



2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development



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Commission

UN Decade for Ocean Science for Sustainable Development: **Tsunami**

Dr. Laura Kong
International Tsunami Information Centre (ITIC)



2021 United Nations Decade
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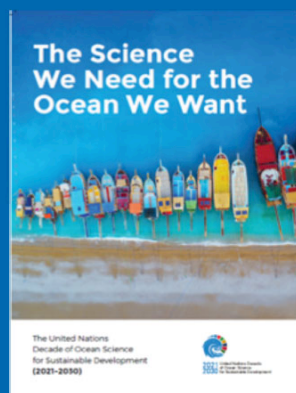
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Vision:
*“The science we need
for the ocean we want”*

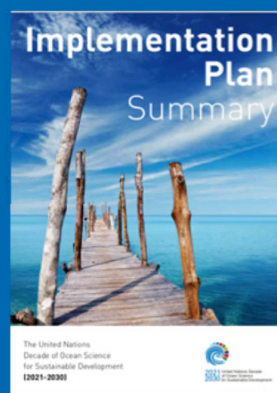
Mission:
*Transformative Ocean Science
solutions for sustainable
development, connecting
people and our ocean*



2016-2017



2018-2019



2019-2020



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Ocean Decade Goals: Societal Outcomes



1. A Clean Ocean

Sources of pollution are identified and reduced
Or removed.



2. A Healthy and Resilient Ocean

Marine ecosystems are understood,
protected, restored and managed.



3. A Productive Ocean

Supporting sustainable food supply and a
sustainable ocean economy.



Ocean Decade Goals: Societal Outcomes



4. A Predicted Ocean

Society understands and can respond to changing ocean conditions.



5. A Safe Ocean

Life and livelihoods are protected from ocean-related hazards.



6. An Accessible Ocean

Open and equitable access to data, information and technology and innovation.

Capacity Development

Cross-cutting. No one left behind.



IOC Ocean Decade Tsunami Programme



THE OCEAN DECADE WILL PROVIDE A 'ONCE-IN-A-LIFETIME' OPPORTUNITY FOR NATIONS TO WORK TOGETHER TO GENERATE THE GLOBAL OCEAN SCIENCE NEEDED TO SUPPORT THE SUSTAINABLE DEVELOPMENT OF OUR SHARED OCEAN.

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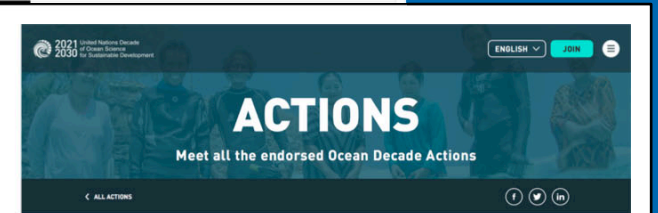
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NEWLY ENDORSED DECADE ACTION THE OCEAN DECADE TSUNAMI PROGRAMME



Lead Institution: Intergovernmental Oceanographic Commission - IOC-UNESCO

#OceanDecade



The Ocean Decade Tsunami Programme

Intergovernmental Oceanographic Commission of UNESCO, IOC-UNESCO - France

Increase community resilience to ocean hazards, Indian Ocean, North Atlantic Ocean, North Pacific Ocean, Programme, South Atlantic Ocean, South Pacific Ocean

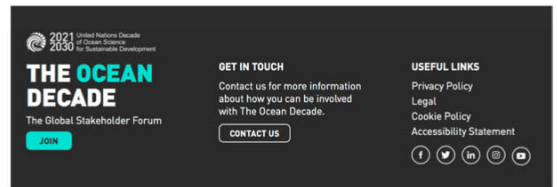
Progress actions is envisioned particularly in the fields of rapid tsunami detection, measurement and forecasting capabilities, implementation of Tsunami Ready communities and related capacity development efforts, specifically targeting SIDS and LDCs.

Additionally, the ambition is to identify and advance specific actions that align with the components of UNDRR People-centered early warning systems including:

