



21st Conference of the Mediterranean and Black Seas Hydrographic Commission (MBSHC)

11 - 13 June 2019, Cádiz, España (Spain)

ICG/NEAMTWS and the Decade of Ocean Science for SD

Status, key Achievements,
Challenges & Opportunities

Denis Chang Seng
IOC of UNESCO



2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



Sustainable
Development
Goals

Tsunami Warning Systems

- **Establishment:** Following the 26 December 2004 tsunami in the Indian Ocean, IOC started to also coordinate the development of similar warning systems for the North East Atlantic, the Mediterranean and connected seas (ICG/NEAMTWS)
- **Governance:** ICG/NEAMTWS-40 Member States, Chair/Vice-Chairs, 4 WGs, 3 TTs, TNCs and TWFPs
- **Global Agenda/Contributions:** Contribution to Target G (Availability and access to Multi-Hazard Early Warning Systems) of the Sendai Framework for DRR

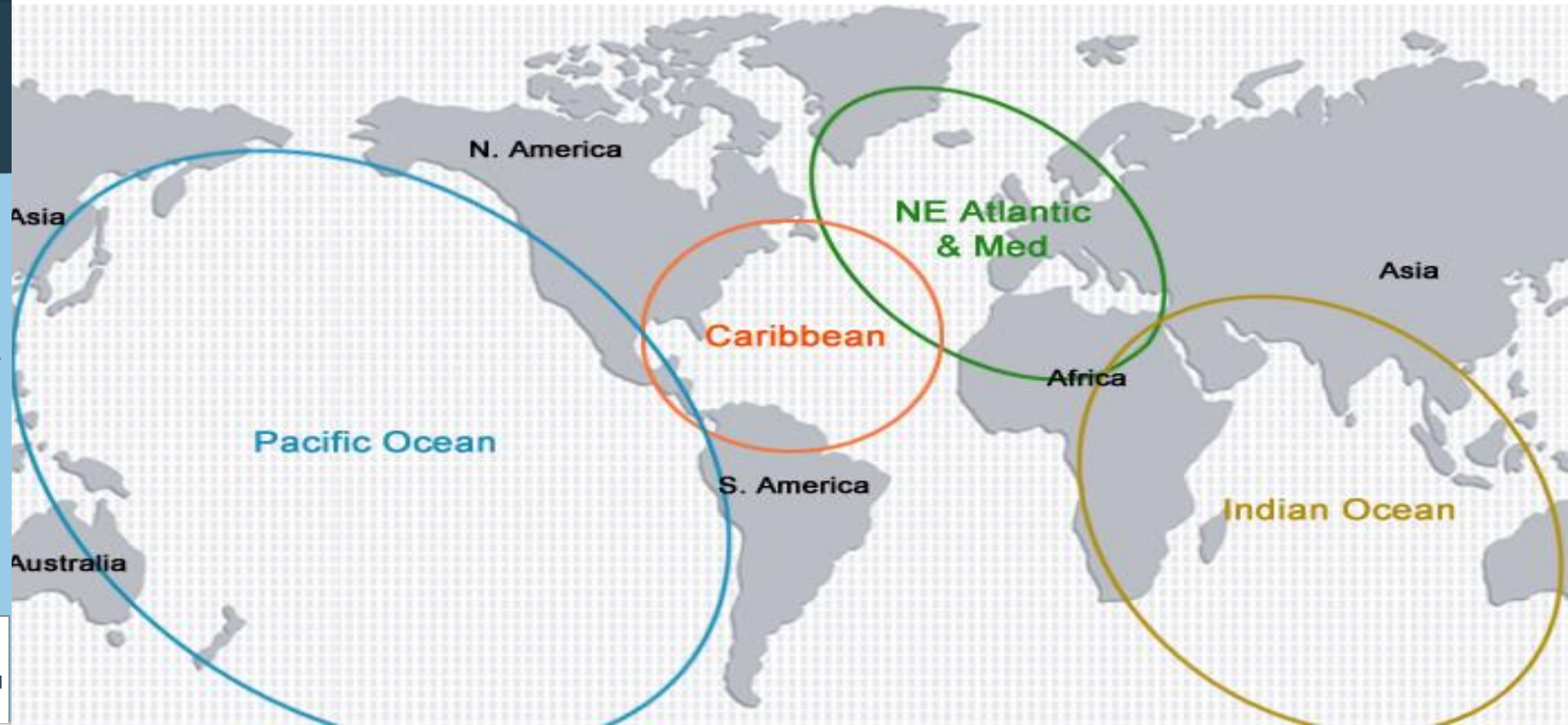


ICG/NEAMTWS
INTERGOVERNMENTAL COORDINATION GROUP
FOR THE TSUNAMI WARNING AND
MITIGATION SYSTEM IN THE NORTH-EASTERN
ATLANTIC, THE MEDITERRANEAN AND
CONNECTED SEAS

