

# Report from TT TWO (TOWS WG)

## 9. NON-SEISMIC TSUNAMIS AND LOCAL SOURCE SOPS

TOWS WG Inter-ICG Task Team on Tsunami Watch Operations  
**21 – 22 February 2022 (Online Meeting)**

**NEAM representatives:**

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# Actions and recommendations 2021 – Update 2022

2021 Action 2:	Prepare the final report on <b>atypical tsunami sources</b> for presentation the 2022 TT-TWO meeting.	Feb 22:	Francois Schindele (J2)
2021 Action 3:	<b>Update the Global Service Definition Document</b> (GSDD) during the inter-sessional period and submit for approval at the 2022 TOWS-WG meeting.	Feb 22:  NEAM threat-based and level of warnings recommended globally by TOWS-WG has not yet been adopted due to several issues such as definition of No Threat... and translation of new terminology.  <b>TT TWO and TOWS-WG need to discuss the need to include warning for atypical tsunamis</b> as part of global service and inclusion in GSDD	Francois Schindele Secretariat (14)
2021 Rec 1:	<b>Local source tsunami standard operating procedures</b> should be included as an important component of the UNESCO-IOC Tsunami Ready programme.	Feb 22:  Outcome to be reviewed in joint session with TT DMP	Secretariat (J2, J5, J6)

## J2. Report by the TT on atypical tsunamis (Feb. 2022)

- The TT on atypical tsunami (F. Schindel )
  - Noted the need for necessary expertise to fully examine all the different types of non-seismic sources generating tsunamis. Nonetheless, the report manages to provide a very good **general assessment of the non-seismic generated tsunami hazard**.
  - Next step : more work to be undertaken **to provide guidelines** utilizing current best practices to help national monitoring agencies and NTWCs develop Standard Operating Procedures (SOPs) to monitor and warn for non-seismic tsunamis.
  - At least 100 volcanoes have the potential to generate tsunamis. The recent Hunga-Tonga Hunga Ha'apai (HTHH) volcanic eruption and tsunami event has **highlighted the urgency** to undertake the identified further work.

- Rick Bailey (TT-TWO) announced the **Satellite Activity at the UN Ocean Decade Safe Ocean Laboratory** (5-7 April 2022) on atypical (non-seismic) tsunamis.
  - Outcomes from the work of the TT-TWO ad hoc team on Atypical Tsunami Sources and other active work being undertaken around the world on the topic (e.g. Germany-Indonesia Tsunami Risk Project and the Kyoto Landslide Commitment)
- Mohammad Mokhtari (IOTWMS) recommended from experiences in the NW Indian Ocean that
  - Work to better understand the **generation of tsunamis** from splay faulting and submarine landslides, which can also worsen the magnitude of any typical subduction zone tsunamis.
  - **Meteo-tsunamis** have also been observed in the Persian Gulf.

- **Recommendation #1 on cost benefit analysis** for non-seismic generated tsunami monitoring
  - **Noting** the potentially high costs for monitoring and forecasting of relatively rare non-seismic generated tsunamis that many Member States may not be able to afford
    - **Recommends a cost-benefit analysis** be first undertaken for monitoring non-seismic tsunami
- **Recommendation #2 on sea level data calibrations:**
  - **Noting** the issues associated with the sometimes unknown and conflicting accuracies of sea level data used in tsunami warnings
    - **Recommends** each ICG encourage sea-level network operators to undertake regular and routine calibration of their sea-level monitoring instrumentation, following recommendations of IOC Manuals & Guides No #3.
- **Recommendation #3 from Ad Hoc Team Atypical Tsunami Sources:**
  - **Noting with appreciation** the work of the current Ad hoc Team on Atypical Tsunami Sources chaired by Dr Francois Schindele;
  - **Considering** that the current report is of great interest for all ICGs and Member States
    - **Recommends** the report be published as an IOC Technical Manual
  - **Acknowledging** confusion sometimes amongst scientific experts about the term “atypical tsunami”
    - **Recommends** that the term “atypical tsunamis” not be used and that tsunamis be classified as either: a) Seismic generated tsunamis; or b) Non-seismic generated tsunamis; or c) Complex source generated tsunamis;

