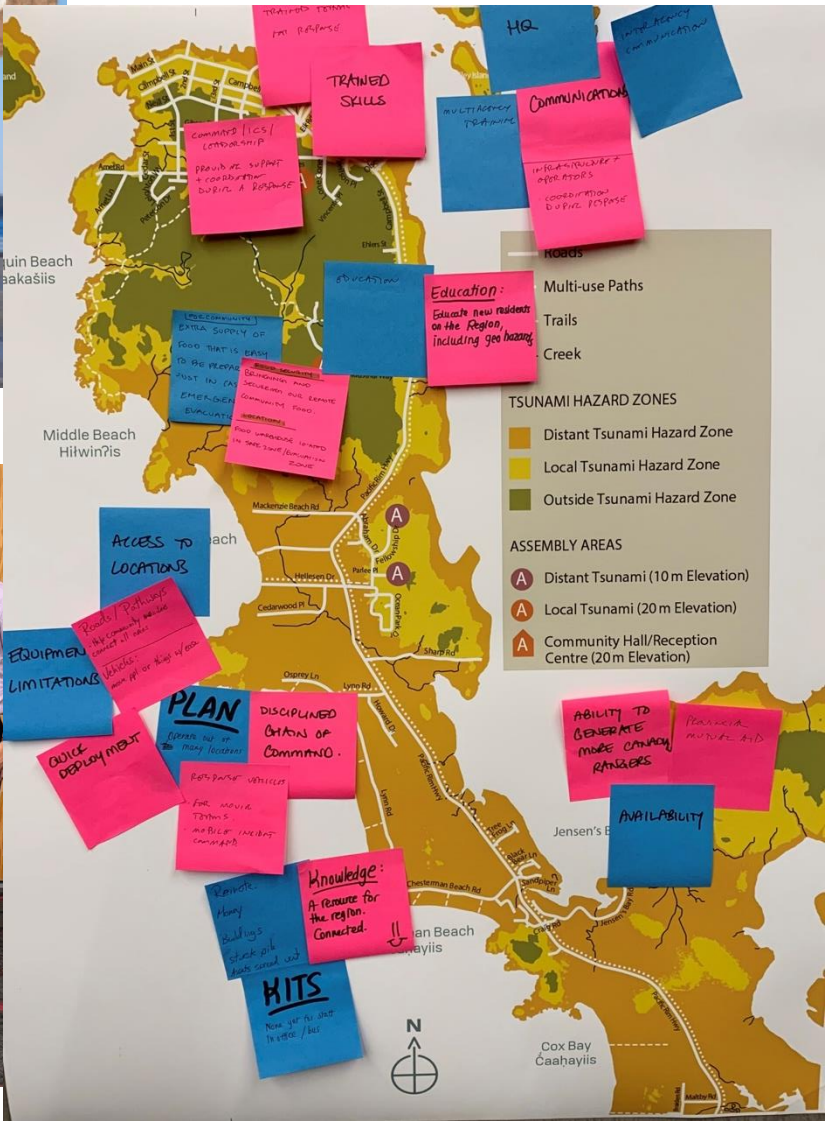




Tofino Human Mobility Data Collection Study



Background

– Early Warning, Evacuation & Response –

- When the **Cascadia subduction earthquake** occurs, ground shaking will affect Tofino (people and infrastructure) in the first 5 minutes.
- This may cause various secondary hazards, such as liquefaction, landslides, and fires. Various infrastructures (**roads** and **powers**) may be destroyed.
- **Massive tsunamis (5-15 m)** will arrive in **20 to 40 minutes**.
- **Early warning system** is the first line of defense against earthquake-tsunami disasters.
- People must start their **evacuation to reach high grounds**. The beach areas may be completely inundated.
- **Disaster response and recovery** must start immediately after the evacuation phase is passed.