**ICG/NEAMTWS
MEMBER STATES**

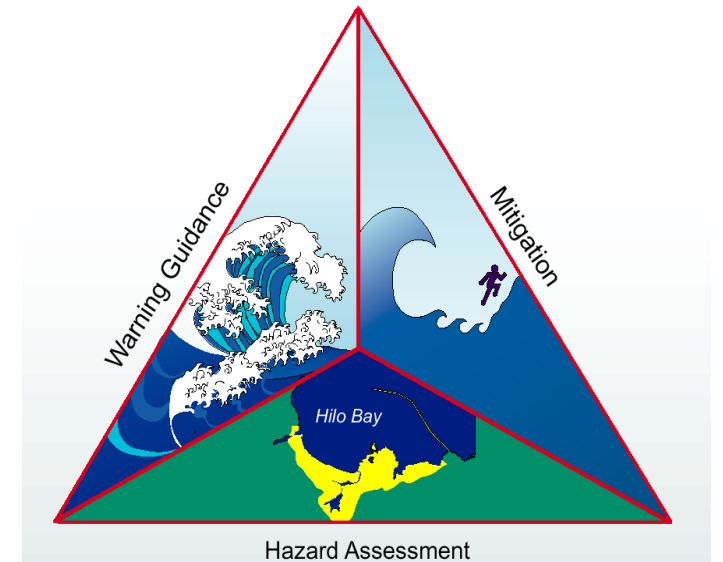
ALBANIA, ALGERIA, BELGIUM, BULGARIA,
CAPE VERDE, CROATIA, CYPRUS, DENMARK,
EGYPT, ESTONIA, FINLAND, FRANCE, GEORGIA,
GERMANY, GREECE, ICELAND, IRELAND,
ISRAEL, ITALY, LEBANON, LIBYA, MALTA,
MAURITANIA, MONACO,
MONTENEGRO, MOROCCO,
NETHERLANDS, NORWAY, POLAND,
PORTUGAL, ROMANIA, RUSSIAN
FEDERATION, SLOVENIA, SPAIN,
SWEDEN, SYRIA, TUNISIA, TURKEY,
UKRAINE, UNITED KINGDOM

Member States
Non-member States
TSP & NTWC operational
CTSP and NTWC



TWS Strategy / Approach/Activities

- Three strategic pillars
 1. Tsunami Hazard / Risk Assessment;
 2. Warning System Development
 3. Preparedness and Awareness
- TEWS design is end-to-end and people centered
 - People need to know what to do in presence of natural signs (e.g. earthquake/ rapid sea level changes), with or without a warning.



