



Intergovernmental  
Oceanographic  
Commission

National Oceanic  
and Atmospheric  
Administration

International  
Tsunami Information  
Center

## INTERNATIONAL TSUNAMI INFORMATION CENTER (ITIC) ITIC TRAINING PROGRAMME HAWAII (ITP-HAWAII)

### TSUNAMI EARLY WARNING AND MITIGATION SYSTEMS ICG/PTWS PACIFIC TSUNAMI WARNING CENTER ENHANCED PRODUCTS

**18 - 29 August 2014  
Honolulu, Hawaii USA**

Week 1 will provide an overview of the end-to-end tsunami warning system, and focus on the importance of standard operating procedures to enable rapid tsunami warning and response.

Week 2 will provide information and guidance on the PTWC New Enhanced Tsunami Forecast Products. Topics will cover advanced topics in tsunami warning center operations, and the methodologies, use, interpretation, and limitations of the new products. 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 helping to increase scientific understanding, better techniques have been developed to quickly characterize the earthquake and numerically model the tsunami. This in turn has led to significant improvements in a warning center's ability to accurately forecast coastal wave height and impact, and an ability to provide timely advice to support local tsunami warning decision-making. At the ICG/PTWS-XXV (September 2013), Member States approved the start of the PTWC Enhanced Products on October 1, 2014. These products, the first large-scale modifications in decades, fundamentally change the way in which countries assess their national tsunami threats. The PTWC will cease providing Warnings and Watches, and instead issue advisory wave forecasts. Public text products will continue to be issued, but the additional graphical and statistical products will only be sent to PTWS Tsunami Warning Focal Points (TWFP).

#### Resource Agencies and Trainers:

International Tsunami Information Center (ITIC), Pacific Tsunami Warning Center (PTWC), National Weather Service Pacific Region and Guam Forecast Office, NOAA Pacific Marine Environmental Laboratory (PMEL), University of Hawaii, Hawaii State Emergency Management Agency, Hawaii County Civil Defense, Pacific Tsunami Museum

### PROVISIONAL AGENDA

Session	Start Time	End Time	Topic	Speaker
<b>1 - 2</b>			<b>MONDAY, 18 AUGUST, DAY 1</b>	
			<b>Welcome and Programme Overview, Earthquake and Tsunami Science and Hazards - Auditorium</b>	
<b>1.1</b>	9:30	10:30	Opening Ceremony: Welcome and Introductions	NWS Pacific Region, ITIC, PTWC
	10:30	10:45	COFFEE / TEA BREAK	
<b>1.2</b>	10:45	11:00	Programme Logistics – IRC Building, Local Transportation, Coffee/Tea/Lunch Breaks, Internet/Phone/Fax, Foreign Visitor Forms, etc	ITIC, Brian Yanagi, Tammy Fukuji
			Group Photo - Auditorium	

2.1	11:00	12:00	Earthquake and Tsunami Science – generation, propagation, impact	PTWC, Stuart Weinstein
2.2	12:00	12:30	Global and Pacific Tsunami Hazard	Weinstein
	12:30	13:30	LUNCH	
			<b>Country Presentations, Tsunami Risk Assessment - Training Room</b>	
2.3	13:30	14:00	Course Overview, Manual, Materials, including Awareness and TWTtools	Yanagi, Fukuji
2.4	14:00	15:30	Country Presentations (10 min each) - Oman, FSM, Palau, RMI, Cooks Islands, Kiribati, Tonga, Tuvalu	Participants
	15:30	15:45	COFFEE / TEA BREAK	
2.5	15:45	17:00	Tsunami Risk Assessment: Modeling and Mapping of Tsunami Inundation	Univ of Hawaii, Yoshiki Yamazaki
	17:00	18:00	Return to hotel	
2 - 4			<b>TUESDAY, 19 AUGUST, DAY 2</b>	
			<b>Tsunami Risk Assessment, Country Presentations, ICG/PTWS, End-to-End Tsunami Warning</b>	
	9:00	9:15	Announcements	Yanagi
2.6	9:15	9:45	Tsunami Risk Assessment: Methods and Role of Tsunami Deposits	ITIC, Nic Arcos
2.4	9:45	10:30	Country Presentations (10 min each) - Honduras, Nicaragua, Colombia, Ecuador	Participants
	10:30	10:45	COFFEE / TEA BREAK	
2.4	10:45	11:15	Country Presentations (10 min each) - China Hong Kong, Indonesia, Philippines	Participants
3.1	11:15	11:45	UNESCO IOC Global Tsunami System: Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS)	Yanagi
3.2	11:45	12:30	End-to-end Tsunami Warning – Stakeholder and their needs, Roles and Responsibilities, Standard Operating Procedures, and their linkages	Arcos
	12:30	13:45	LUNCH	
3.3	13:45	14:15	Hawaii example: Hawaii Tsunami Warning and Mitigation System	Yanagi
			<b>Tsunami Warning Decision Support Tools, TWC SOPs, Lessons Learned</b>	
4.1	14:15	15:15	Tsunami Warning Decision Support Tools – Overview: Message Alerts, Real-Time Earthquake Display (CISN); Sea level monitoring (Tide Tool, IOC Sea Level Monitoring web site); Tsunami Databases (WDC/NGDC web tools, TsuDig), Tsunami Travel Time (TTT) calculation	Weinstein, Fukuji
	15:15	15:30	COFFEE / TEA BREAK	
4.2	15:30	16:30	TWC Concept of Operation and Standard Operating Procedures (SOP) for Distant, Regional, and Local Tsunamis: Monitoring, Detection and Evaluation, Communications, Message Dissemination	Weinstein
4.3	16:30	17:00	What will Tsunami Warning Centers (TWCs) provide to Tsunami Emergency Response (TER) agencies? Operations Challenges and Limitations, and Lessons Learned from Past Tsunamis - Tsunami Warning	Yanagi
	17:00	18:00	Return to hotel	