- **Further recommends** TT DMP consider outreach activities for educating the public and the media about the differences.
  - **Recognising** that non-subduction zone earthquakes and landslides (aerial and submarine) can also generate tsunamis and should be monitored and warned for with typical TSP and NTWC tools;
    - **Recommends** TSPs and NTWCs of each ICG identify all coastal areas or near-shore faults that could generate large earthquakes and submarine landslides and be prepared to issue warnings as appropriate.
  - **Noting** the potential for tsunamis to be generated by specific atmospheric conditions;
    - **Recommends** TOWS-WG establish a specific *Ad Hoc Team on Meteo-tsunamis* under the TT-TWO chaired by Mr Mike Angove with ToRs:
      - Review and advise on gaps related to meteo-tsunami monitoring and warning systems.
      - Develop guidelines on SOPs to monitor and warn for meteo-tsunamis.
      - Review relationship required between TSPs/NTWCs and Regional/National Met Services to monitor and warn for meteo-tsunamis
      - Write a report to submit to the TT TWO for its next session in February 2023

## J5. Local source SOPs

- PTWS (L. Kong)
  - Released Version 1 of Local Source Tsunami Response Best Practice (ICG/PTWS-XXVIII, 2019), for use by PTWS Member States
    - Focuses on response to earthquake-generated tsunamis and their natural tsunami warnings
    - Emphasizes self-evacuation and public awareness and education
    - Items left for subsequent consideration included work to cover non-typical or non-earthquake-generated tsunamis

- The PTWS was advised by an ad Hoc Hunga-Tonga Hunga Ha'apai Task Team
  - Is urgently implementing as a best-endeavors effort Interim volcano tsunami procedures, with training, for the HTHH volcano should it erupt again.
  - The Tonga Meteorological Services (NTWC for Tonga)
    - Acknowledging the challenges to effectively warn in time for local events
      - is working with expert partners to produce worst case volcano scenario expected inundation maps as public education and outreach tools to inform their people on what to expect and where to evacuate to.
    - Previously its NTWC had implemented a 'Did You Feel It' mobile phone tool for quick, non-instrumental characterization of the earthquake source as a local SOP for tsunami warning
    - These interim SOPs could be shared with the other ICGs

## ■ ICG/IOTWMS

- Has a [Task Team on Tsunami Preparedness](#) for a Near-Field Tsunami Hazard
- Due to the near-field threat of tsunamis in the North West Indian Ocean due to the Makran Source Zone (MSZ), the [UNESCAP funded project “Strengthening Tsunami Warning in the North West Indian Ocean”](#) is helping Member States in the region to develop national tsunami warning chains with well-developed SOPs
- In response to Anak Krakatoa flank collapse and corresponding tsunami in 2018, [Indonesia has implemented volcano and tsunami wave monitoring](#) procedures to inform future tsunami warnings

## ■ Recommendation (#12) for local SOPs

- [Requests the ICGs to share their local source SOPs with other ICG’s with a view on consistent approaches \(ICGs, Secretariat\)](#)

## ■ Action #11

- [ICG/PTWS share interim SOPs for tsunamis generated by HTHH volcano with other ICGs \(Chip McCreery, Secretariat\)](#)

# UPDATE TO THE GLOBAL SERVICE DEFINITION DOCUMENT

- TT-TWO proposed updates on (a) forecasting techniques, (b) public bulletins and products, (c) procedure for reporting of estimated and observed sea levels, and (d) earthquake parameters. **Furthermore, a new chapter on ‘Interim Hunga Tonga Hunga Ha’apai Warning System’ was proposed.**
- Dr. Nishimae noted the tsunami response procedure for the 2022 Hunga Tonga volcano eruption should be referenced as an example or annexed within the GSDD
- Action 15
  - GSDD to be updated with agreed changes, including warning for non-seismic generated tsunamis. (Chip McCreery; Secretariat)
- Action 16
  - Chip McCreery takes over task of updating GSDD from Francois Schindele