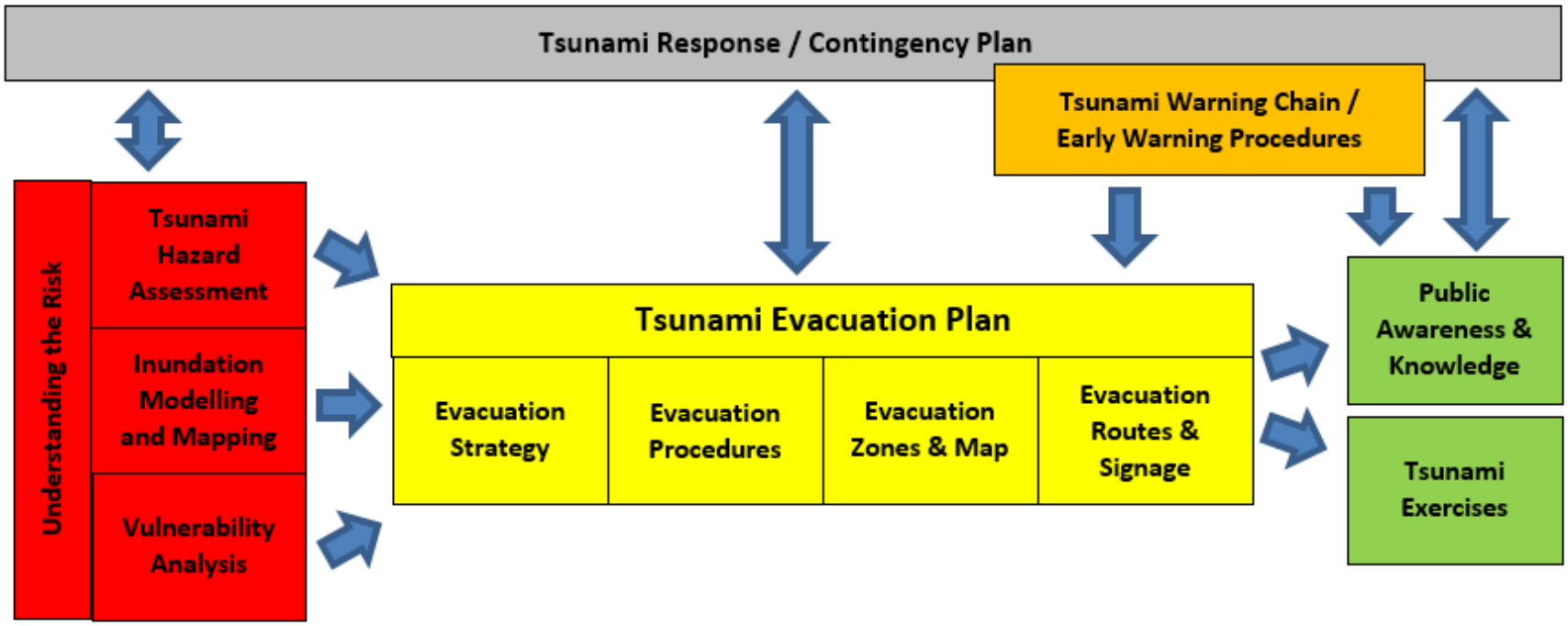
UNESCAP TTF-31

United Nations Educational, Scientific and Cultural Organization | Intergovernmental Oceanographic Commission | Indian Ocean Tsunami Information Centre

Requirements for Inundation Mapping from the Tsunami Evacuation Planning (TEP) perspective

Harald Spahn, International Consultant

Hazard Assessment and Inundation Maps are main references for TEP

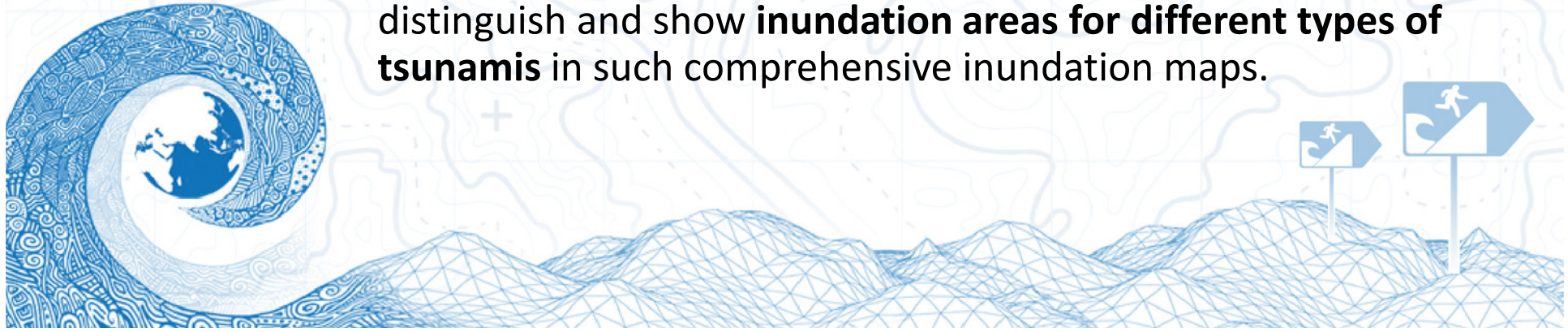


Preliminary remarks

It is understood that at present and within the TTF-31 Project the inundation areas can only be modelled for **seismically induced tsunamis** based on the results of the **PTHA for the Makran Region**.