仙台東IC

荒浜

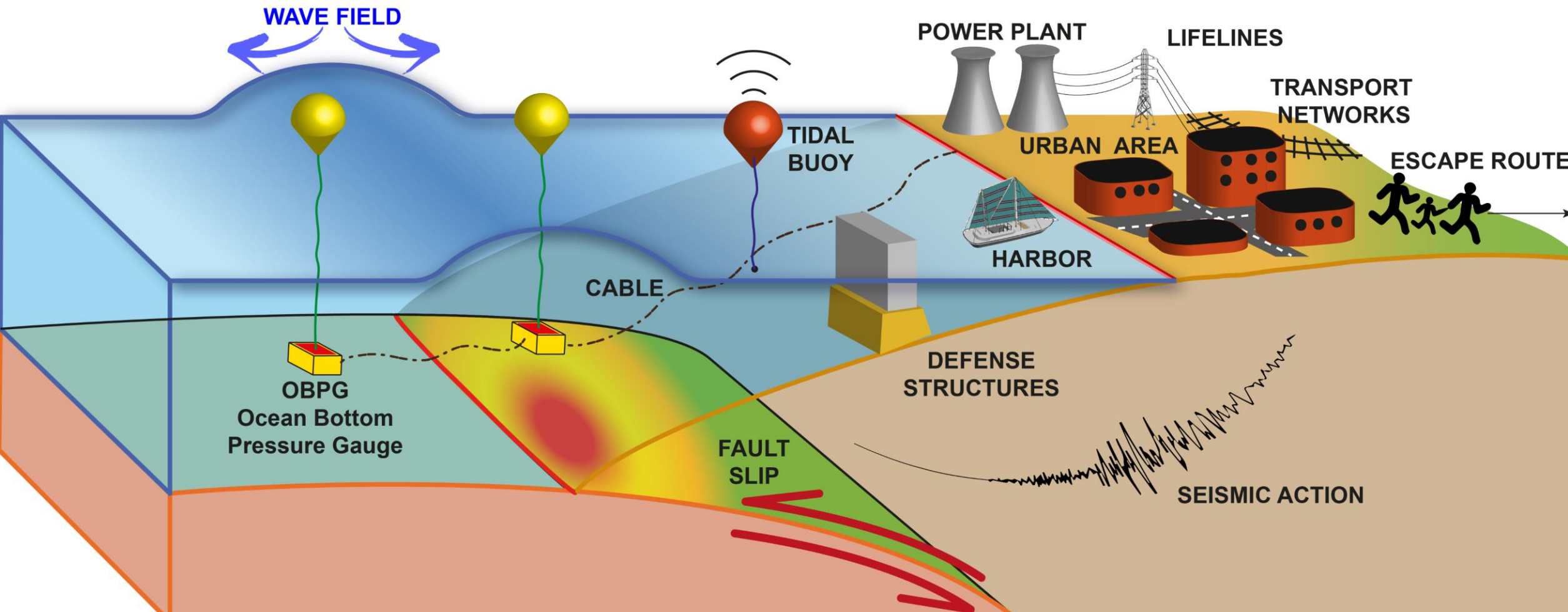
仙台若林JCT

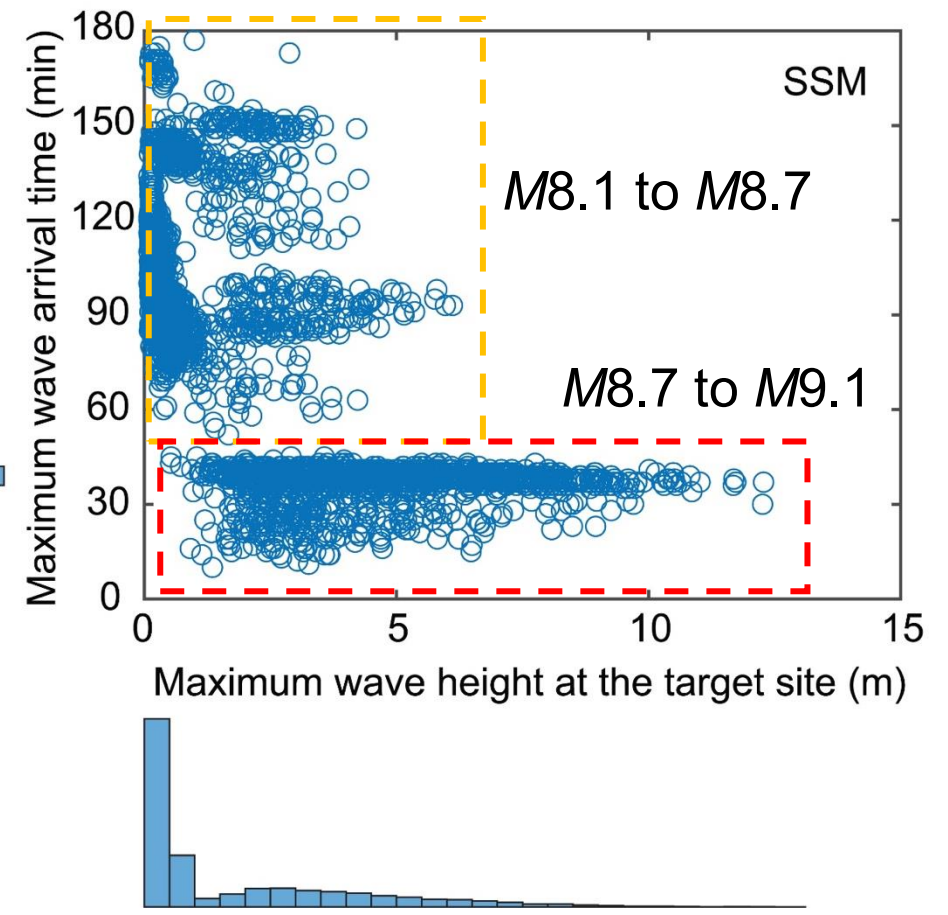
