



IMPLEMENTING TSUNAMI READY IN PACIFIC ISLAND COUNTRIES  
FIJI, FEDERATED STATES OF MICRONESIA, PALAU, REPUBLIC OF MARSHALL ISLANDS

# RMI Tsunami Ready – Majuro

WEATHER SERVICE OFFICE (WSO) – MAJURO

NATIONAL DISASTER MANAGEMENT OFFICE (NDMO)

NOAA INTERNATIONAL TSUNAMI INFORMATION CENTER (ITIC)

NOAA CENTER FOR TSUNAMI RESEARCH / PACIFIC MARINE ENVIRONMENTAL LABORATORY (PMEL)



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2021 United Nations Decade  
2030 of Ocean Science  
for Sustainable Development

## UNESCO IOC Ocean Decade Tsunami Programme

# 100% of tsunami at-risk communities Tsunami Ready by 2030



**Tsunamis are the most deadly of all sudden onset natural hazards**

Next slide to  
play video

World Tsunami Awareness Day - 2021

# UNESCO/IOC TSUNAMI READY RECOGNITION PROGRAMME (TRRP)

50  
TSUNAMI READY  
COMMUNITIES

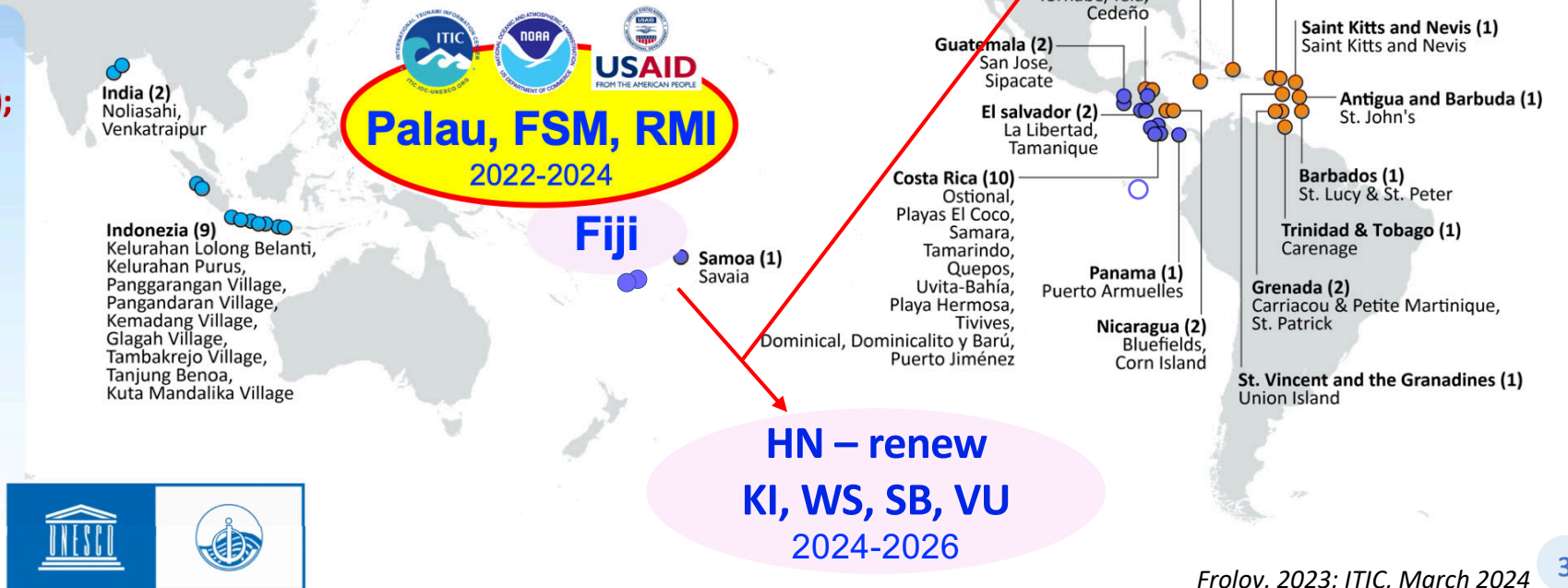
- 11 – IOTWMS
- 19 – PTWS
- 18 – CARIBE-EWS
- 2 – NEAMTWS