NEAMTWS

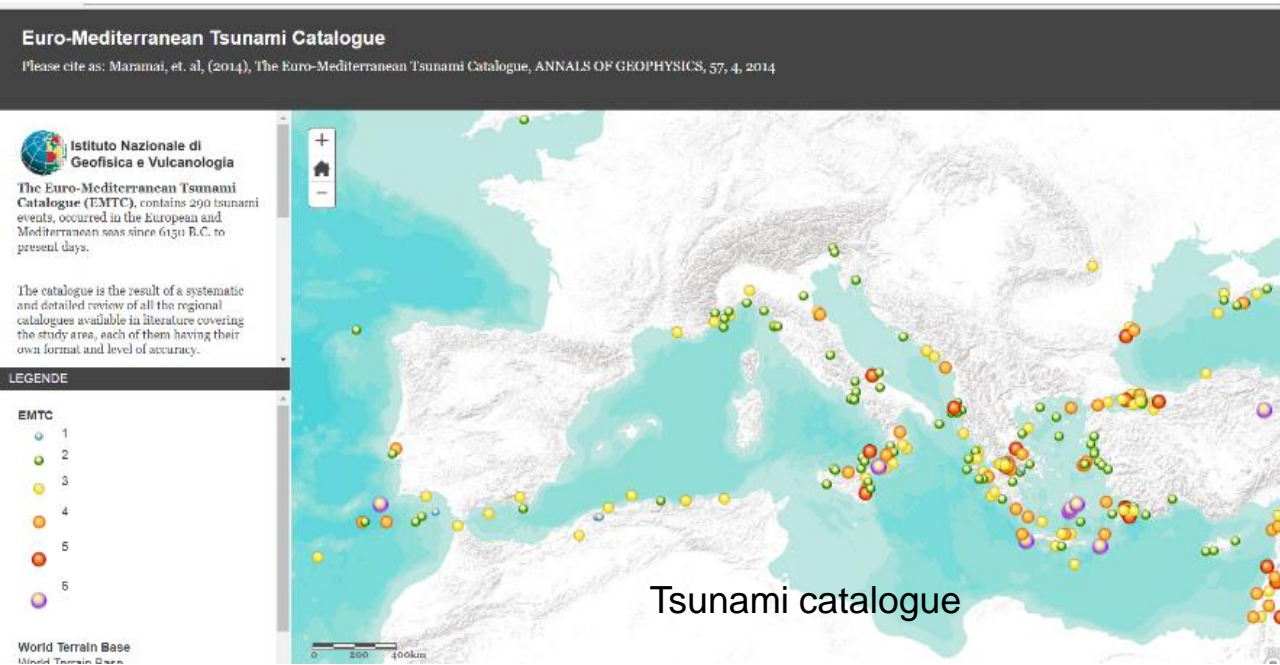
Key Achievements

- Four accredited Tsunami Services Providers (TSPs)-Tsunami Services to MS
- **Candidate TSP in Portugal (To be accredited in 2019)**
- Tsunami catalogue
- TSUMAPS-NEAM, the first region-wide long-term homogeneous Probabilistic Tsunami Hazard Assessment for the NEAM Region
- Three regional tsunami exercise (NEAMWave)

IOC-UNESCO ICG-TWS Regional Tsunami Service Providers



7 New TSPs established since 2004 IO Tsunami



Meetings (2018-2019)

- IOC / UNESCO Tsunami Symposium: Advances in Tsunami Warning to Enhance Community Responses, 12-14 February 2018, Paris, France



IOC/UNESCO SYMPOSIUM

Advances in Tsunami Warning to Enhance Community Responses

12–14 February 2018

Summary Statement



Activities (2018-2019)

- ICG/NEAMTWS, 26-28 Nov, 2018, Paris, UNESCO
- Joint IOC/UNESCO-ISESCO Tsunami and DRR Workshops, 12-16 November 2018, Rabat, Morocco to support the further development of national tsunami early and mitigation capacities.



Alert Messages to the Shipping Community

- Work completed with IHO/IMO/WMO Sub-Committee on the World-Wide Navigational Warning Service on the development of products by Tsunami Service Providers for use by the maritime communities.
- **TOWS-WG XII**
The Group approved the proposal on TSP Messages for the Maritime Community and requested the ICGs to consider the proposal for implementation in their respective basins. (Appendix XX).
- NEAMTWS TSPs need to implement tsunami messages for the maritime /shipping community
- NAVAREA Coordinators informed about NEAMWave17 tsunami exercise



Education, Awareness and Preparedness: The World Tsunami Awareness Day (WTAD), 5 Nov 2018

Turkey: Press Conference at KOERI Regional Earthquake and Tsunami Monitoring Centre

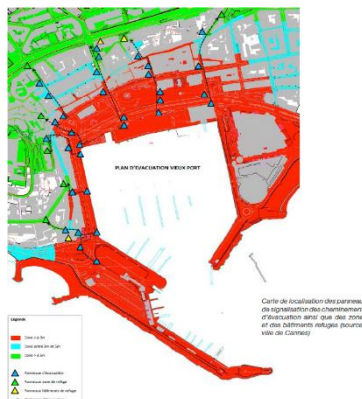


Greece: School activities



- Increase in national effort to raise awareness on tsunami hazards and preparedness
- WTAD French Exercise. Now a yearly exercise.