1. Risk Knowledge
 - (i) Improve our understanding of the tsunami hazard by expanding our knowledge of past or potential tsunami sources
 - (ii) Fully understand the impacts to critical infrastructure and marine assets and how to minimize them
2. Monitoring and Warning
 - (i) More quickly detect and measure tsunamis directly, through ocean observations to include instrumentation of undersea cables
 - (ii) Ensure critical tsunami generation parameters are identified through the optimal use and real-time sharing of new and existing sensors and data
 - (iii) Leverage the Nippon Foundation-GEBCO Sealed 2030 hydrographic survey initiative to ensure nearshore coastal zones have complete bathymetric/topographic data coverage at the required resolution
3. Warning Dissemination and Communication
 - (i) Ensure full integration of tsunami services within a multi-hazard early warning framework
 - (ii) Facilitate development of warning dissemination and communication options that are appropriate to geographic, demographic, and infrastructure conditions for the timely dissemination of warnings
4. Response Capability
 - (i) Tsunami evacuation maps must be available for all coastal communities
 - (ii) Ensure that 100% of communities at risk of tsunami around the world meet the indicators outlined in the IOC-UNESCO Tsunami Ready programme
 - (iii) Ensure plans to minimize impacts to critical infrastructure and marine assets are in place to enable quicker post-tsunami restoration of services
5. Capacity Development and attention to SIDS and LDCs
 - (i) Enhanced capacity development is necessary for the understanding of the tsunami hazard to enhance timely warning, response and resilience
 - (ii) Ensure that SIDS and LDCs are fully integrated into all development phases of the global Tsunami Warning and Mitigation System

Start Date: 01/09/2022
End Date: 31/12/2030

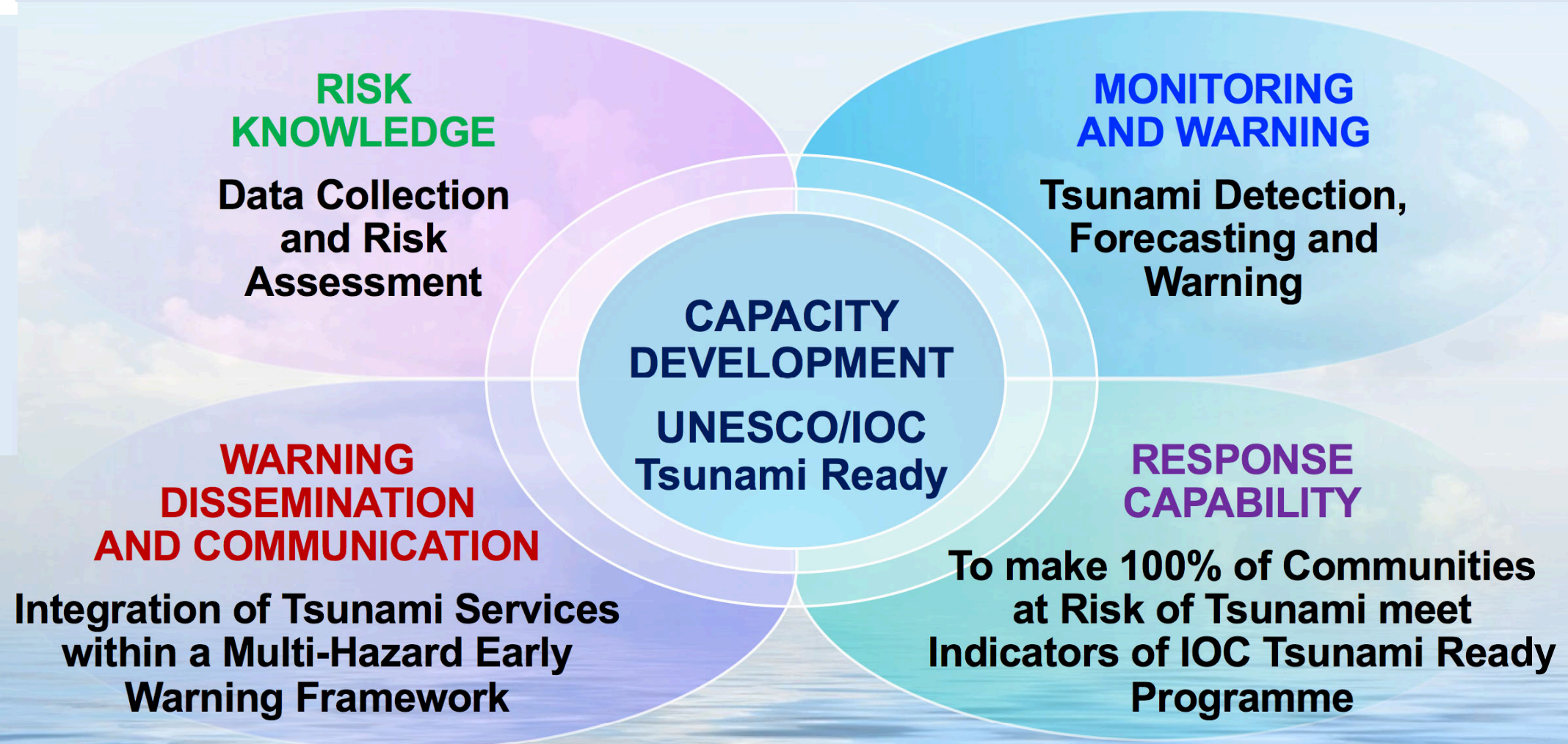
Lead Contact: Bernardo Aliaga (b.aliaga@unesco.org)



IOC OCEAN DECADE TSUNAMI PROGRAMME

Components and Actions

Annex 1, IOC Circular letter 2825, Protecting Communities from the World's Most Dangerous Waves: A Framework for Action under the UN Decade of Ocean Science for Sustainable Development” (6 January 2021)





OCEAN DECADE TSUNAMI PROGRAMME

Seeking Major Advances in SCIENCE and PREPAREDNESS

New observational and analysis technologies to move from a **high-uncertainty** assumption-based capability to a **low-uncertainty** dynamic-based capability

1. Real-time impact forecasts

2. Deep community preparedness

Tsunami disaster impacts are minimized, enabling rapid restoration of critical infrastructure and services

RESILIENCE!