NEAMTWS  
○ in progress

Spain ○  
France ●  
Italy ●  
Greece ●  
Türkiye ●  
Israel ○

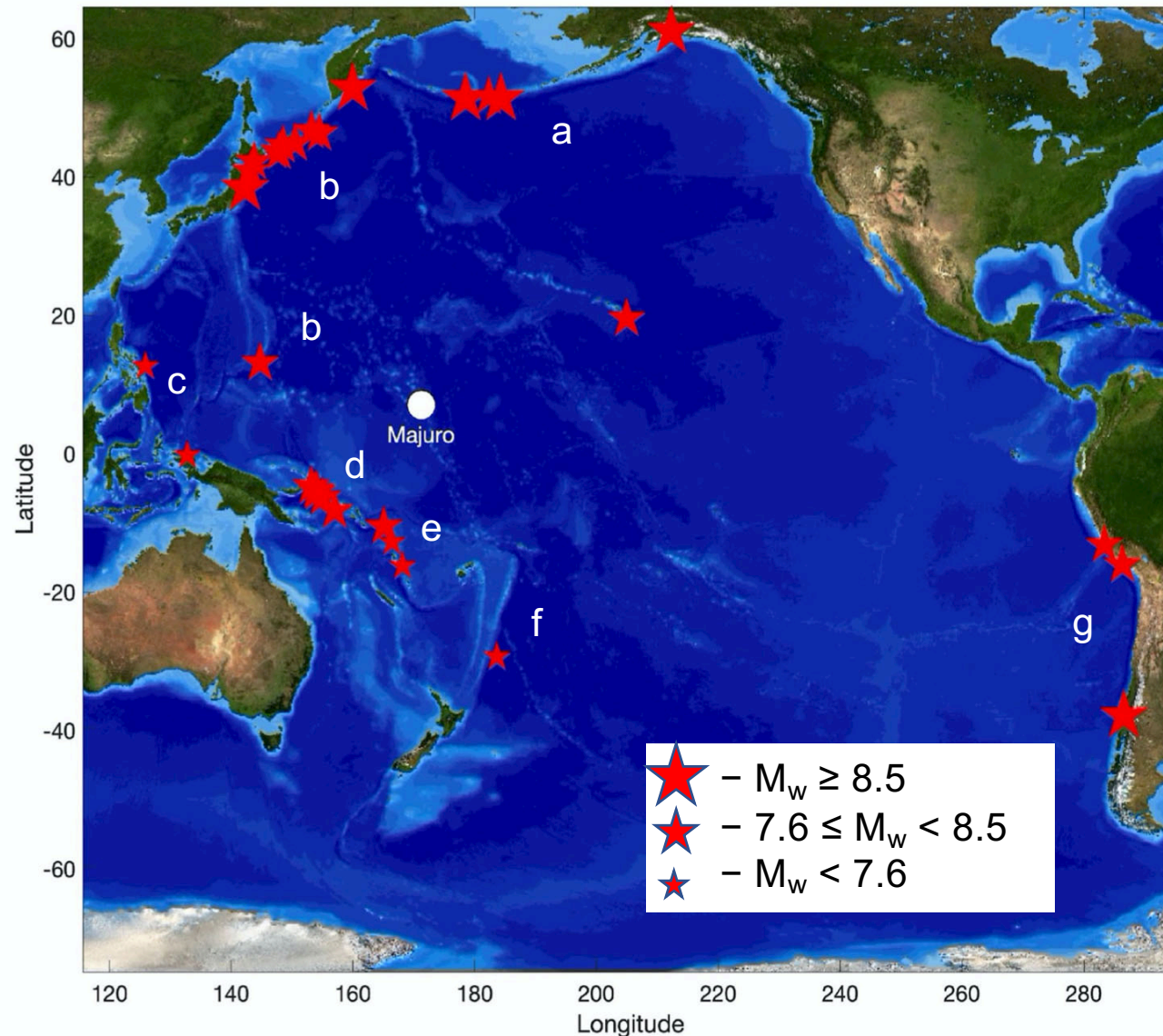
## MAJOR ACTIVITIES IN 2021-2024

- **Planned Next TR Pacific: Ecuador Galapagos (Apr); FSM (4, Apr-July); RMI (1), Palau (1), Honduras**
- **Development of a global Tsunami Ready Interactive Map Viewer**
- **Hosting by ITIC of the Tsunami Ready web site**
- **Development of a new Tsunami Ready Board Game**
- **Publication of the IOC Manuals and Guides 74 «Standard Guidelines for Tsunami Ready Recognition Programme»**