Cannes, France Tsunami Exercise



Italy: Leaflets and Volunteers raising awareness on tsunami risk



Situation: Hazard Perspective

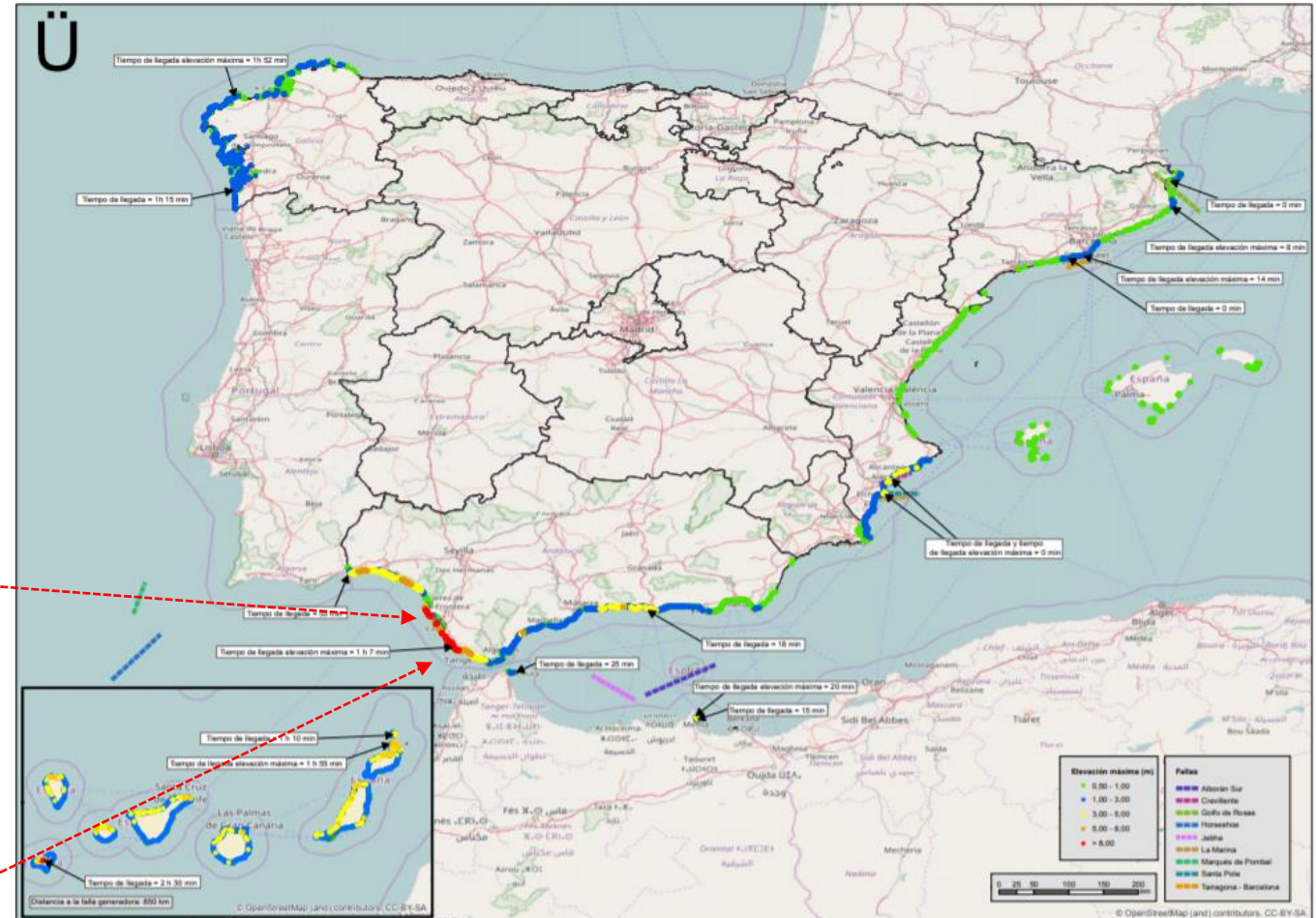
- **Long record** of tsunami events produced by submarine or coastal earthquakes, volcanic eruptions (e.g. Santorini 1600BC-volcanic eruptions and tsunami, Stromboli, Italy, 30 December 2002-landslide induced tsunami, but on an active volcano flank).
- **Large tsunamis** (e.g Lisbonn earthquake and tsunami 1755) may occur at any time.
- **Recent tsunamis** (wake-up call) in the Mediterranean region e.g. (Lithakia (26 October 2018), Aegean Sea (21 July 2017), in Alboran Sea (25 January 2016) and in the Ionian Sea (17 November 2015).



Tsunami Hazard at Spanish Coasts

Results: Maximum sea surface elevations > 0.5 m

- Tsunami hazard is highest at the SW coasts:
- Cadiz, Canary Islands - Sea surface elevations higher than 8 m
- Arrival times for maximum sea elevations: 30 min to 1.5 hours.



Situation: Vulnerability and Risk Perspective

Low Probability of Occurrence, High Risk and Impact

TSUNAMI HAZARD, EXPOSURE

THE RISK

Although the risk and impact of tsunamis are less common than in the Pacific and Indian Ocean, exposure and impacts to coastal areas is high because of:



RISING POPULATION

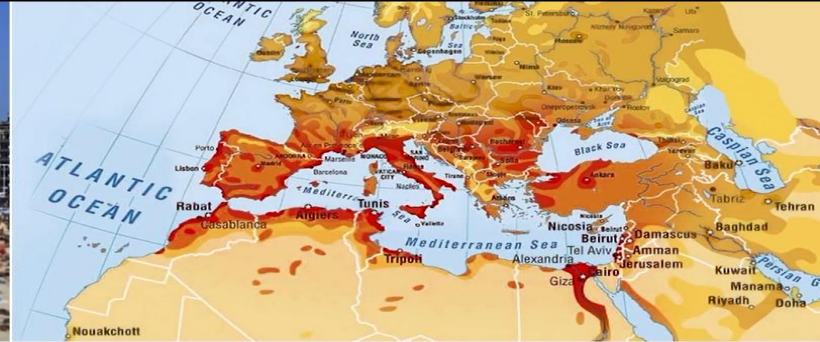


PORT INFRASTRUCTURE



COASTAL TOURISM

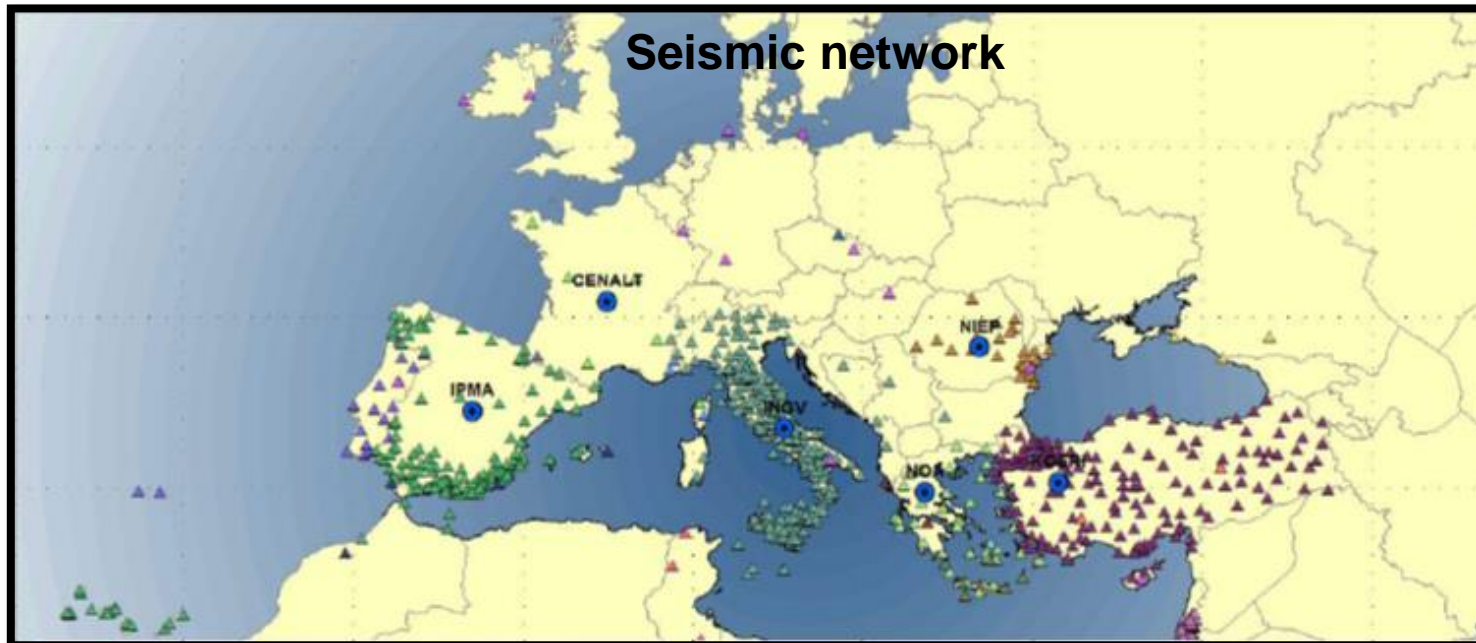
THE PROBABILITY OF A TSUNAMI WAVE EXCEEDING ONE METER IN THE MEDITERRANEAN THE NEXT 30 YEARS IS CLOSE TO... **100%**