Communities respond to tsunami threats by combining accurate

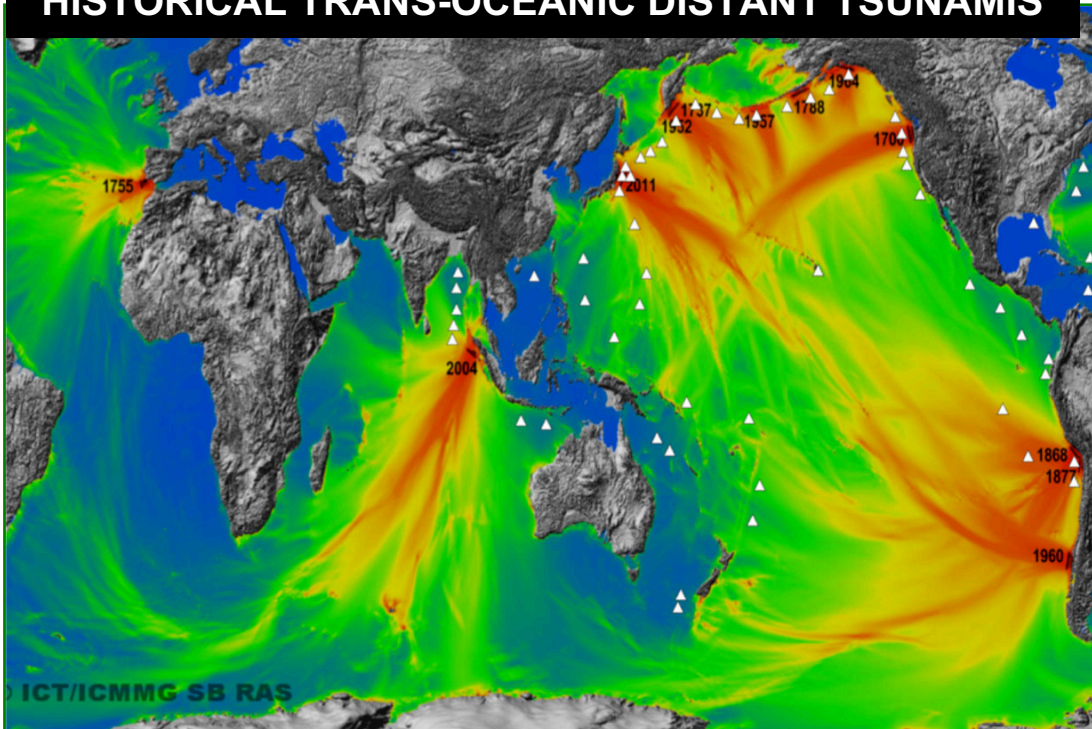
with

Comprehensive institutional & community preparedness and capacity building efforts aimed at achieving **IOC Tsunami Ready** designation across all socio-economic categories