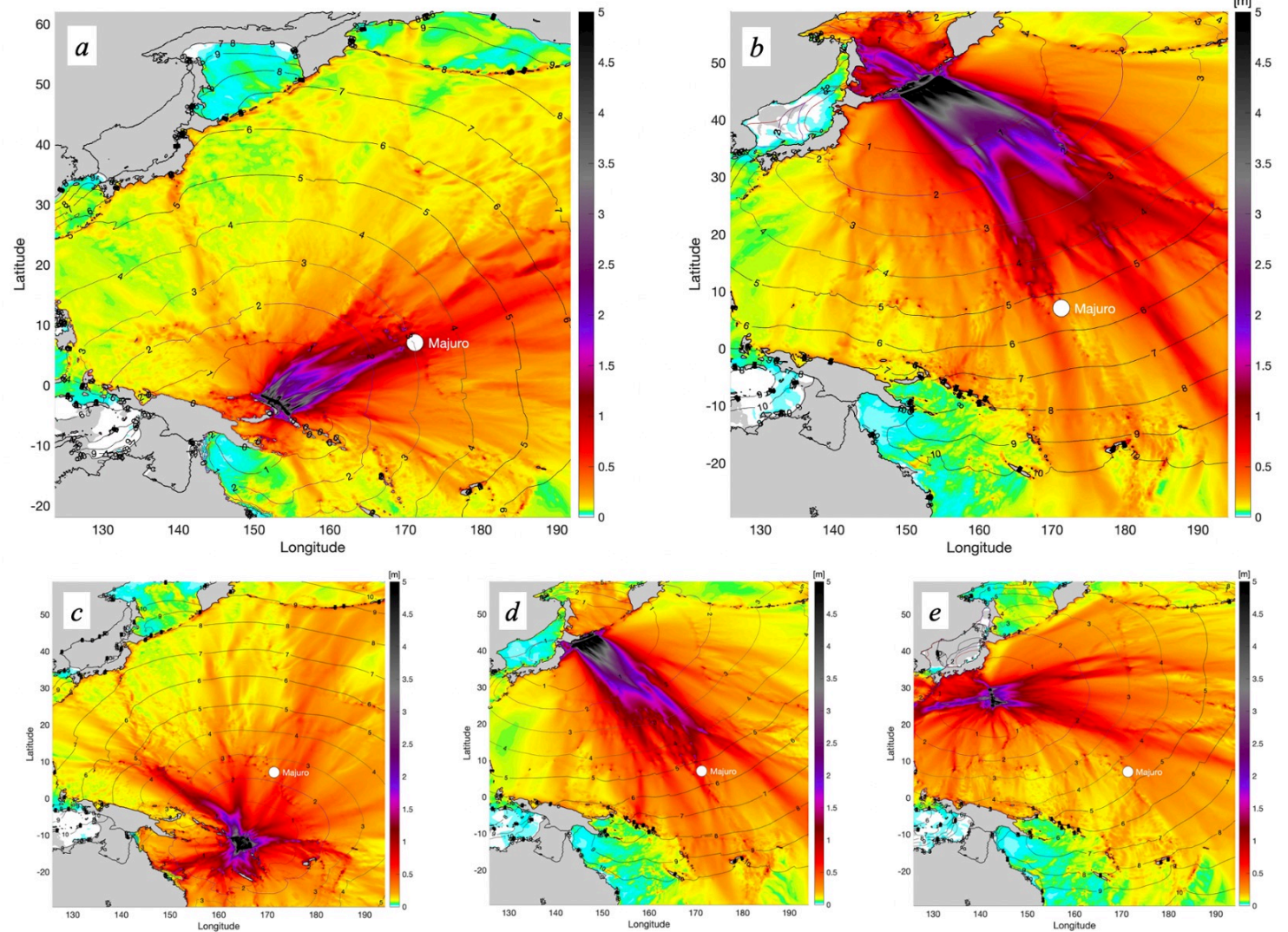
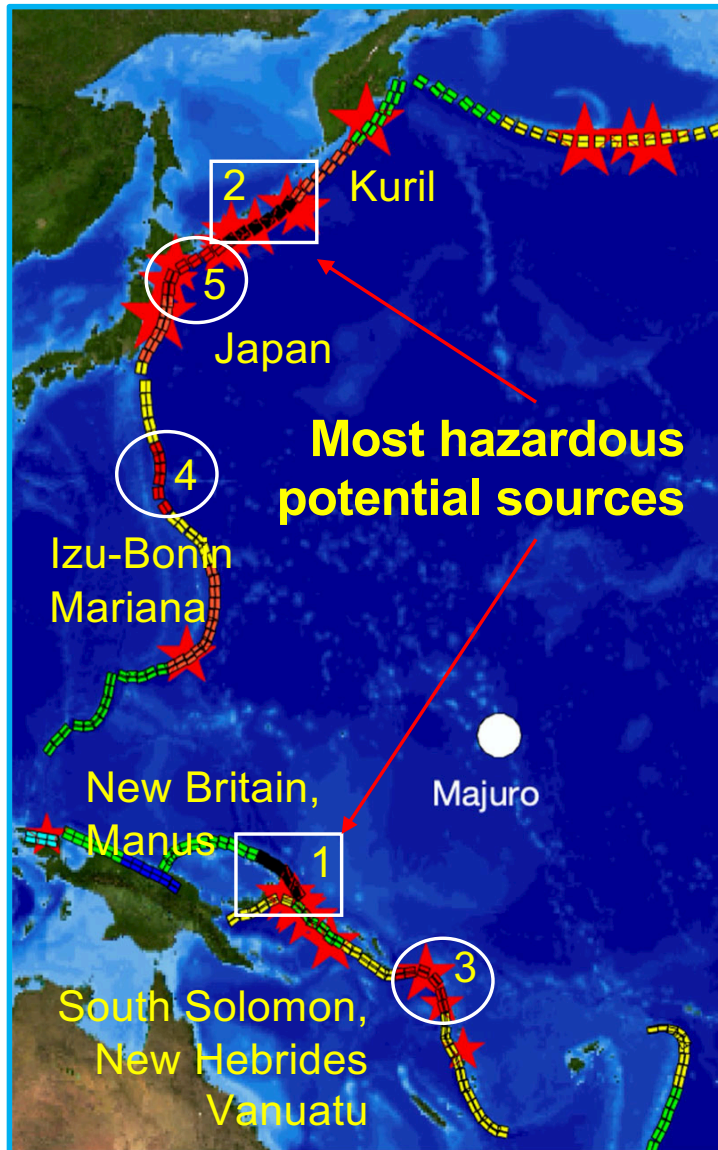
# HAZARD ASSESSMENT – ID Historic Earthquakes that Generated Tsunamis