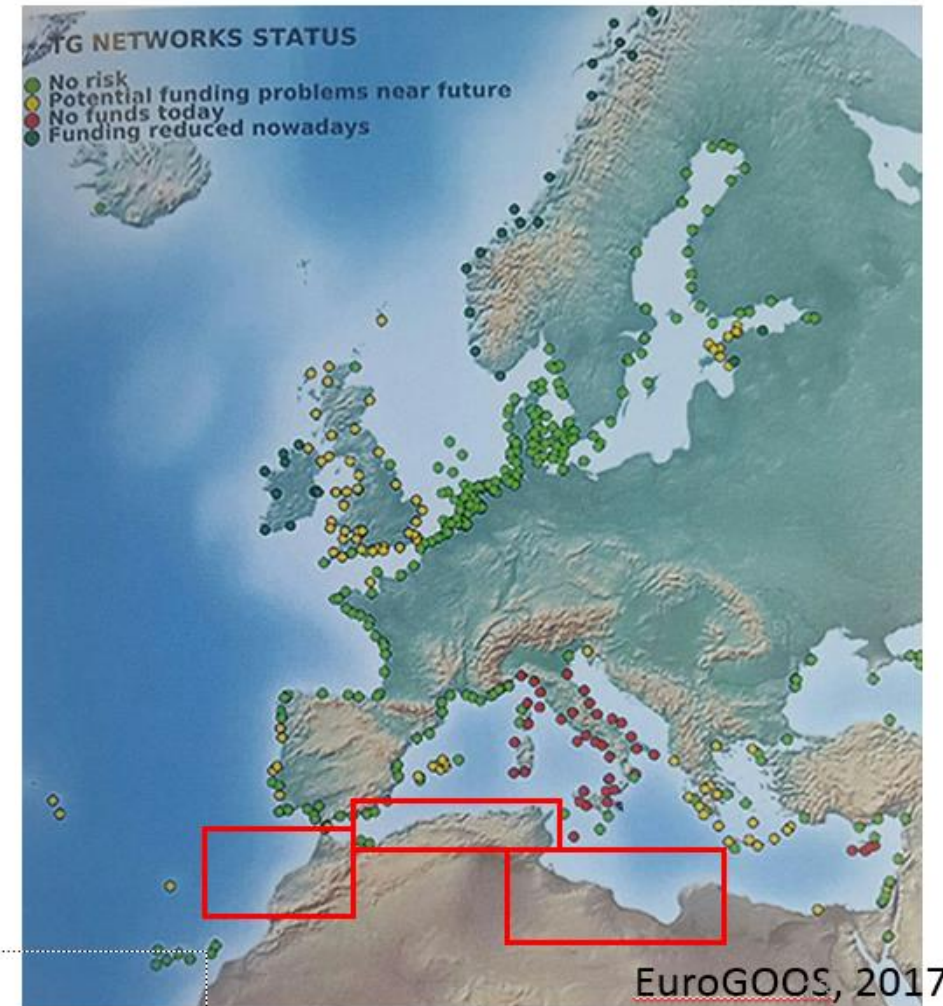
The Mediterranean is the **main tourist destination in the world**, with tourists arriving from all over the world.

Challenges and Gaps

- There continues to be gaps in the seismic and sea level network notably in North Africa.
- Some countries have difficulties sharing observations due to national policy.
- The implication is sub-optimal performance of the regional Tsunami Warning Systems.



Sea Level network



Challenges and Gaps (Con't)

- Effectiveness of Warning Systems for near field and **non-seismic** tsunamis (common in all regions)
- Lack of comprehensive national coastal tsunami hazards and risk assessments
- Lack of implementation – Last Mile/down stream
- Massive lack of awareness and preparedness on tsunami risk



Major Volcanic Eruptions / Land Slide Tsunamis

- **Landslide/active volcano flank-** Stromboli, Italy, 2002
- **Submarine land slide-** Includes the 1979 Nice, France (3 m)

Upcoming ICG/NEAMTWS Events and Meetings

- World Tsunami Awareness Day, 5 Nov 2019
- ICG/NEAMTWS XVI, Cannes, France, 1-3 December 2019