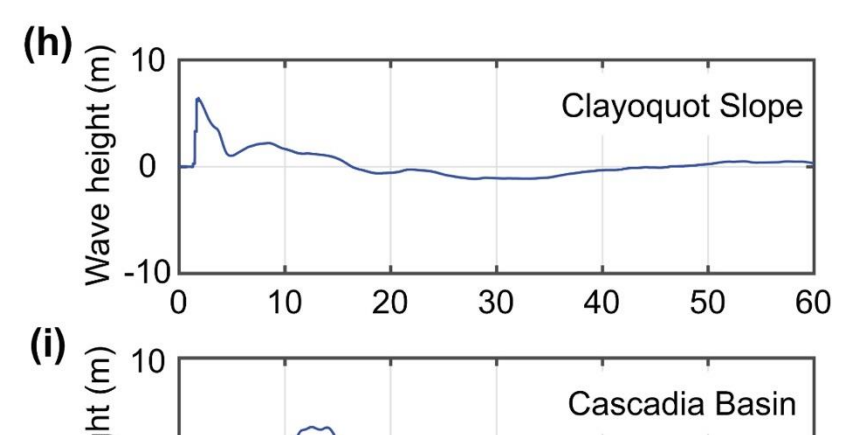
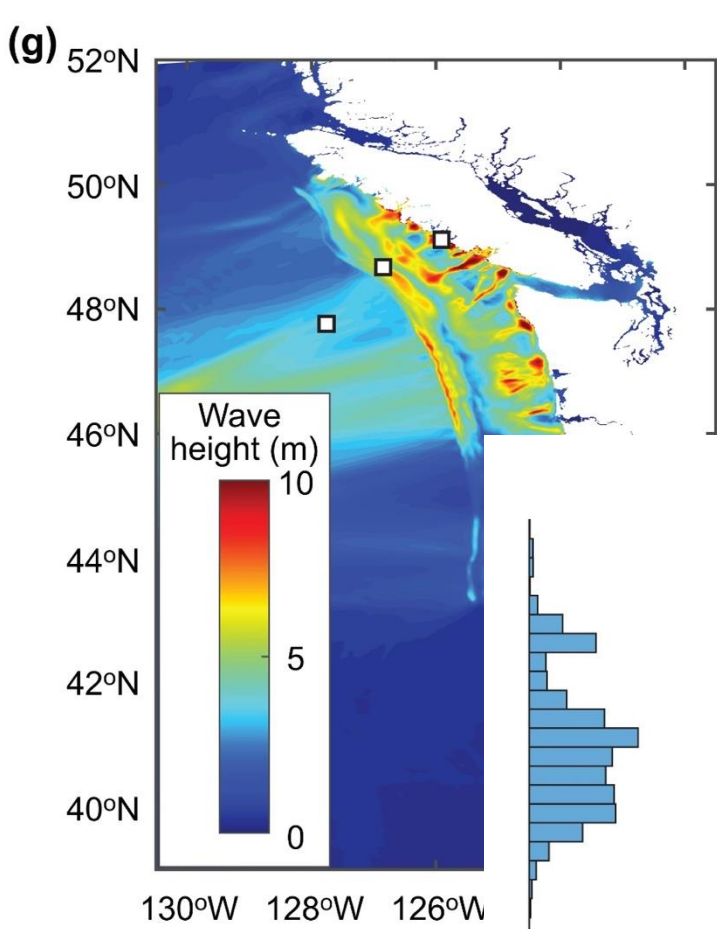
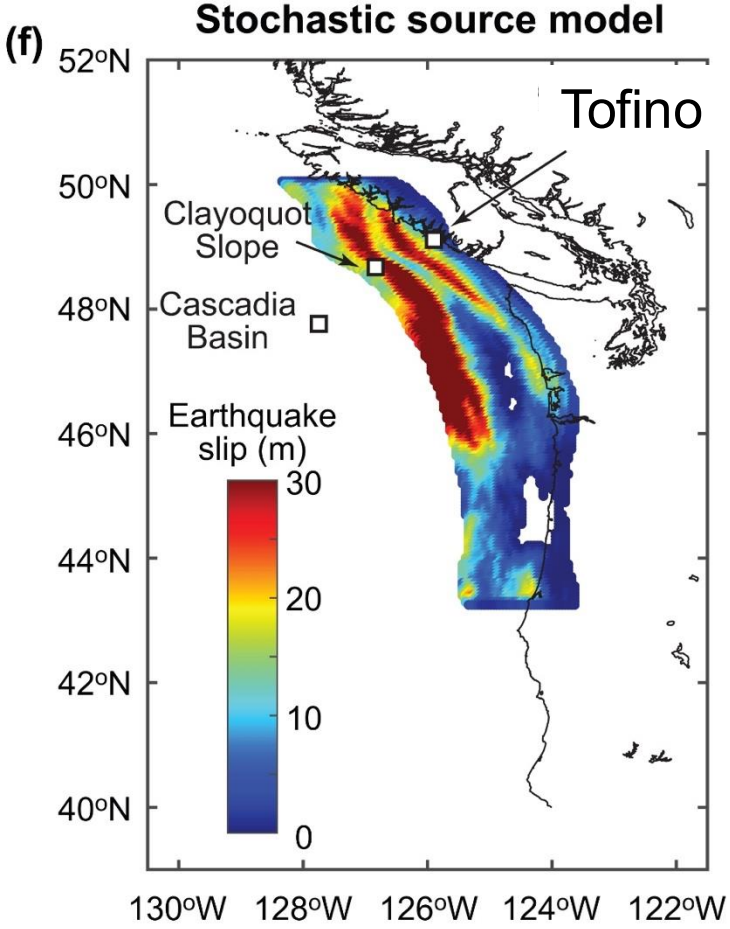
仙台東部道路