<b>4 - 5</b>			<b>WEDNESDAY, 20 AUGUST, DAY 3</b>	
			<b>Visit Pacific Tsunami Warning Center</b>	
<b>4.4</b>	9:00	11:30	Visit Pacific Tsunami Warning Center: PTWC SOPs and Decision Support Tools for Earthquake and Sea Level Monitoring. Topics covered:	PTWC Staff
			1. Seismic Monitoring (Networks and latency, Source location, Magnitude estimation, W-phase CMT)	
			2. Sea level Monitoring (Coastal and DART stations, runup gauges), Monitoring (Tide Tool)	
			3. Tsunami Forecasting (RIFT, SIFT, ATFM)	
	11:30	12:00	Transit back to IRC	
	12:00	13:00	LUNCH (TWTools installation as needed)	
			<b>Tsunami Emergency Response (TER) - SOPs, Communications, Evacuation</b>	
<b>4.5</b>	15:30	16:00	TWC SOPs and Checklists: Templates and examples of SOP best practices. Homework - Review & improve country TWC SOP / Checklists (especially for local/regional threat)	Yanagi
<b>5.1</b>	13:00	13:30	TER Coordinated Information Flow, SOPs and Checklists: Templates and examples of SOP best practices	Arcos
<b>5.2</b>	13:30	14:45	Communication technologies for the transmission of tsunami warnings to local governments and communities – robustness, reliability, redundancy criteria for emergency communications	Young
	14:45	15:00	COFFEE / TEA BREAK	
<b>5.3</b>	15:00	15:30	Conducting public coastal evacuations - "Downstream" Communications Process	Yanagi
<b>5.4</b>	16:00	17:00	Warning Dissemination and Public Alerts: Information Flow and Role of Media. Learning Activity: Information Flow Timeline	Arcos
	17:00	17:30	Return to hotel	
<b>5</b>			<b>THURSDAY, 21 AUGUST, DAY 4</b>	
			<b>Visit Hawaii State Emergency Management Agency, Tsunami Preparedness, Education, and Mitigation</b>	
	8:30	9:00	Drive to Hawaii State Emergency Management Agency Emergency Operations Center	Arcos
<b>5.5</b>	9:00	10:30	Hawaii State Emergency Management Agency Responses to PTWC Tsunami Products	Hawaii State EMA Staff
<b>5.6</b>	10:30	11:00	Transit to IRC	
	11:00	12:00	What do TERs want from TWCs? Challenges and Limitations in Alerting, Evacuation, and Safe-to-Return (All-Clear), and Lessons Learned from Recent Tsunamis; Learning Activity: Tsunami Warning Chain	Yanagi
<b>5.7</b>	12:00	12:30	Building Preparedness: Tsunami Exercises and Drills, IOC Tsunami Exercise Guideline – show video examples?	Yanagi
	12:30	13:45	LUNCH (TWTools installation as needed)	Fukuji
<b>5.8</b>	13:45	14:30	Tsunami Education and Awareness - International Perspectives	Arcos
<b>5.9</b>	14:30	15:45	Tsunami Mitigation: Designing buildings for tsunami loading - FEMA P646, ASCE 7 and International Building Code updates	Univ of Hawaii, Ian Robertson
			<b>Preparedness - Special Sectors</b>	
	15:45	16:00	COFFEE / TEA BREAK	
<b>5.10</b>	16:00	16:45	Community Readiness, Tourism and Marine Sector Readiness, TsunamiReady	Arcos
	16:45	17:15	Return to hotel	