- 32 earthquake generated events
- Tsunami originated from **subduction zones**: (a) Aleutian, (b) Kamchatka-Kuril-Japan-Mariana, (c) Philippines, (d) New Britain-Manus, (e) South Solomon-Vanuatu, (f) Kermadec-Tonga, (g) Peru-Chile



- **Largest measured runups –**
  - 66 cm/2.1 ft (Kwajalein), 51 cm (Majuro) 03/11/2011 Tohoku
  - 38 cm (Kwajalein) - 05/22/1960 Chile
  - 30 cm (Kwajalein, Enewetak - 03/09/1957 Andreanof Islands
- **Majuro atoll:** Three measured runups:
  - 03/11/2011 Tohoku (51 cm/1.7 ft)
  - 10/07/2009 Vanuatu (2 cm/0.8 in)
  - 11/15/2006 S. Kuril Islands (8 cm / 3 in)

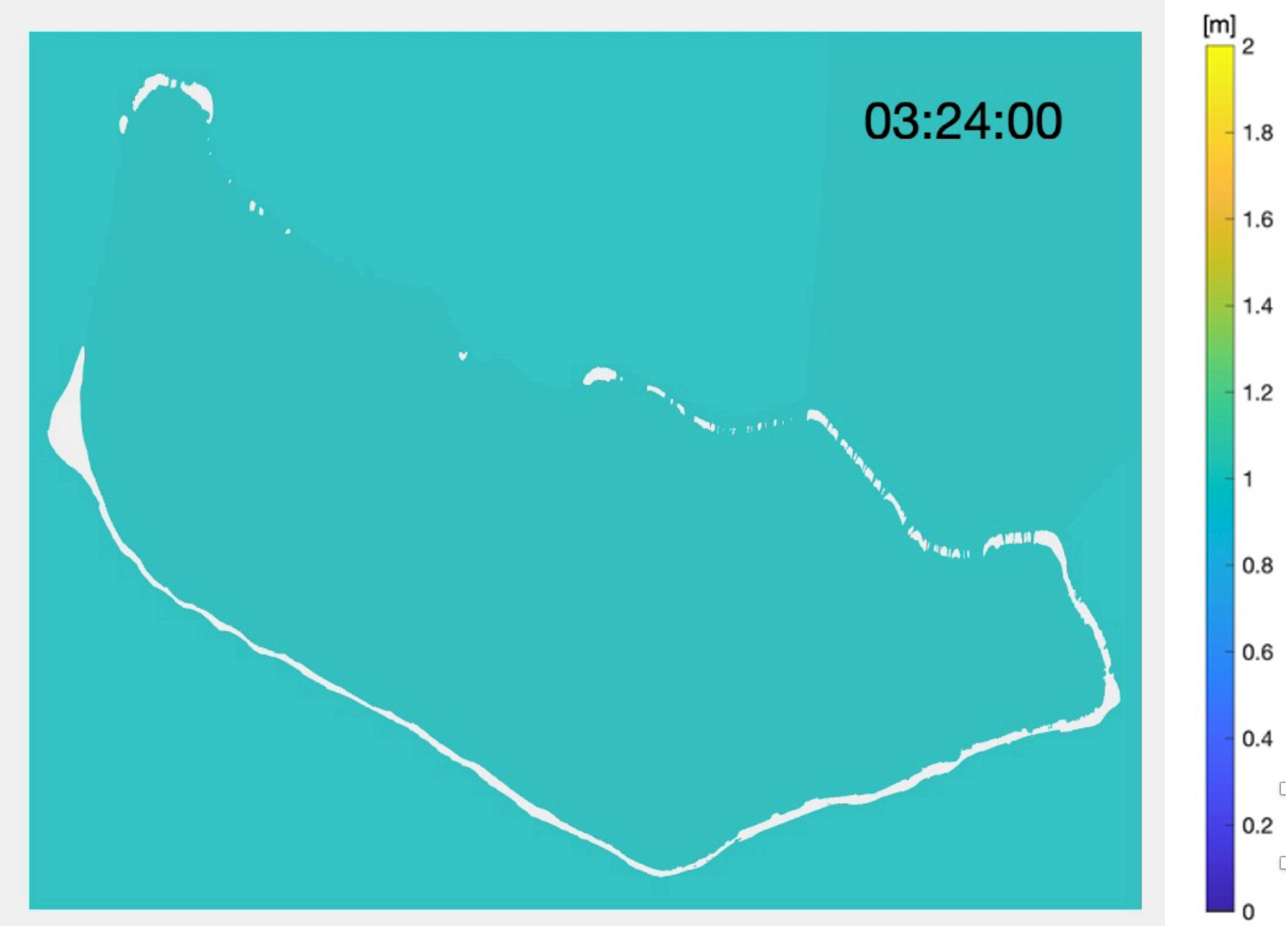
# Maximum Offshore Tsunami Amplitudes from Most Potentially Hazardous Sources (Magnitude 9.1)