霞目飛行場



Iwanuma

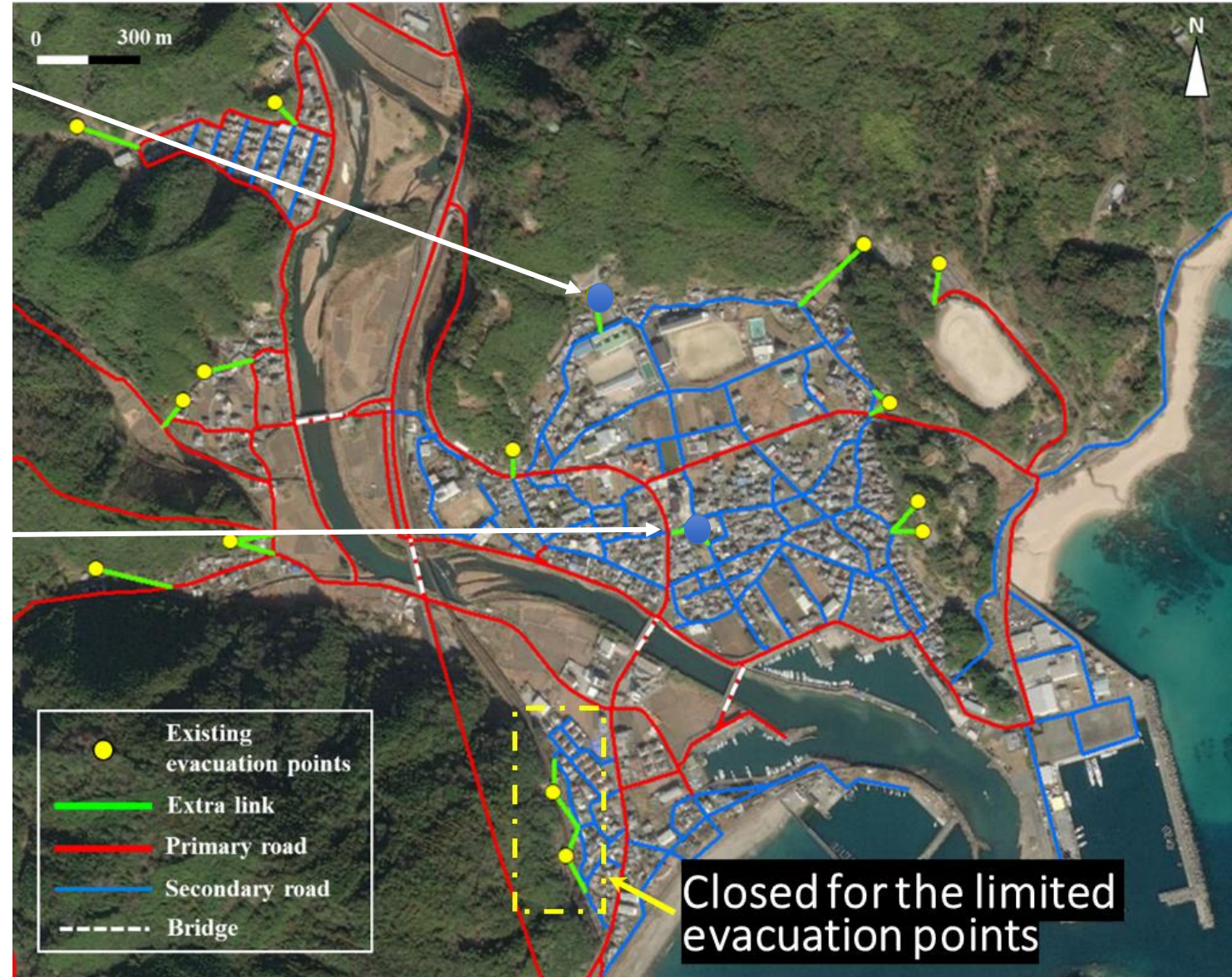




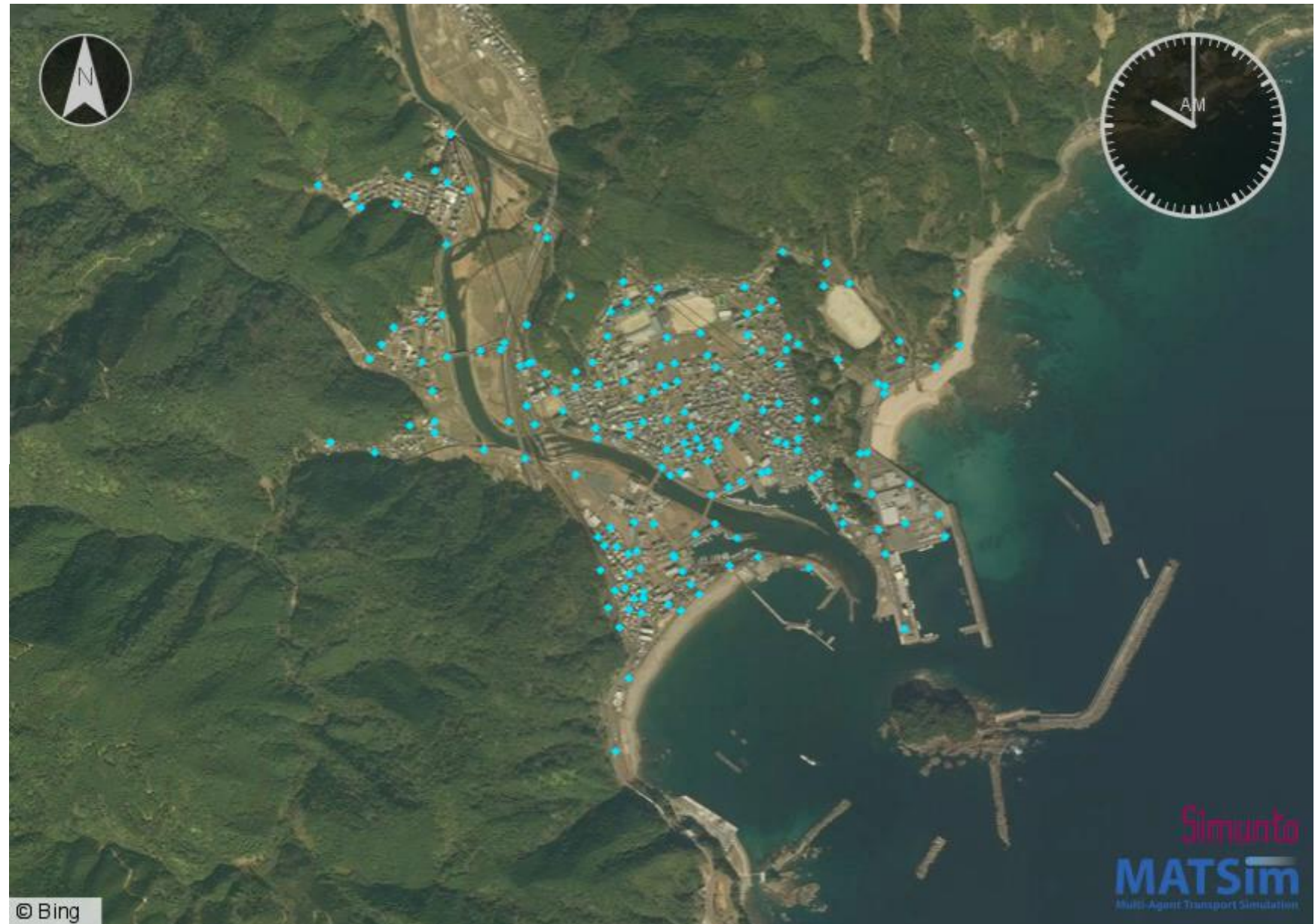
Tsunami Arrival & Warning

- The Cascadia tsunami can cause catastrophic destruction to beach areas in Tofino. A **major ground subsidence** may occur.