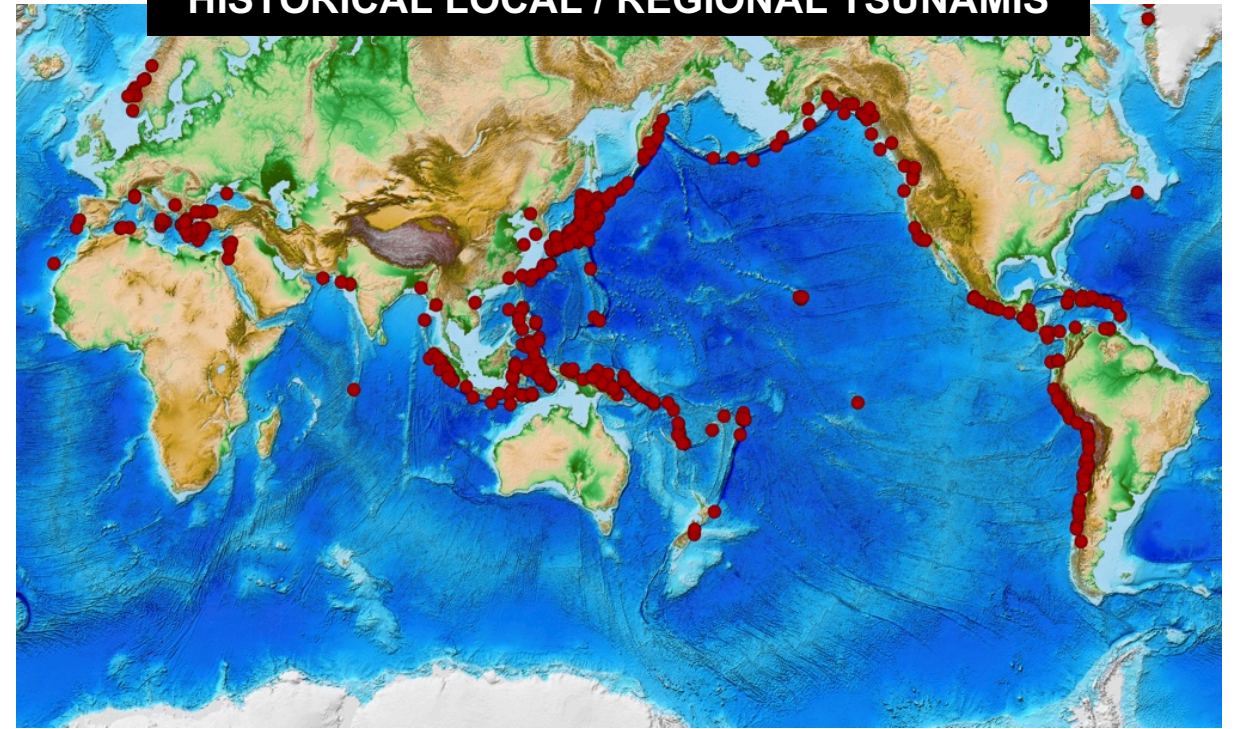


DEADLY TSUNAMIS – DISTANT to LOCAL

HISTORICAL TRANS-OCEANIC DISTANT TSUNAMIS



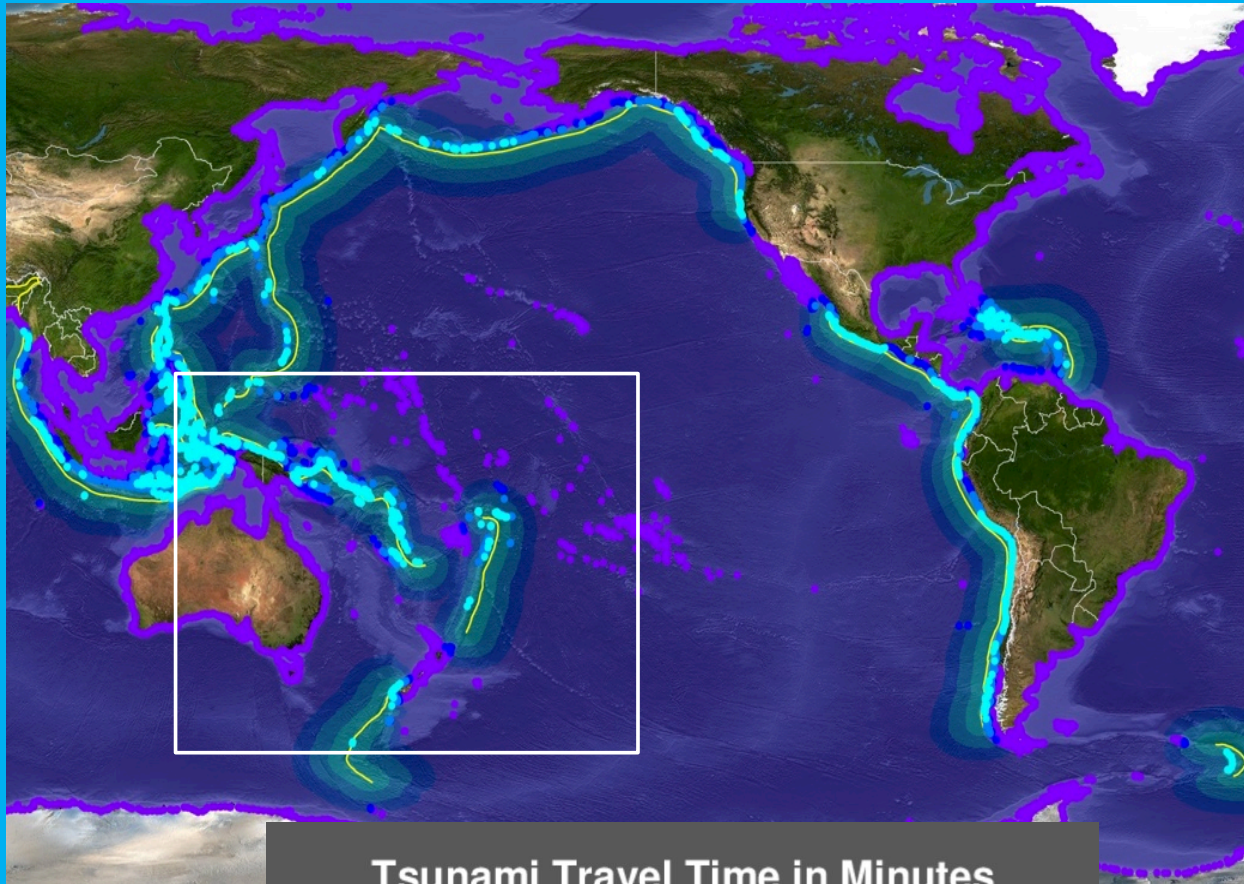
HISTORICAL LOCAL / REGIONAL TSUNAMIS



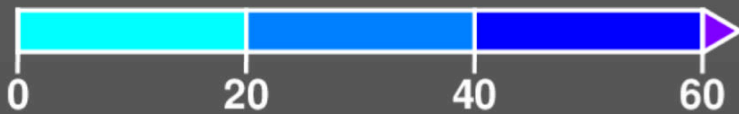