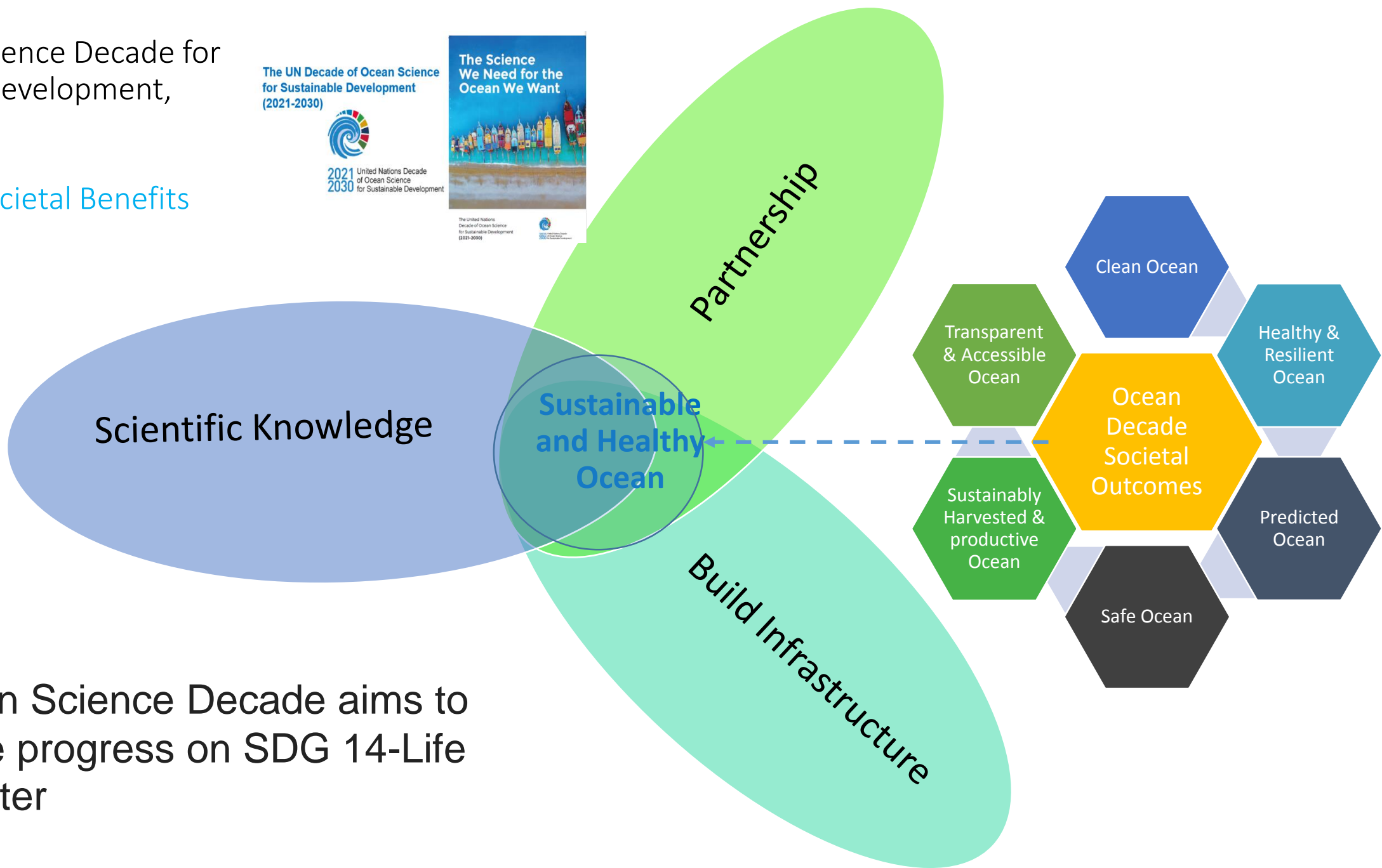
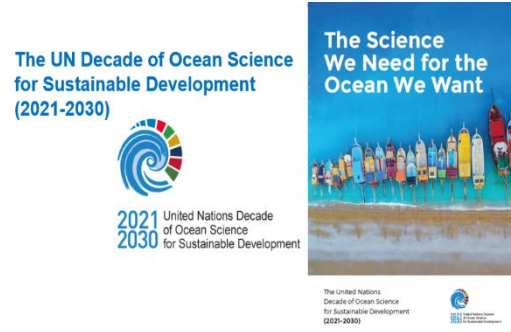


■ Key Points

- **Data exchange and sharing:** Further improvement in the seismic detection system, e.g. by facilitating data-sharing between Northern Africa member states and Tsunami Service Providers
- **Detection and Monitoring:** Improve offshore sea level monitoring and tsunami detection (e.g. buoys, submarine cables)
- **Mapping/Assessment:** Start mapping hazard from non seismic sources (e.g. from submarine landslides and volcanoes; meteo-tsunamis)
- **Integration of Multi-Tsunami Source:** Multi-source Tsunamis-Investigate the feasibility of integrating the TWS with some non-seismic-source components
- **Last-Mile:** Implement the NEAMTWS Last-mile (e.g education and awareness raising)
- **Preparedness/exercise:** ICG/NEAMTWS to organise and conduct the fourth tsunami exercise in 2020 (NEAMWave 20). People need to be involved in the exercise