*Figure 2: Source location, arrival times, and maximum wave amplitudes in deep ocean for the most hazardous sources: a) New Britain, b) Kuril, c) New Hebrides, d) Kuril-Japan, e) Izu-Bonin.*

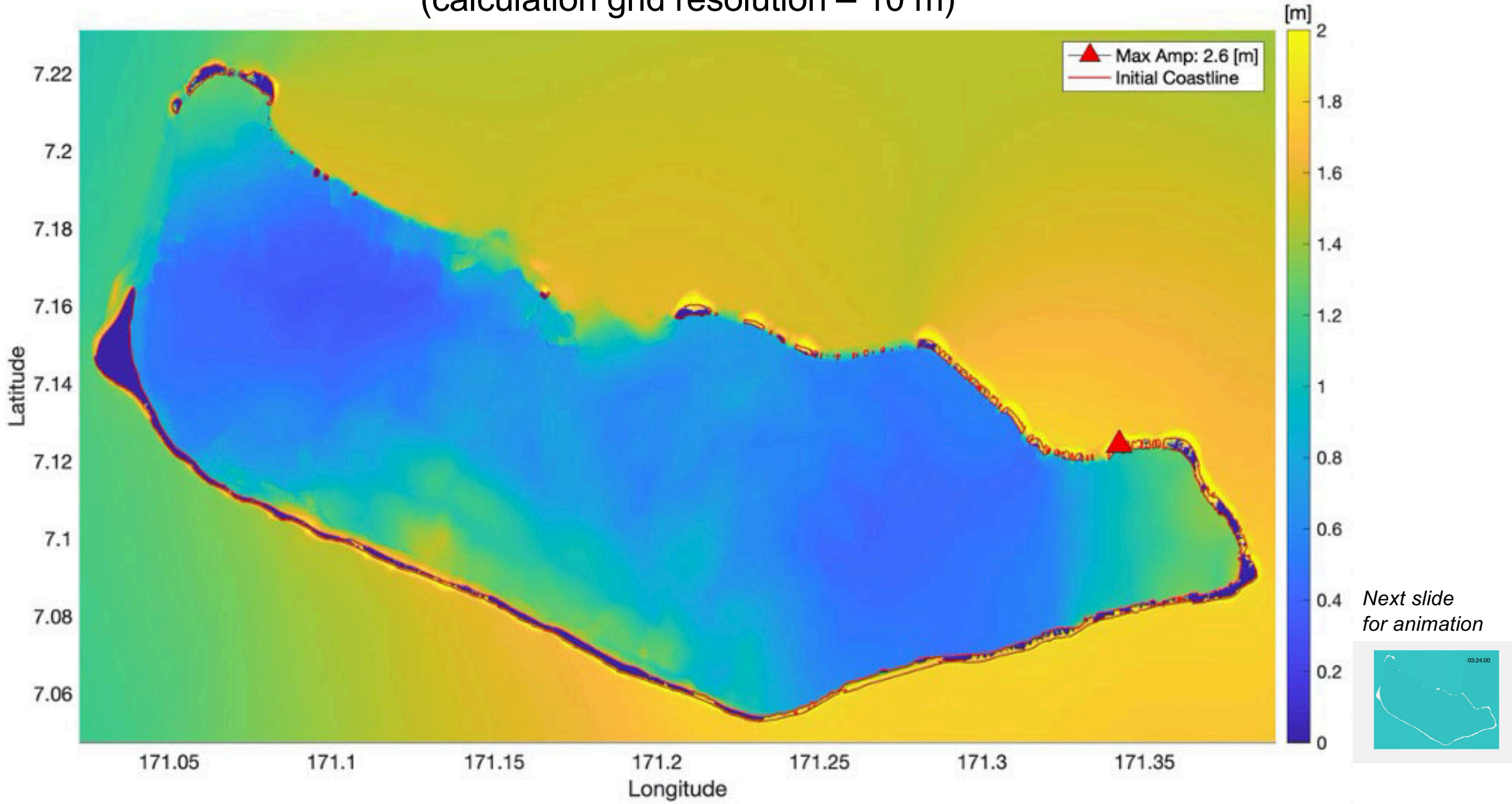
# Maximum of maximums tsunami amplitude

(calculation grid resolution – 10 m)



# Maximum of maximums tsunami amplitude

(calculation grid resolution – 10 m)



# Tsunami Inundation Modeling Study - Conclusions

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- ❑ **Arrival time:** 3:35 - 3:39 hours
- ❑ **Maximum tsunami amplitudes (heights):** 1.5 – 2.5 m (5.2 – 8.3 ft)
- ❑ **Wave Inundation**
  - **Almost fully inundate low-lying:**
    - ❑ South-eastern (Rairik with Amata Kabua International Airport)
    - ❑ North-eastern (islands between Djarrit and Calalin)
  - **Also significantly inundated:**
    - ❑ DUD areas between Djarrit-Uliga and Uliga-Delap
- ❑ **Water currents**
  - Large consistent exceeding 9 knots in Calalin Pass (main reef pass into lagoon) from most hazardous tsunami source (New Britain)
  - 3-knot attenuation time more than two hours.