- ❑ Most tsunamis are local (< 1 hr) or regional (1-3 hrs)
- ❑ Globally, 90% of deaths from local or regional tsunamis (Pacific, 99% of deaths)

EARLY WARNING FOR LOCAL TSUNAMIS

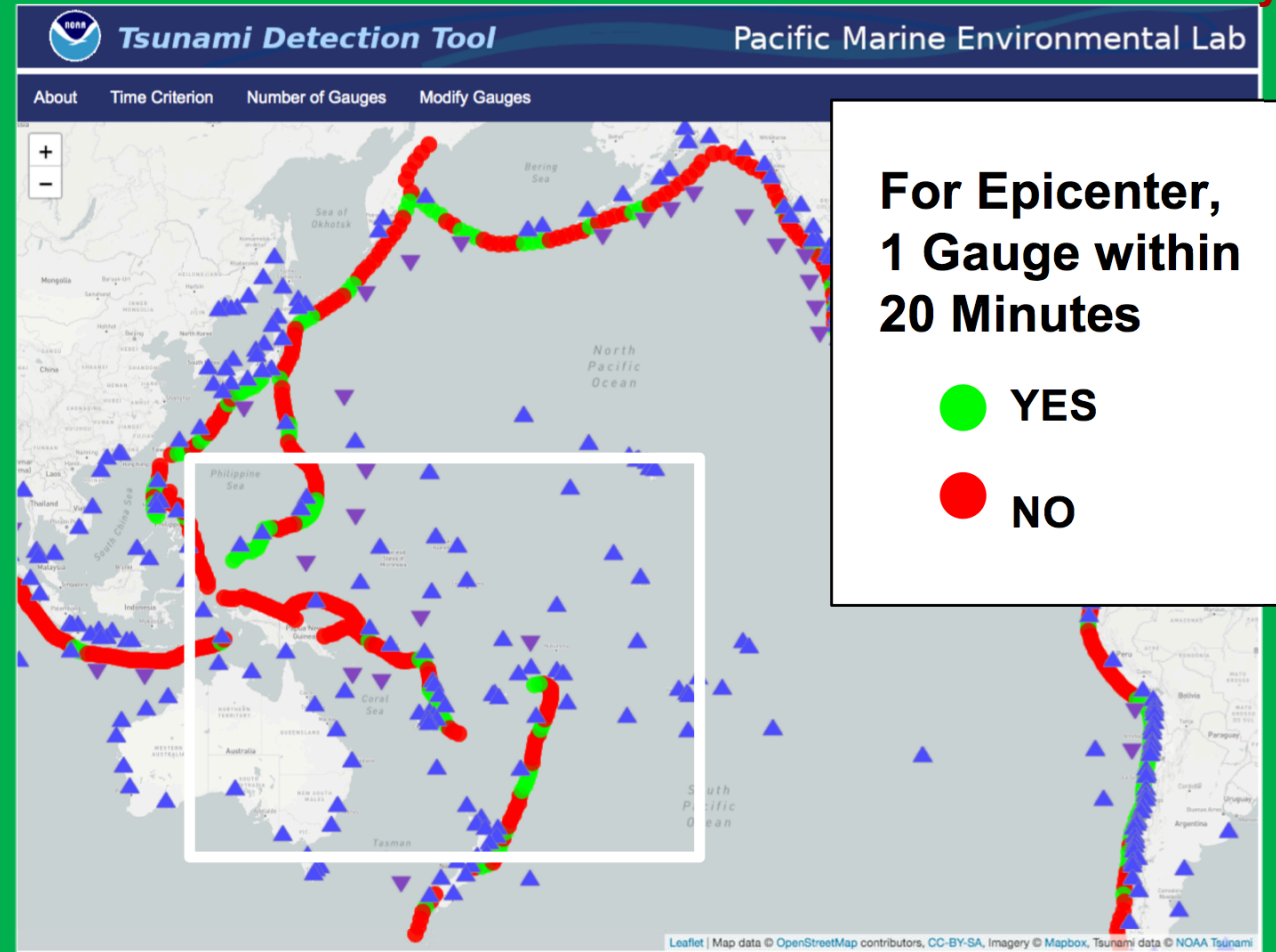
How much time until wave arrives? <20 min