6			<b>FRIDAY, 22 AUGUST, DAY 5</b>	
			<b>Hawaii island: Hawaii County Civil Defense, Pacific Tsunami Museum, Tsunami Memorials, USGS Hawaiian Volcano Observatory</b>	
			<b>Hilo, Hawaii (Big Island)</b>	
	5:30	6:00	Hotel Pickup	
	6:00	7:10	Arrive Honolulu Airport and check-in	
	7:22	8:15	Hawaiian Air (HA) Flight #122, Depart 7:22 am, Honolulu - Hilo	
	8:45	9:15	Pick up Grayline Polynesian Adventure bus; Transit to Hawaii County Civil Defense	
6.1	9:15	10:15	County of Hawaii: Tsunami Emergency Responses to PTWC Tsunami Messages	HCDA Staff, Univ of Hawaii, George Curtis
6.2	10:30	11:30	Pacific Tsunami Museum	Marlene Murray
6.3	11:30	12:30	Tsunami memorials	Yanagi
	12:30	13:30	Transit to USGS HVO / Hawaiian Volcanoes National Park. Box lunch enroute	
6.4	13:30	15:45	US Geological Survey Hawaiian Volcano Observatory: Seismic and Volcano monitoring of Kilauea Volcano; Seismic Vault visit; Jaggar Museum	USGS HVO, Paul Okubo
	15:45	16:45	Transit to Hilo Airport	
	18:04	18:55	Hawaiian Air Flight # 141, Hilo - Honolulu	
	19:15	19:45	Return to hotel	
			<b>SATURDAY-SUNDAY, 23-24 AUGUST - FREE DAYS</b>	
7 - 9 Oman			<b>MONDAY - WED MORNING, 25 - 27 AUGUST, DAYS 6-7</b>	Oman Participants
7-9			Tsunami Warning Operations: Topics pertinent to the Indian Ocean	PTWC Staff
7 - 9 PTWS			<b>MONDAY - WED MORNING, 25 - 27 AUGUST, DAYS 6-7 PTWS PTWC NEW PRODUCTS</b>	PTWS Participants
7.PTWS			<b>MONDAY, 25 AUGUST, DAY 6</b>	
			<b>PTWC New Enhanced Forecast Products</b>	
	9:00	9:15	Announcements	Yanagi
7.1	9:15	9:45	Responding Rapidly and Effectively: Tsunami Warning and Emergency Response Requirements and Timeline-driven SOPs	ITIC, Laura Kong
7.2	9:45	10:30	Pacific Tsunami Warning Center (PTWC) New Enhanced Products SOPs - Why, What, Criteria, Staging of Products	PTWC, Chip McCreery
	10:30	10:45	COFFEE / TEA BREAK	
7.3	10:45	11:45	PTWC Enhanced Products - Explanation of Each Product: Public Text, Graphical Deep-Ocean Tsunami Amplitude, Coastal Tsunami Amplitude, Coastal Tsunami Amplitude Polygons, Tsunami Amplitude Statistics, Coastal Tsunami Amplitude KMZ	McCreery
			<b>Advanced TWC Topics - Seismology</b>	
7.4	11:45	12:30	TWC Operations: Real-time Earthquake Detection and Fast Source Characterization - Sparse networks, Magnitudes, W-Phase Centroid Moment Tensors – Techniques, Use, and Limitations	PTWC, Fryer
	12:30	13:45	LUNCH (TWTools installation as needed)	
	13:45	14:15	TWC Operations: Real-time Earthquake Detection and Fast Source Characterization - Sparse networks, Magnitudes, W-Phase Centroid Moment Tensors – Techniques, Use, and Limitations	Fryer