Saga district, Kochi, Japan, under the Nankai-Tonankai Earthquake & Tsunami



- Tsunami evacuation model can identify **bottlenecks in a community**.
- The **effectiveness of vertical evacuation towers** can be evaluated.
- The **demographic information** (population mobility in the community) is crucial.
- The **road selection, travel speed, and travel mode** are the key information.



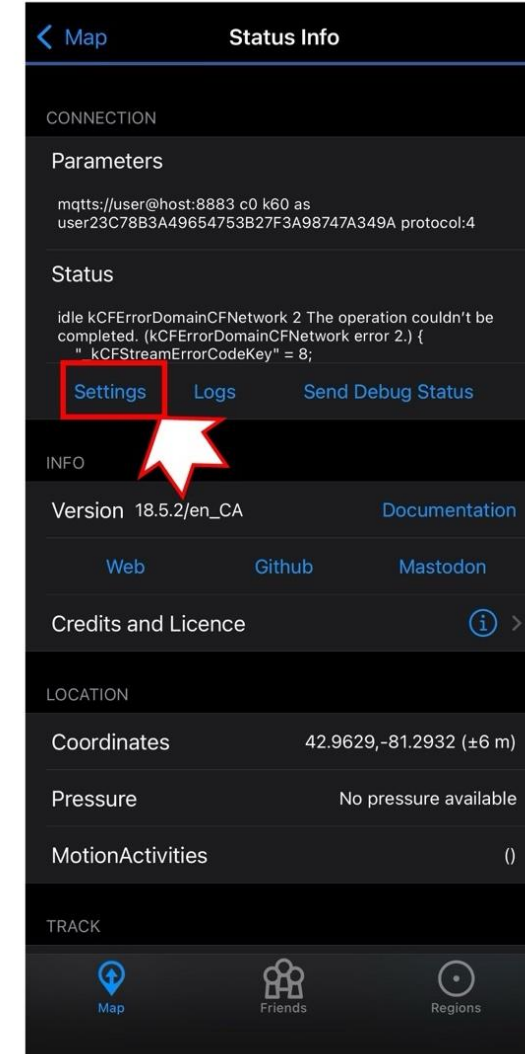
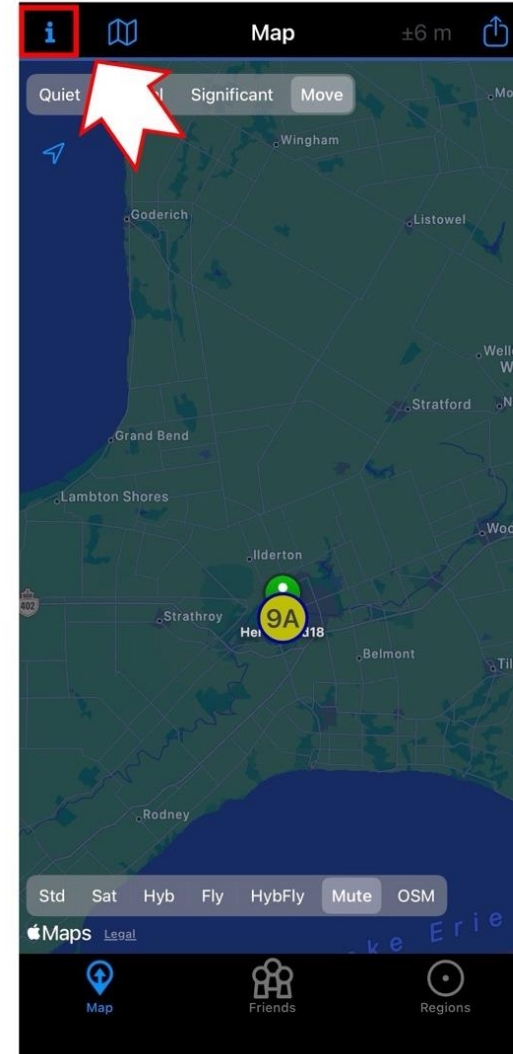
Community-scale Human Mobility Data Collection for Tsunami Evacuation Planning in Tofino

- This study collects **participatory, community-scale GPS tracking data** to identify residents' and visitors' travel patterns in normal days as well as during hypothetical evacuation exercises.
- For GPS data collection, we will use the **OwnTracks** app (<https://owntracks.org/>).
- The **hypothetical evacuation** exercises can be started from beach areas to public assembly areas for evacuation or nearby high grounds.
- The ultimate goal is to significantly advance evacuation planning for Tofino.



Data Collection Using OwnTracks App

- The OwnTracks app prioritizes **user privacy and security** by ensuring **data encryption** to prevent unauthorized access to your mobile phones and by ensuring users control how their data are used.
- The OwnTracks app does not keep/send participants' location data on their servers. Instead, participants are asked to **enable the data transfer option of your location data to a secure server at Western University** (<https://mobility-western.es.uwo.ca/pub>).
- The GPS mobility data that are collected by OwnTracks app include: **Participant ID** (which will be provided by the research team), **GPS locations**, and **date and time**.