Tsunami Travel Time in Minutes



Coastal / DART Detection Latency



For Epicenter,
1 Gauge within
20 Minutes

- YES
- NO

How fast you find out if wave is severe? <20 min





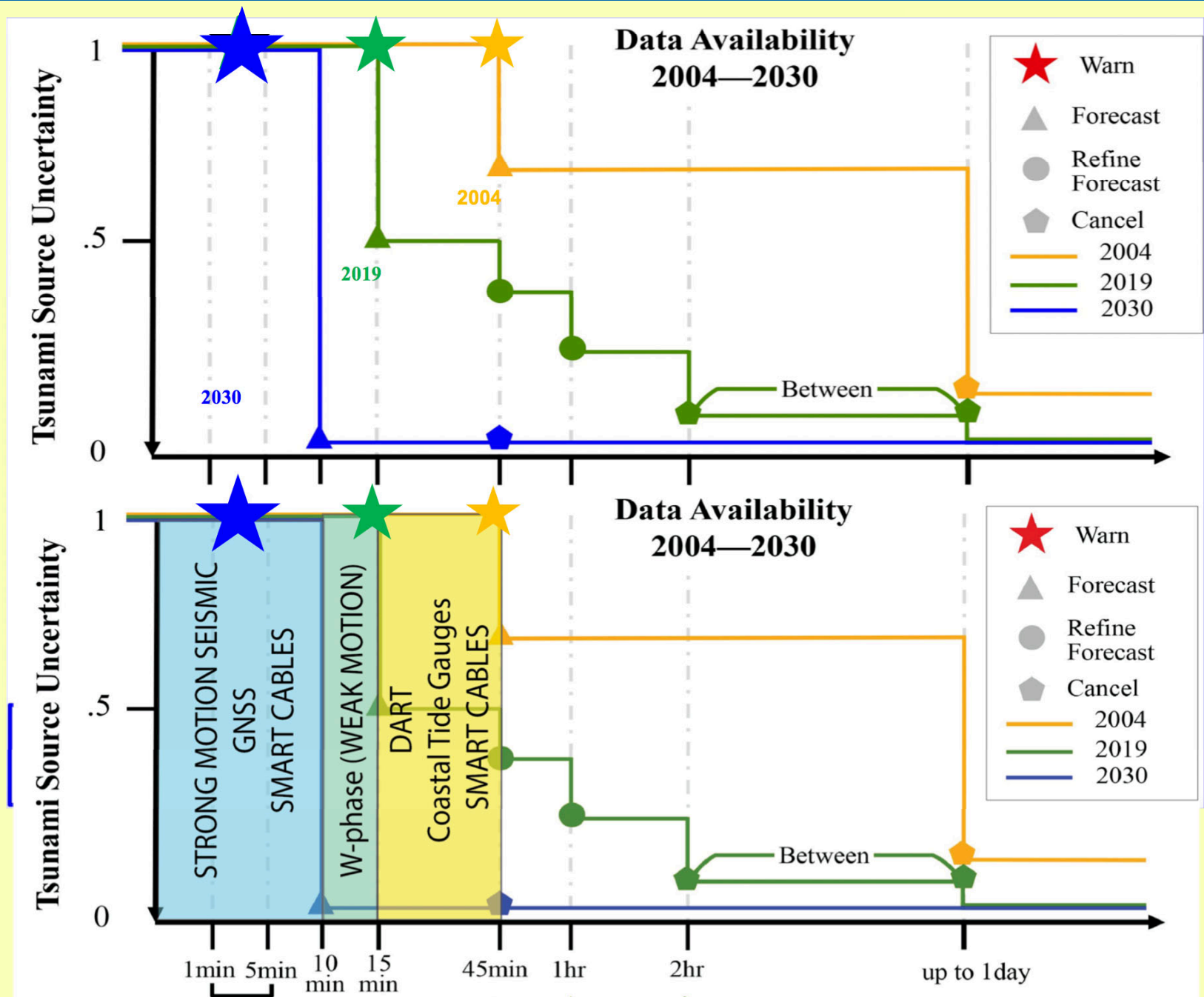
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Improving Early Warning