			<b>Advanced TWC Topics - Tsunami Forecasting</b>	
<b>7.5</b>	14:15	15:15	TWC Operations: Travel Time and Wave Forecasting – Techniques, Use and Limitations, Sensitivity Studies (Location, Depth, Magnitude)	PTWC, Dailin Wang
	15:15	15:30	COFFEE / TEA BREAK	
<b>7.6</b>	15:30	17:00	PTWC TWC Operational Forecasting – RIFT, SIFT, ATFM, Limitations and Uncertainties	Wang
	17:00	18:00	Return to hotel	
<b>8 - 9 PTWS</b>			<b>TUESDAY, 26 AUGUST, DAY 7</b>	
			<b>New Products Guidance - Flow Charts, Criteria Tables, Message Templates, Information Flow and Staging</b>	
	9:00	9:15	Announcements	Yanagi
<b>8.1</b>	9:15	10:30	National Tsunami Warning Center SOP for PTWC Enhanced Products - Guidance and Examples: Flow Charts, Criteria Tables, Warning/Watch/Information Message Templates	Kong
	10:30	10:45	COFFEE / TEA BREAK	
<b>8.2</b>	10:45	11:15	PTWC Enhanced Products Guidance for National Warnings and Evacuation – Land and Marine Threats and Public Safety	Yanagi
<b>8.3</b>	11:15	12:00	Timeline-driven SOPs – Intl TWCs, NTWC, NDMO/DMO actions	Kong
			<b>RIFT Scenarios</b>	
<b>9.1</b>	12:00	12:30	Using PTWC Enhanced Products – Distant, Regional, and Local Tsunami Warning Decision-making	ITIC, PTWC
	12:30	13:45	LUNCH (TWTools installation as needed)	
<b>9.2</b>	13:45	15:15	Interpreting PTWC Enhanced Products – Scenarios	ITIC, PTWC
	15:15	15:30	COFFEE / TEA BREAK	
			<b>Small Groups: Country SOPs for PTWC Enhanced Products</b>	
<b>9.3</b>	15:30	17:00	Small Group sessions (Central America, South America, Pacific Island Countries, US Compact Countries, Southeast Asia): Improving Country SOPs for PTWC New Enhanced Products, Dangerous Tsunami Scenarios	PTWC, ITIC, PMEL, WFO Guam
	17:00	18:00	Return to hotel	
<b>9.PTWS</b>			<b>WEDNESDAY, 27 AUGUST, DAY 8</b>	
			<b>Small Groups: Country SOPs for PTWC Enhanced Products</b>	
	9:00	9:15	Announcements	Yanagi
<b>9.3</b>	9:15	10:30	Small Group sessions - Improving Country SOPs for PTWC New Enhanced Products, Dangerous Tsunami Scenarios	PTWC, ITIC, PMEL, WFO Guam
	10:30	10:45	COFFEE / TEA BREAK	
	10:45	12:30	Small Group sessions - Improving Country SOPs for PTWC New Enhanced Products, Dangerous Tsunami Scenarios	PTWC, ITIC, PMEL WFO Guam
	12:30	13:45	LUNCH (TWTools installation as needed)	Kong and Fukuji
			<b>WEDNESDAY, 27 AUGUST, DAY 8</b>	
<b>10</b>			<b>OMAN and PTWS PARTICIPANTS MEET TOGETHER AGAIN</b>	
			<b>ITP-Hawaii 2014 Tsunami Exercise - Preparation</b>	
<b>10.1</b>	13:45	14:15	Tsunami Exercise - Overview and Format	Kong
<b>10.2</b>	14:15	14:45	Tsunami Exercise - Preparation - SOPs, Checklists, Templates, etc	Yanagi
	14:45	15:00	COFFEE / TEA BREAK	

10.3	15:00	16:30	Tsunami Exercise - Preparation Homework - If needed, finish SOPs, checklists, message templates to be used in Exercise	Arcos, Exercise Country Teams
10			<b>THURSDAY, 28 AUGUST DAY 9</b>	
			<b>ITP-Hawaii 2014 Tsunami Exercise - Preparation</b>	
	9:00	9:15	Announcements	Yanagi
10.4	9:15	9:45	Topic to be determined	ITIC
10.5	9:45	10:45	Country Teams share Exercise SOPs	Country Teams
	10:45	11:00	COFFEE / TEA BREAK	
10.6	11:00	11:15	Tsunami Exercise - Preparation and Setup	Yanagi, Kong
	11:15	12:30	LUNCH	
			<b>ITP-Hawaii 2014 Tsunami Exercise</b>	
10.7	12:30	15:00	Conduct Tsunami Exercise	Country Teams, Exercise Controller (Yanagi)
	15:00	15:15	COFFEE / TEA BREAK	
10.8	15:15	16:45	Post-Exercise Evaluation - Hotwash preparation Homework - If needed, finish Post-Exercise Evaluation report, including readiness for PTWS New Products 1 October 2014 start	Arcos, Country Teams
10 - 11			<b>FRIDAY, 29 AUGUST DAY 10</b>	
			<b>ITP-Hawaii 2014 Wrap-up - Training Room</b>	
11.1	9:00	10:00	ITP-Hawaii 2014 Logistics wrap-up; Travel Vouchers, Course Materials	Yanagi, Sonen
	10:00	10:15	COFFEE / TEA BREAK	
			<b>ITP-Hawaii 2014 Tsunami Exercise Evaluation - Auditorium</b>	
10.9	10:15	11:45	Post-Exercise Evaluation	Yanagi, Country Teams
	11:45	13:00	LUNCH	
			<b>Summary and Closing - Auditorium</b>	
11.2	13:00	14:30	Summary Discussion (Way Forward, Next Steps, Gaps, Needs) - PTWC New Products, SOPs, Preparedness	Kong, McCreery, All
	14:30	14:45	COFFEE / TEA BREAK	
11.3	14:45	15:30	Presentation of Certificates and Closing	ITIC, PTWC, NWS
			<b>Friday - Saturday, 30 AUGUST</b>	
			<b>Hotel Checkout - Depart for home country</b>	