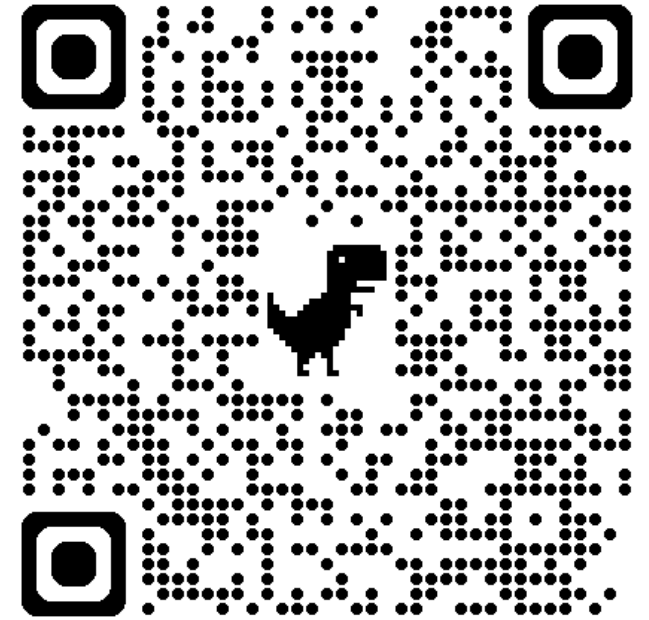


Data Collection Using OwnTracks App

- These data are collected when participants' mobile phones are carried and moved. **No other information that can be used for identifying participants' device is collected (e.g., IP address and app usage).**
- Data collection and processing flow:
 1. Participant's mobile phone (iPhone or Android)
 2. Western server (<https://mobility-western.es.uwo.ca/pub>)
 3. Researcher's computer in Earth Science
 4. Deidentification of the data
 5. Processing of the data to understand the static and dynamic travel behaviours of Tofino residents and tourists in **normal days** and dynamic travel behaviours of Tofino residents and tourists during **hypothetical evacuation exercises**.

