	Kong
	15:00	15:15	COFFEE / TEA BREAK	
5.3	15:15	16:30	Activity: Improving Response – What Happens When? Timeline-drive SOPs for Local Scenario	von Hillebrandt-Andrade
6-7			Thursday, December 10, 2015	
			MORNING	
			Tsunami Hazard Scenarios, Tsunami Exercise	
6.1	9:00	9:30	Tsunami Hazard Scenarios for the Caribbean - Understanding PTWC Enhanced Products	Kong
6.2	9:30	10:30	Tsunami Table Top Exercises - Decision-making using PTWC Enhanced Products, Regional Scenario	von Hillebrandt-Andrade
	10:30	11:00	COFFEE / TEA BREAK	
6.3	11:00	12:30	Tsunami Table Top Exercises - Decision-making using PTWC Enhanced Products, Distant Scenario	von Hillebrandt-Andrade
	12:30	13:45	LUNCH	
			AFTERNOON	
			CARIBEWAVE16, Closing	
6.4	13:45	14:30	Tsunami Exercises, CARIBEWAVE16	von Hillebrandt-Andrade
6.5	14:30	15:00	Summary Discussion: Country Readiness for PTWC New Enhanced Products	All
	15:00	15:15	COFFEE / TEA BREAK	
7	15:15	15:45	Closing Ceremonies	