UN Ocean Science Decade for Sustainable Development, 2021-2030

Vision and Societal Benefits



The Ocean Science Decade aims to accelerate progress on SDG 14-Life Below Water

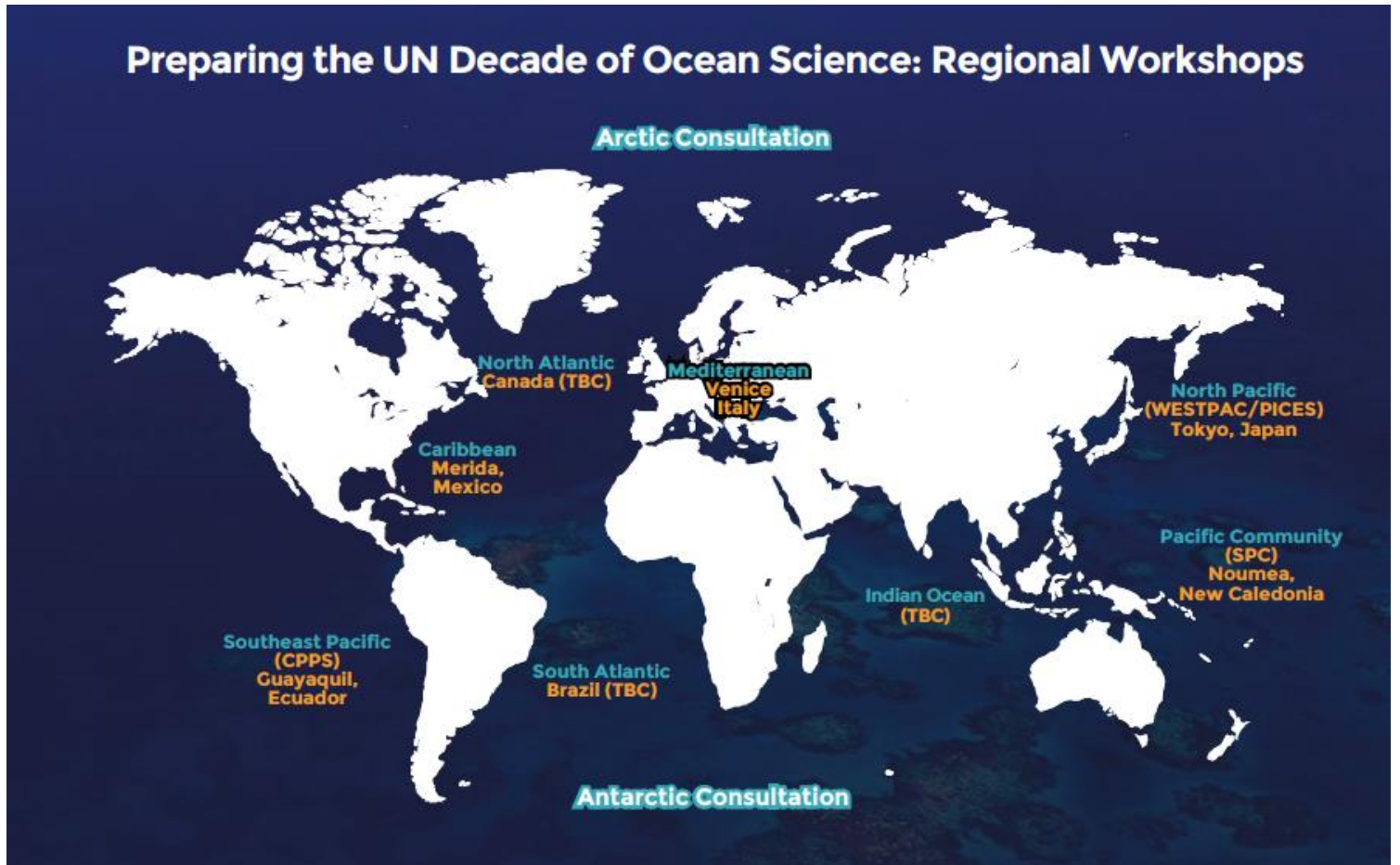
UN Ocean Science Global Planning Meeting

- **First UN Ocean Science Global Planning Meeting, Copenhagen – 13-15 May 2019**
 - ✓ International commitments
 - ✓ Sets in motion full year of preparatory activities across regions
 - ✓ Dr Mathias Jonas, IHO Secretary General participated



Ocean Decade Regional Workshops

- The first regional workshop will be hosted and organized by the Pacific Community (SPC) in Noumea, 23-25 July 2019.
- North Pacific regional workshop, Tokyo, Japan, 31 Jul 2019 - 02 Aug 2019
- Indian Ocean regional workshop, July/August, La Reunion
- Mediterranean regional workshop in January 2020?



Recommendations to MBSHC and Member States

(TOWS-WG, and ICG/NEAMTWS)

- I. Densify sea level networks particularly nearby tsunamigenic sources
- II. Share sea level data relevant to tsunami detection and alerts
- III. Invite NEAM NAVAREA coordinators to participate in NEAMWave 20 exercise
- IV. Acknowledge the importance of high resolution bathymetry for Tsunami modelling/ assessments and forecasting and encourage sharing of such data



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2030 of Ocean Science
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