Your Participation

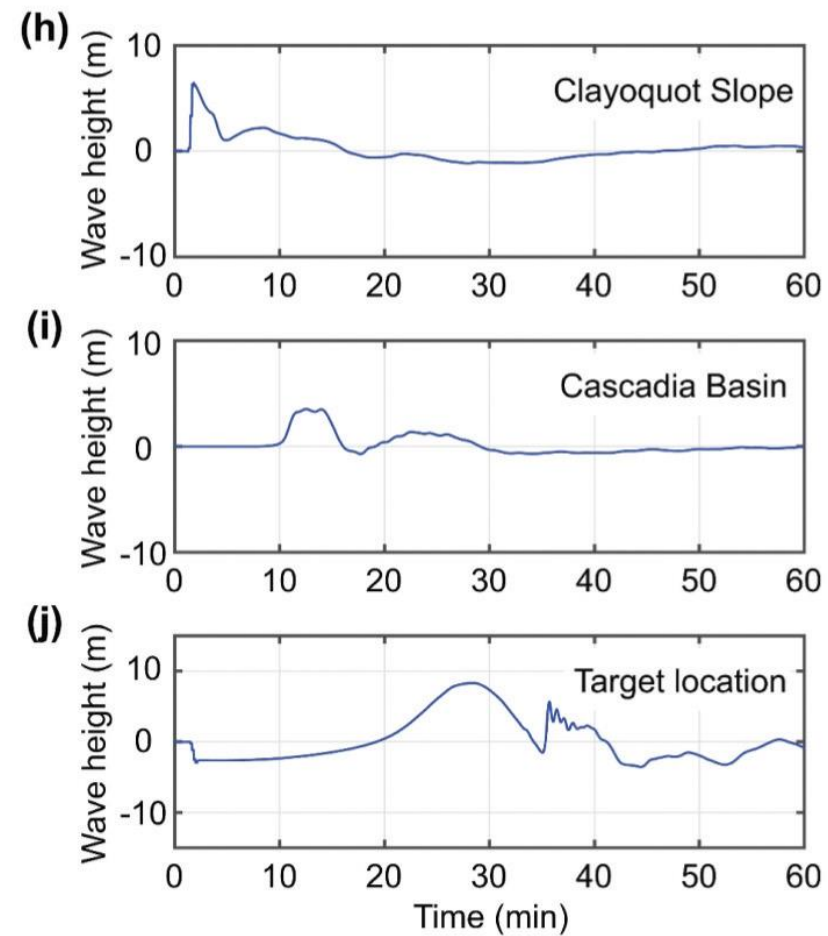
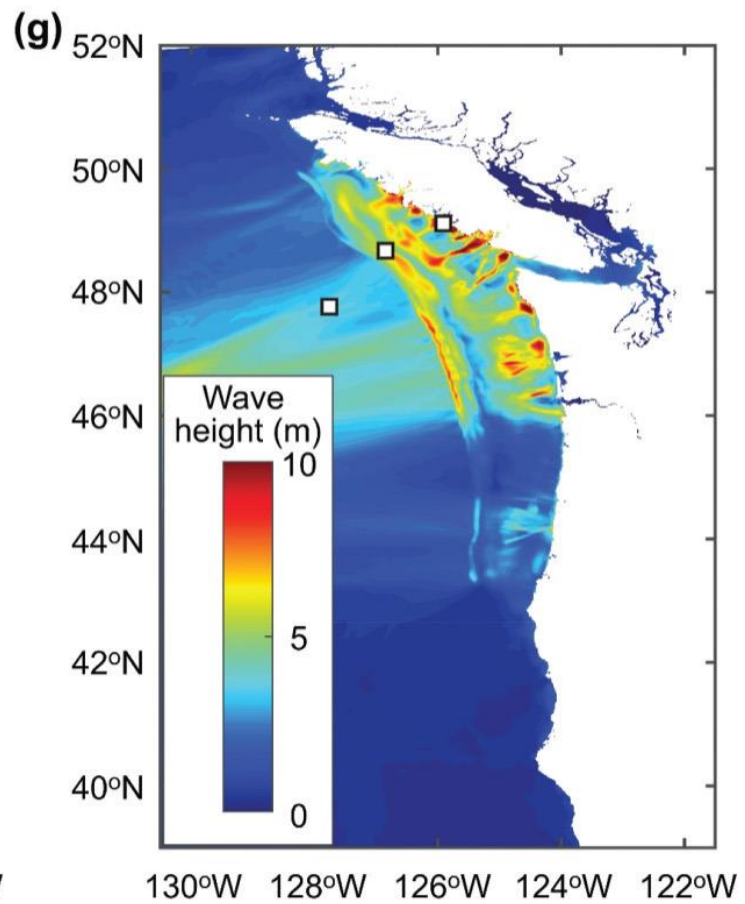
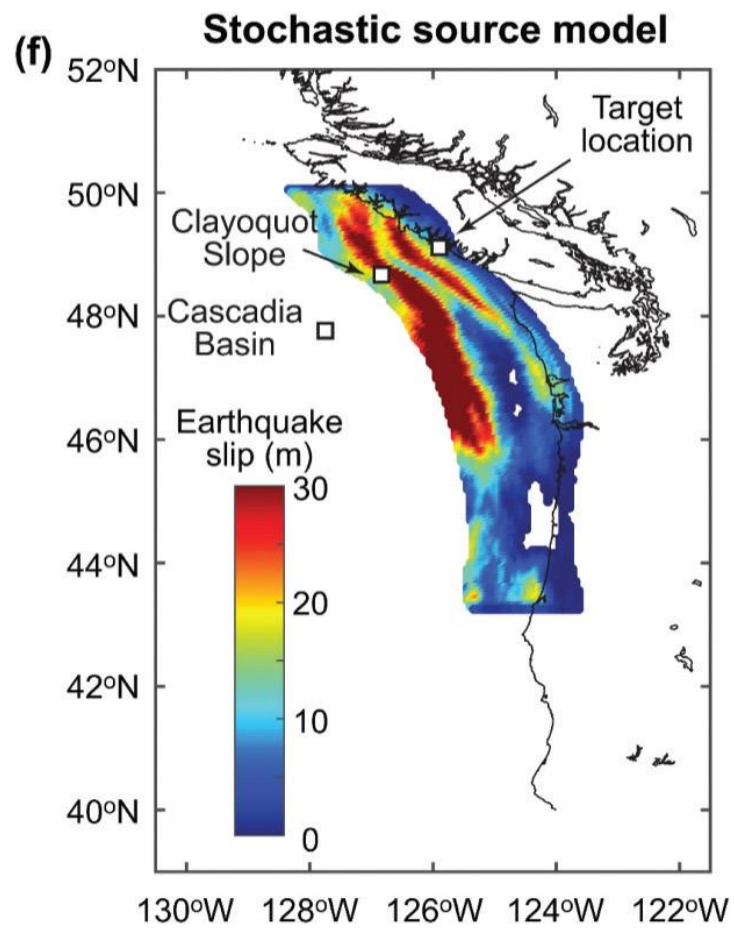
- Please visit our project website (https://www.uwo.ca/multihazard_risk_resilience/CIR_CLE_project/Tofino_human_mobility/index.html).
 1. Register.
 2. Review the consent information and instructions.
 3. Fill in the entry survey.
 4. Install OwnTracks app.
 5. Participate in the study (turning on the app in the background and carrying your phone).
 6. Fill in the exit survey and uninstall the app.
- Please join the project before the Tofino's **high ground hike day** on **April 24, 2026**. Participate in the hike by **just carrying your mobile phone**.