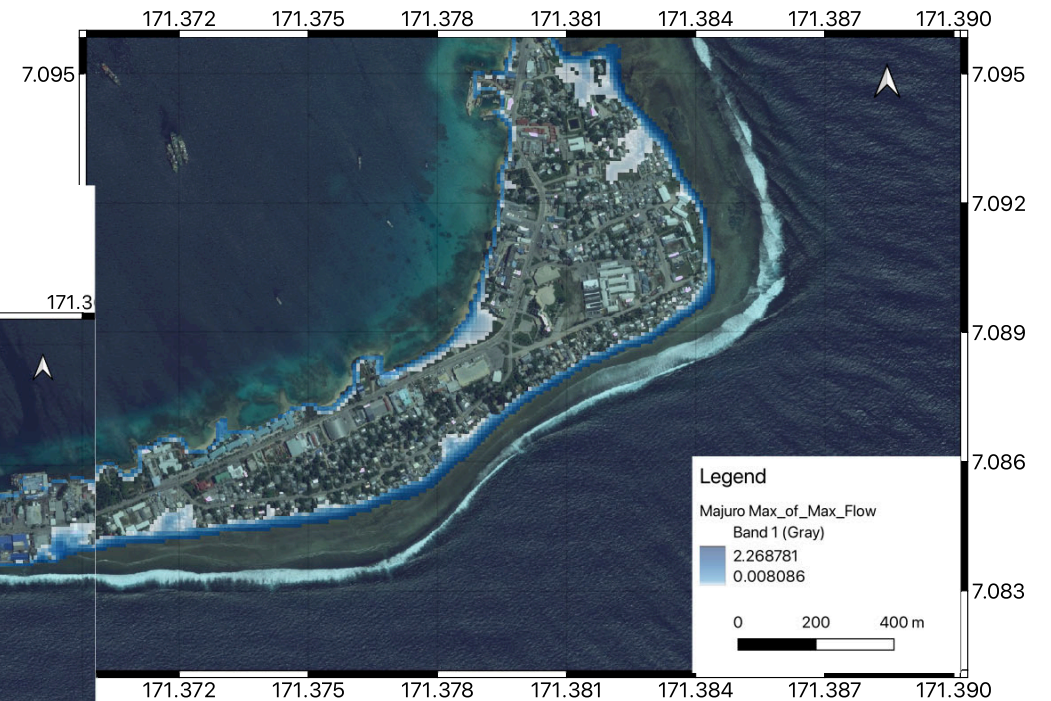




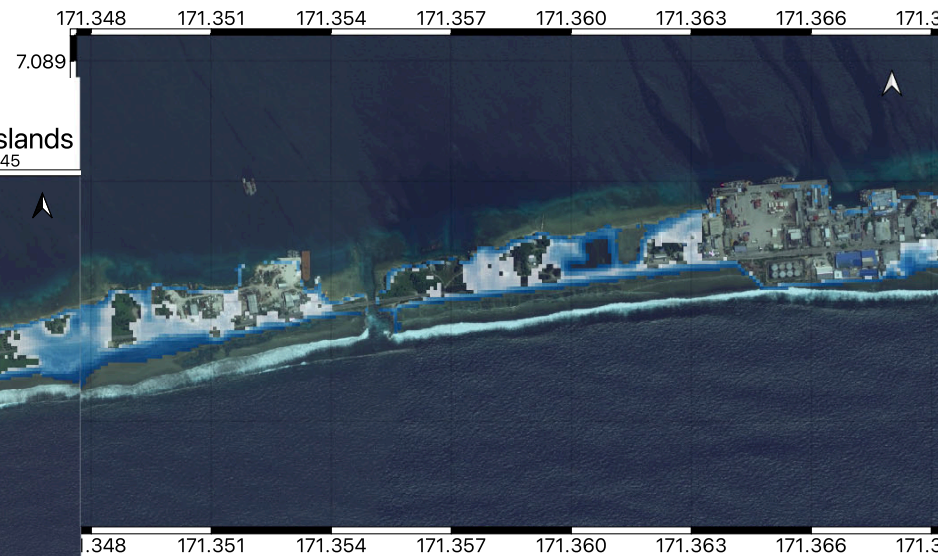
# Hazard Assessment – Inundation Modeling

Sources along New Britain-Manus, South Solomon-New Hebrides, and Kuril-Japan-Izu subduction zones identified from modeling as posing greatest risk to Majuro.