- More Sensors (GNSS, SMART)
- Faster Detection
- Better Techniques
- More Accurate Forecasts
- Faster Warnings

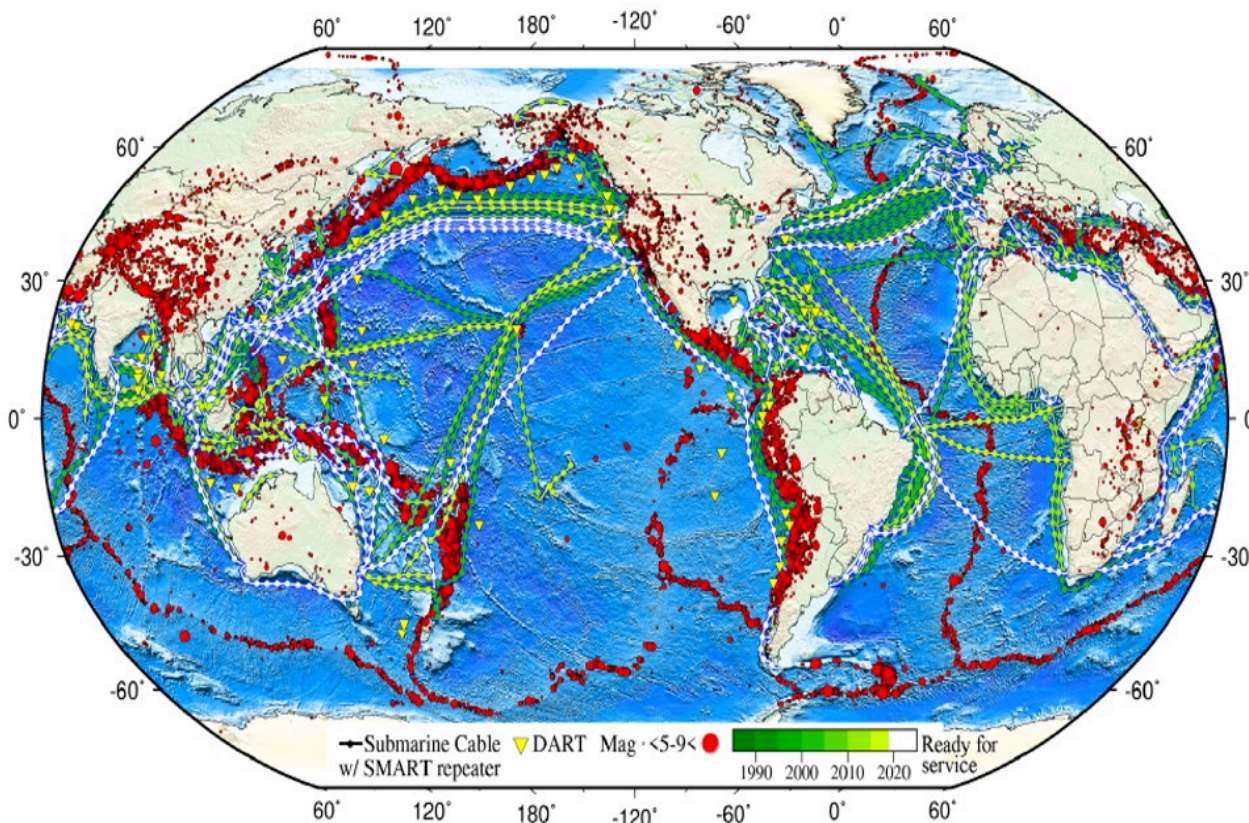


FASTER, BETTER EARTHQUAKE SOURCE CHARACTERIZATION FASTER TSUNAMI DETECTION / REAL-TIME MONITORING: UNDERSEA SMART CABLES, GNSS NETWORK

Historical seismicity (red), DART tsunami buoys (yellow triangles)

