International Tsunami Symposium Commemorating
50th Anniversary of the
Pacific Tsunami Warning and Mitigation System

Making the Pacific Ready for the Tsunami Threat
20-21 April 2015

SUMMARY
AGENDA

1. **Opening Ceremony - IOC**
   - Dr. Vladimir Ryabinin, Executive Secretary (by video)
   - Dr. Yutaka Michida, Japan, IOC Vice President

2. **PTWS Historical Keynotes - USA - Chile, Japan, Pacific Islands**

3. **History and milestones in development of ITSU / PTWS, 1960 - 2015**:
   - Keynote: Dr. Iouri Oliounine, ITSU Technical Secretary, 1982-2002 (by video)

4.1 **Hazard and Risk - Identification and Risk Reduction**

4.2 **Warning and Forecast: Detection, Warning and Dissemination**
   - **Sub-Theme 1:** Tsunami Warning Operations
   - **Sub-Theme 2:** Warnings - The Last Mile

4.3 **Awareness and Response: Preparedness, Emergency Planning and Response, and Post-Disaster Response**

5. **Assessing Risk and Building Preparedness in Communities**

6. **Summary Session: Looking to Future: PTWS Priorities Next 5-10 Years**
   - ICG/PTWS Chair, Pacific Town Hall Meeting:
     - Poster Session, IRC Tours, and Welcome Reception
     - **Publication of Symposium Special Volume:** Pacific Tsunami Warning & Mitigation System: Past, Present, and Future
3. History and milestones in the development of the Tsunami Warning System in the Pacific, ITSU to PTWS, 1960 - 2015

- Following the 2 earthquakes in early 60s, real challenge for the TWS. Struggled for the first 10 years or so as stations were installed and members joined. The Master Plan was produced
• 1965-90 was fairly quiet for tsunamis. After 1990, more destructive tsunamis.

• 2004 Sumatra EQ: PTWC able to characterise EQ but no TWFPs in IO. IOC took responsibility of establishing TWS in IO, CARIBE, NEAM. => Pacific Expertise valued
After 50 years, 46 member states. PTWC more advanced and has lots of seismic and sea level stations.

Recommendations

* Active participation of all group members in ICG WGs. Don’t leave it all to Chairs.
Theme 1: Hazard & Risk Identification and Risk Reduction

Tsunami is a flooding hazard
Theme 1: Hazard & Risk
Recommendation #1

Establish **standards** for flooding products such as evacuation maps, building codes, preparedness programs, etc. to serve as international guidelines.

These standards require technical expertise that could be drawn from IUGG Tsunami Commission, and other expert sectors.
Theme 1: Hazard & Risk
Recommendation #2

Build capacity to apply these standards in tsunami threatened countries to ensure public safety and global consistency.

Build capacity to apply these standards in tsunami threatened countries to ensure public safety and global consistency. Capacity could be built using UNESCO IOC procedures and educational partners around world.
Theme 2, Sub-Theme 1

Tsunami Warning Operations

Session Summary
COMPETING REQUIREMENTS
SPEED and ACCURACY

When to issue Tsunami Warning?
• EQ (Location, Magnitude, Finite Fault)
• Forecast (Source, Coastal Inundation)

Right now we can’t do both.
LOCAL TSUNAMIS (< 30 min ETA)  
SPEED and ACCURACY

• Announce Quickly
  Hypocenter + Magnitude (worst case) =>
  Use Forecast Database

• Simple Message (Warning => Evacuate)
  Geographic Blocks, Alert Categories (wave ampl),
  Action (evacuate)

• However, if local, people should not wait for warning
  – evacuate immediately if they feel the earthquake.
  May not receive warning (comms fail, night/weekend,
  hearing/visually-impaired, slow EQ so non-strong long
  shaking)
Timeline – Forecasting
Goal: 15 min

NOW => FUTURE

* EQ Source: 3-15 min => (?)
* Basin-wide Forecast: 1-5 min => (1)
* High-Res Forecast – Inundation: 10-15 min => (1)
* Data DART – iterate /improve: 20-120 min => (10)
REALITY - FORWARD

* NO PERFECT WARNING
* SCIENCE HARD, BUT NECESSARY
* FOR PROGRESS - BOTH REQUIRED TECHNOLOGY (TSUNAMI WARNING) and PREPAREDNESS
Theme 2, Sub-Theme 2
Warnings: the Last Mile

Summary
• Requirement - Reliable, Redundant. =>
   Need diverse technologies for warning dissemination

• Isolated communities are hard to reach with warning information - e.g. EMWIN, Chatty Beetle

• Simple technology required for remote communities - HF Radio

• Technology is not only solution. This is a multi-stakeholder problem.

• Training is key to getting information from the upstream to the vulnerable communities.

• As well, SOPs all along the warning chain and its associated regular communications tests
Theme 3: Awareness & Response

Summary
• PTWS “last mile”: = Our (PTWS) world!
  But for the real world: “First in the line of fire” (flood)
⇒ A PTWS refocus: Last mile should become the first kilometer?

• Time: what is effective warning wrt time?
Consider real world perspective & their needs in terms of protection:
• Support time - what are effective warnings from a time perspective (how much time do communities need to take effective action)?
• Time: what is effective warning wrt time? (contd)

• Support appropriate action - what do they need? (education, mapping, communication, evacuation routes & drills, vertical evacuation, design guidance etc)

• We need more emergency managers to improve the balance. With this, PTWS will be in a better position to set important priorities - and then allocate resources accordingly.
6. Summary Session: Looking to the Future

Session Summaries
PTWS Chair
Pacific Town Hall Mtg
Hazard & Risk Identification and Risk Reduction Recommendations: Global => should be addressed by TOWS

Tsunami Warnings: Speed vs accuracy. Local vs teletsunami. Distant tsunamis we can provide warnings for now. Focus now on LOCAL TSUNAMI, which has time-sensitive decisions
We are only effective as our weakest link. Given this, re-think the ways we do things. 3 Pillars

1\textsuperscript{st} Pillar: mega-events are the big risk to address. For local tsunami, mega events will continue to be a challenge.

2\textsuperscript{nd} Pillar: Expanding and Improving detection and analysis: use of GPS and CMT, submarine cables, and other technologies.

3\textsuperscript{rd} Pillar: All activities MUST continue.
Pacific Town Hall

- Must keep **public awareness and media** aware. Even in Japan, an issue. Media can be positive and negative but always important.


- **Sustainability.** Never status quo. To be sustainable, you have to keep developing. Partnerships between science (hard and soft) and operations. In a country or community, Technical Advisory Committees

- **PacWave exercises** every 2 years. Use as public awareness opportunity.

- **Other Tsunami sources:** Establish standards: Volcanoes, Landslides, Meteo-tsunamis

- Integration - for sharing of data and resources, and across Working Groups (technical and regional)
FINAL SUMMARY

• FUTURE: Think about re-focusing
  • Big emphasis on getting evacuation zones and routes identified.
  • Get better balance between scientists and emergency managers.

• SUSTAINABILITY:
  • Celebrate - have sustained for 50 years!
  • We can only get better!