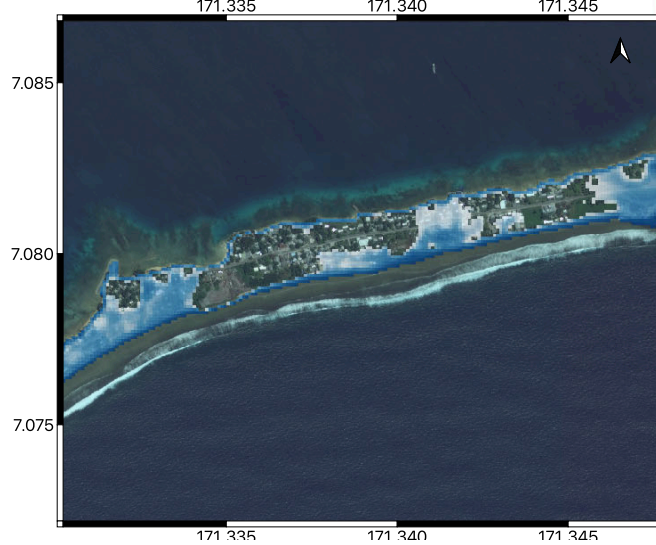
Tsunami Evacuation Map  
DELAP, Majuro Atoll, Republic of Marshall Islands



Tsunami Evacuation Map  
Port Authority, Majuro Atoll, Republic of Marshall Islands

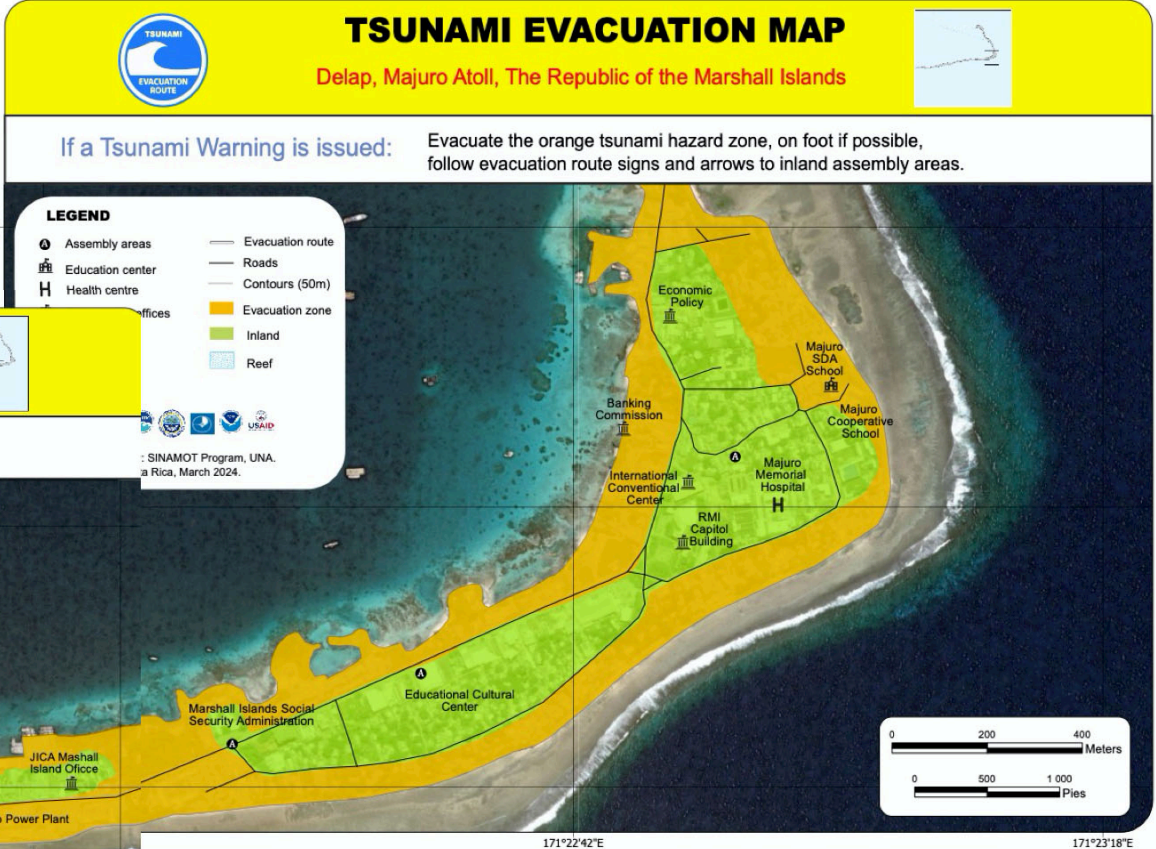
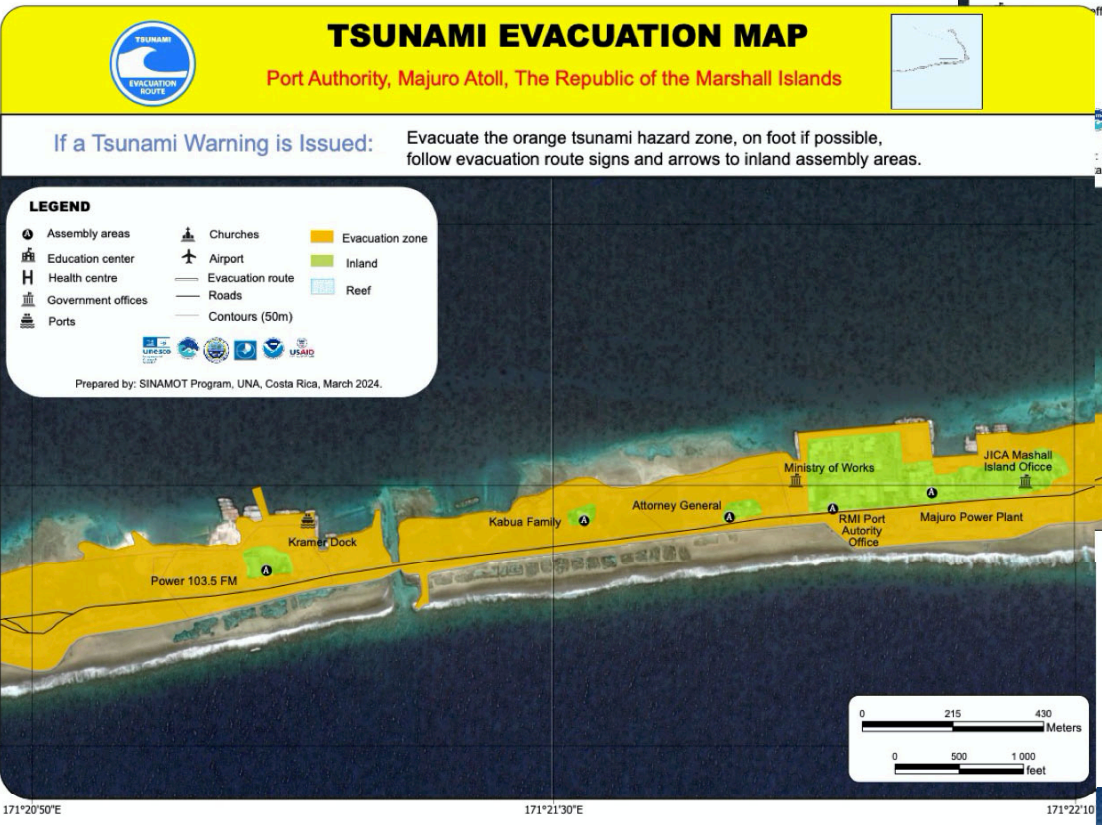