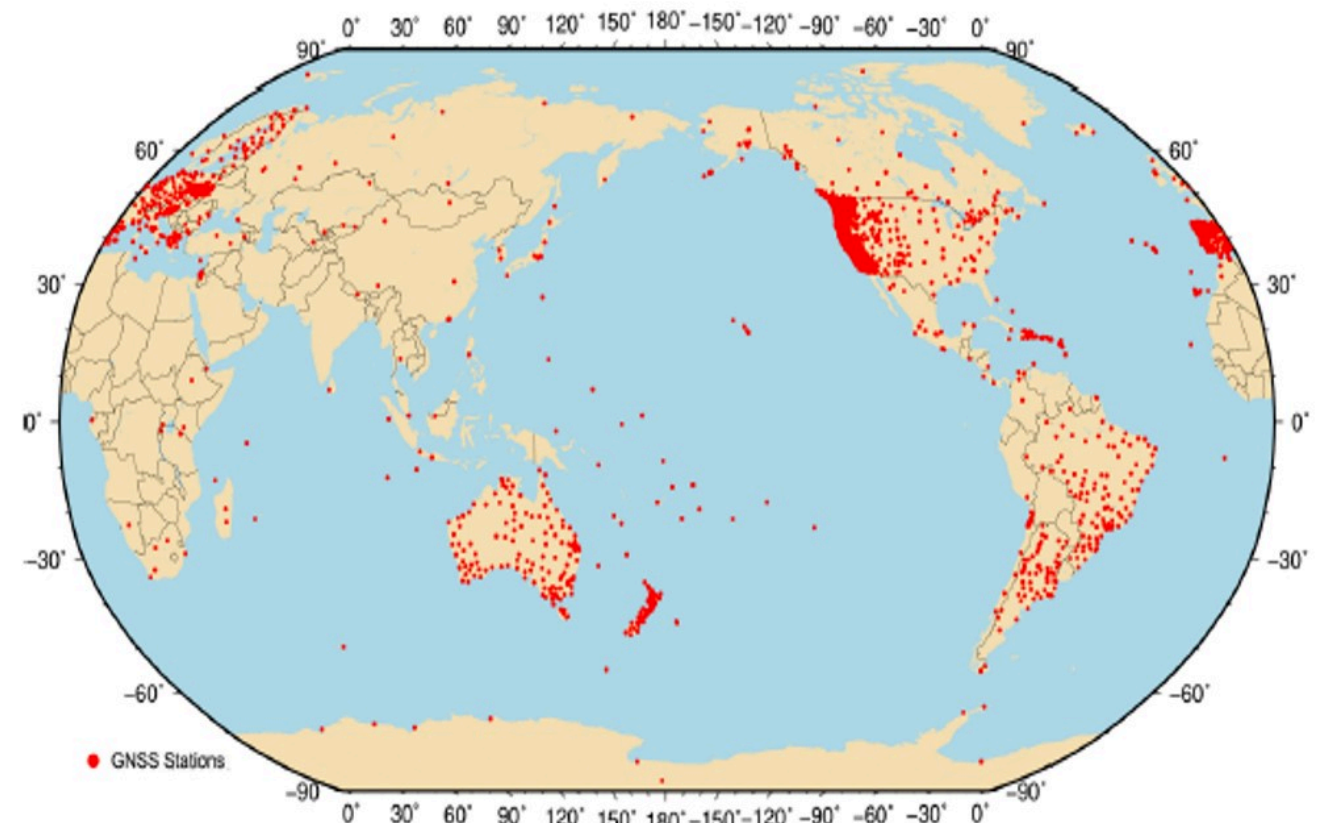
Current / planned (green/white) submarine cables

SMART repeaters shown every 300 km



Angove, M . et. al, 2019

Real-time GNSS stations (public networks, n=2,260)



Pacific Northwest Geodetic
Array/Central Washington University



IOC OCEAN DECADE TSUNAMI PROGRAMME SAFE OCEAN

THE MAIN SOCIETAL OUTCOME

TO MAKE
100%

OF COMMUNITIES AT RISK
OF TSUNAMI PREPARED FOR
AND RESILIENT TO TSUNAMIS

BY
2030

- *Tsunami Coalition: collaborative with critical UN stakeholders, civil protection, others ==> Raise profile. Facilitate resourcing*
- *Capacity Development: augmented through IOC Ocean Teacher Global Academy (OTGA) ==> Global reach, deep curricula*

IOC OCEAN DECADE TSUNAMI PROGRAMME: 100% AT-RISK COMMUNITIES TSUNAMI READY



UNESCO IOC TSUNAMI READY INDICATORS

I ASSESSMENT (ASSESS)	
1	ASSESS-1. Tsunami hazard zones are mapped and designated
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified
II PREPAREDNESS (PREP)	
4	PREP-1. Easily understood tsunami evacuation maps are approved
5	PREP-2. Tsunami information is publicly displayed
6	PREP-3. Outreach and public awareness and education resources are available and distributed
7	PREP-4. Outreach or educational activities <u>are held at least three times a year</u>
8	PREP-5. A community tsunami exercise is conducted at least every two years
III RESPONSE (RESP)	
9	RESP-1. A community tsunami emergency response plan (ERP) is approved
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place

- ❑ **STRATEGY:**
Be Aware, Be Prepared
- ❑ **FRAMEWORK:**
 - Harmonized global guidelines UNESCO IOC Tsunami Ready
 - Performance-based Community Recognition
- ❑ **ACTION:**
National programs empower Communities
- ❑ **GLOBAL MEASURE**



Standard Guidelines for the Tsunami Ready Recognition Program, UNESCO IOC TS 74



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