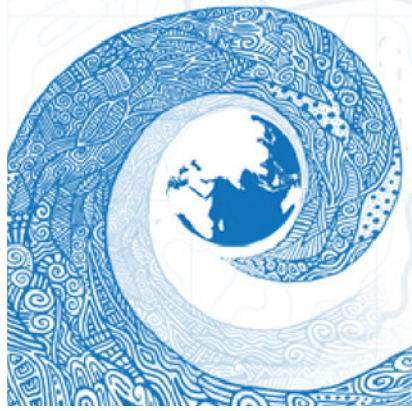
However, from a community perspective, it is important to know the entire **area that can be inundated by tsunamis of any type**, including **volcanic and landslide induced tsunamis**. There is a need for further research here.

It remains to be investigated whether it is useful to distinguish and show **inundation areas for different types of tsunamis** in such comprehensive inundation maps.



Essential Hazard Information for TEP

- Location of **tsunami source areas**
- **Tsunamis of different origins** (seismic and non-seismic) which can affect the area
- **Minimum estimated arrival times (ETA_{min})** for tsunamis of different origins
- If possible: **Areas that can be inundated by tsunamis of all different origins**
- **Wave height at coast** and / or **flow depth** on land
- **Multiple threat scenarios**, including worst case, most probable scenario, historical events



Requirements for Inundation Maps

Inundation Maps need to visualize **the entire area that can be inundated by all wave heights that can occur**.

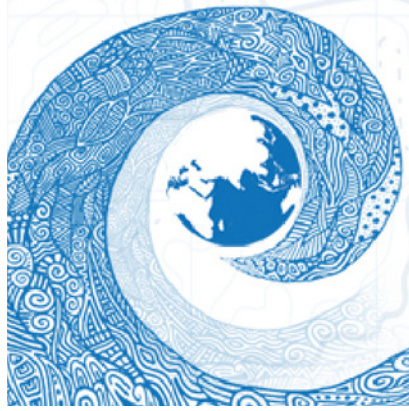
In case of a **single scenario map**, it should represent the **worst case** scenario

Preferred are inundation maps visualizing **multiple scenarios** indicating the **probability** of an area on land being inundated

Resolution of 10m would be sufficient for TEP purposes

Maps should provide information on **ETA_{min}** for different source areas

Information on **flow depth** and / or **impact energy** of tsunamis on land can be helpful, but are not essential



Other Considerations

Regarding **accuracy / resolution** of inundation maps one must have in mind that the modelling of propagation on land involves usually considerable uncertainties due to the application of a single roughness factor to represent the natural or built environment. From therefore the maxim should be: “it is better to be roughly right than precisely wrong”

Replicability: the methodology for inundation mapping introduced and applied by the TTF-project in Pilot Areas should be replicable with own (national) resources for other areas in the partner country. Access to HPC technologies for inundation modelling is probably not realistic in most partner countries.

Inundation modelling and mapping “**on the fly**” is <u>not</u> required nor useful for TEP

UNESCAP TTF-31

United Nations Educational, Scientific and Cultural Organization | Intergovernmental Oceanographic Commission | Indian Ocean Tsunami Information Centre

Identification of Pilot Areas in accordance with Tsunami Evacuation Planning (TEP)

Harald Spahn, International Consultant

India

Identification of community Pilot Areas

- Kollam District of Kerala was one of the worst hit places during the 2004 Indian Ocean Tsunami.
- Kerala will be impacted for the tsunamis from Makran subduction zone and Andaman-Sumatra Zone
- The village of Alappad of Kollam District, Kerala is identified for implementation of Tsunami Ready programme with the support of KSDMA and Amrita Vishwa Vidyapeetham
- Conducted a start-up meeting with Alappad community leaders on June 8, 2022

Iran

Identification of community Pilot Areas In IRAN:

Pilot Area1 : ChaBahar
Population ~ 300,000

Pilot Area2 : Jask
Population ~ 40,000

Pakistan

Pilot Areas- DDMAs (LDMOs)

- District Gwadar
- District West Karachi
- District Malir Karachi

Oman & UAE

Still to be defined…