Tsunami Evacuation Map  
Jable, Majuro Atoll, Republic of Marshall Islands



# Preparedness - Evacuation Maps

Two (2) of 13  
Tsunami Evacuation Maps  
developed for Majuro Atoll.



# Preparedness – Outreach and Exercises



**28-30 April 2024**  
**Tsunami Tabletop Exercise conducted at Majuro Disaster Coordination Office.**  
Two earthquake scenarios were considered



Participants:  
Weather Service Office, International Organization for Migration, Disaster Coordination Office, Departments of Education, Health, Public Works, Red Cross

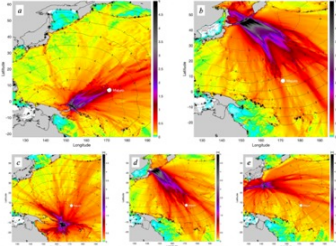


# Tsunami Ready Summary - Majuro

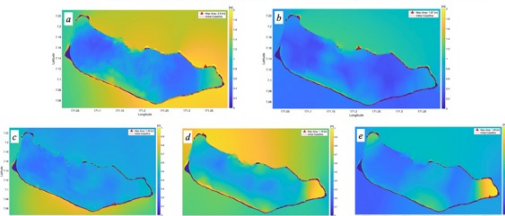


➤ **TR Recognition planned – August 2024**

Maximum Tsunami Amplitudes from Most Potentially Hazardous Sources



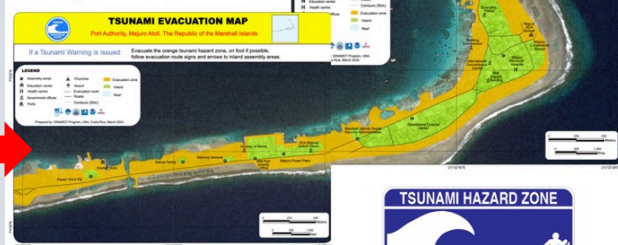
Maximum Tsunami Amplitudes with inundated area from most dangerous sources



**Hazard Assessment:**  
Tsunami Sources and Inundation

## Preparedness: Hazard Map Evacuation

Two (2) of 13 Tsunami Evacuation Maps developed for Majuro Atoll.



**Be Aware Be Prepared**

**Be Tsunami Ready**

**Awareness, Outreach Warning, Response**

NATIONAL EMERGENCY RESPONSE PLAN  
Republic of the Marshall Islands

DRAFT August 2023

**Alerts & Warnings**

- Outdoor Sirens
- Social Media
- Telephone Notifications
- Radio
- Wireless Emergency Alerts and Text Messages
- Television



**Majuro Atoll**  
Republic of Marshall Islands  
is Tsunami Ready

2024 - 2028

**IN CASE OF OFFICIAL TSUNAMI MESSAGE, GO TO HIGH GROUND OR INLAND**

The recognition does not imply approval or promise that a community can or will perform at a certain level in case of tsunami. Tsunami Ready recognition does not mean that a community is tsunami proof. UNESCO-IOC recognizes that the community has built their capacity and implemented measures in accordance to the agreed indicators of UNESCO-IOC Tsunami Ready Programme, and that they will continue to maintain and ensure the sustainability of this preparedness level.





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