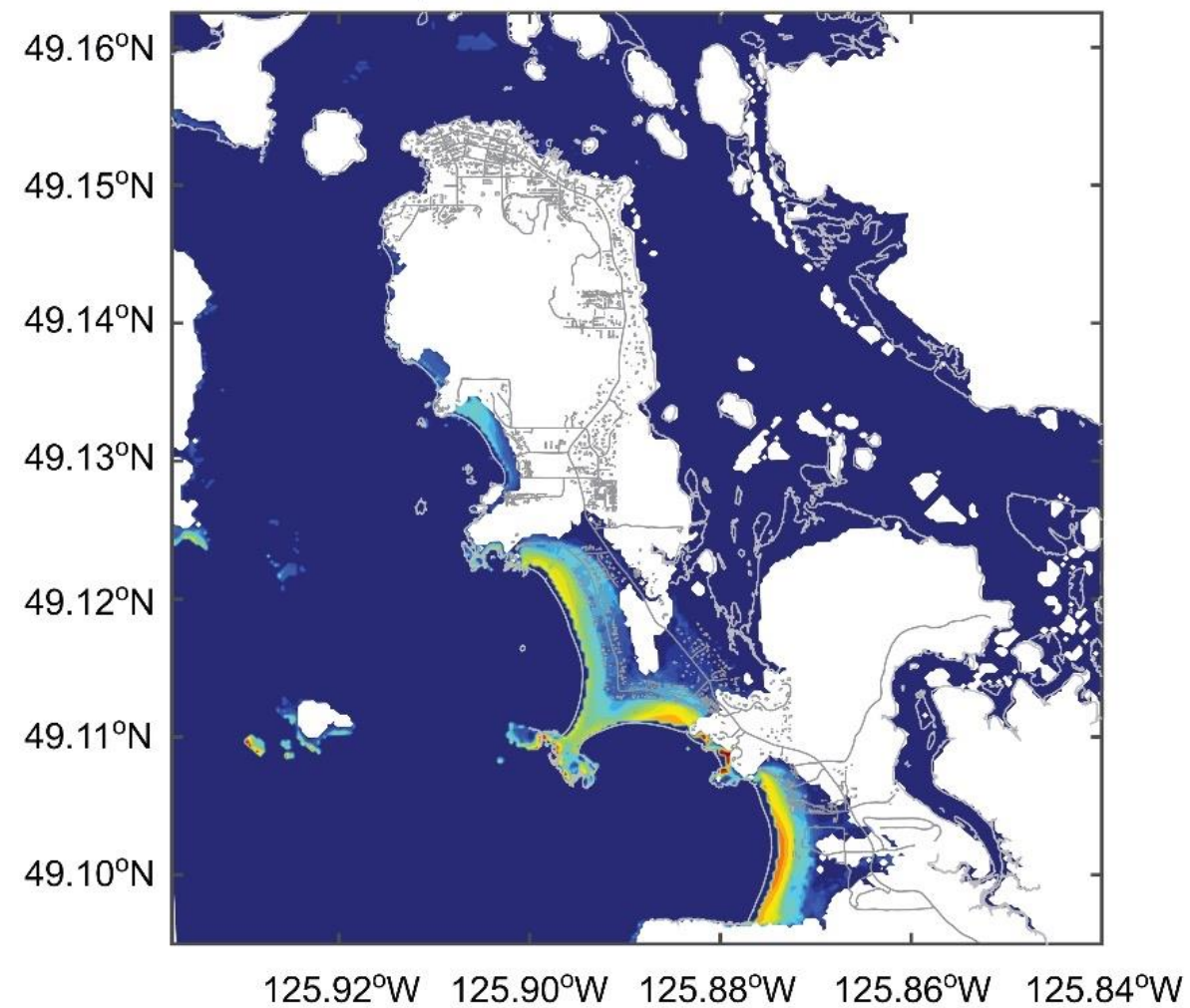
Your Benefit

- The CIRCLE team has conducted extensive tsunami simulations for Tofino, which can quantify the impacts of the Cascadia tsunamis to Tofino.
- The CRICLE team is developing **a bespoke tsunami evacuation model for Tofino**. A future vertical evacuation tower will be embedded in the model.
- The **Tofino mobility data** as well as other available data (Telus) will be used to refine the tsunami evacuation model.
- The CIRCLE team will return to Tofino and will share tsunami simulation results with Tofino residents. This will lead to **improved tsunami evacuation strategies and response/recovery plans**.

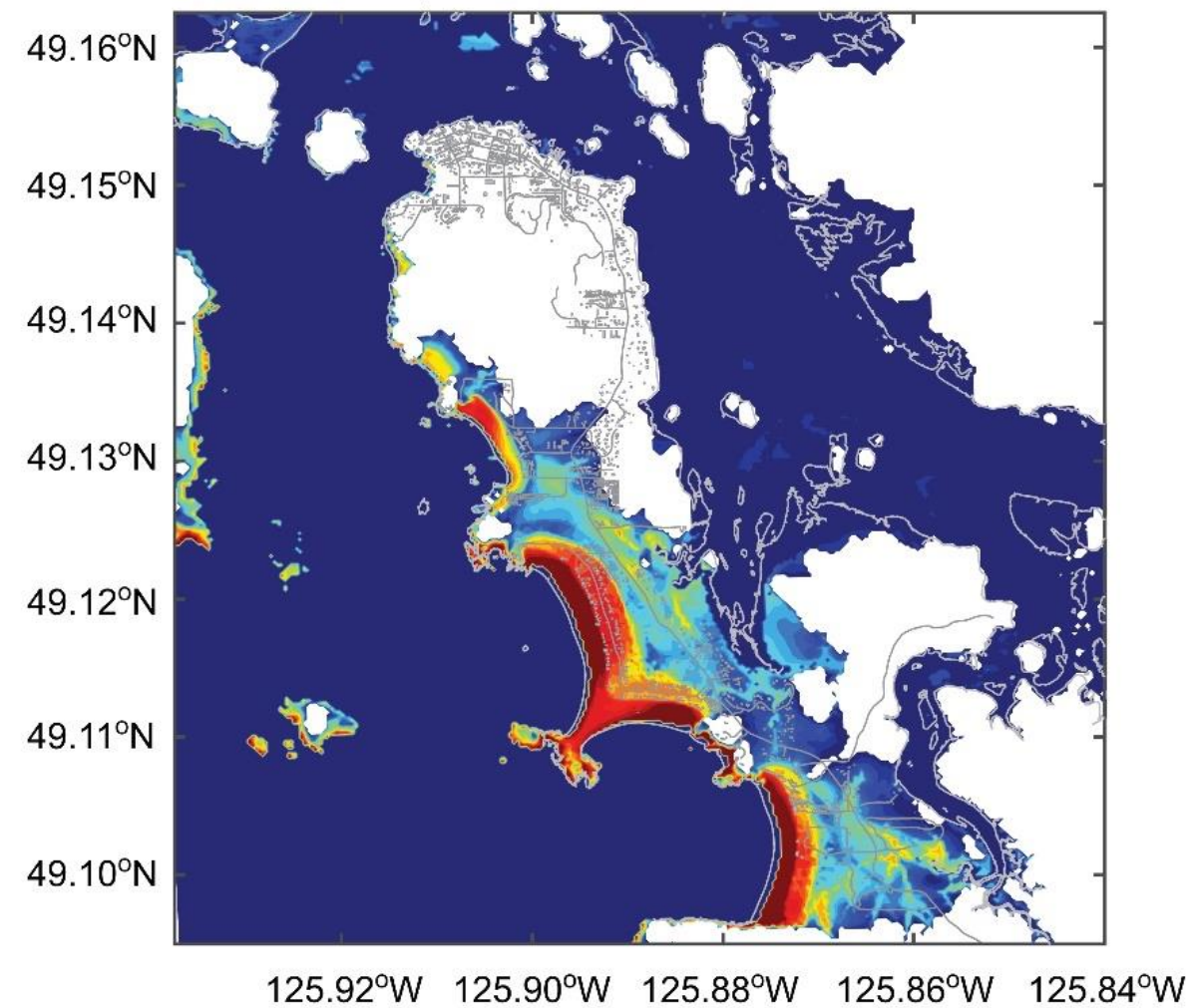


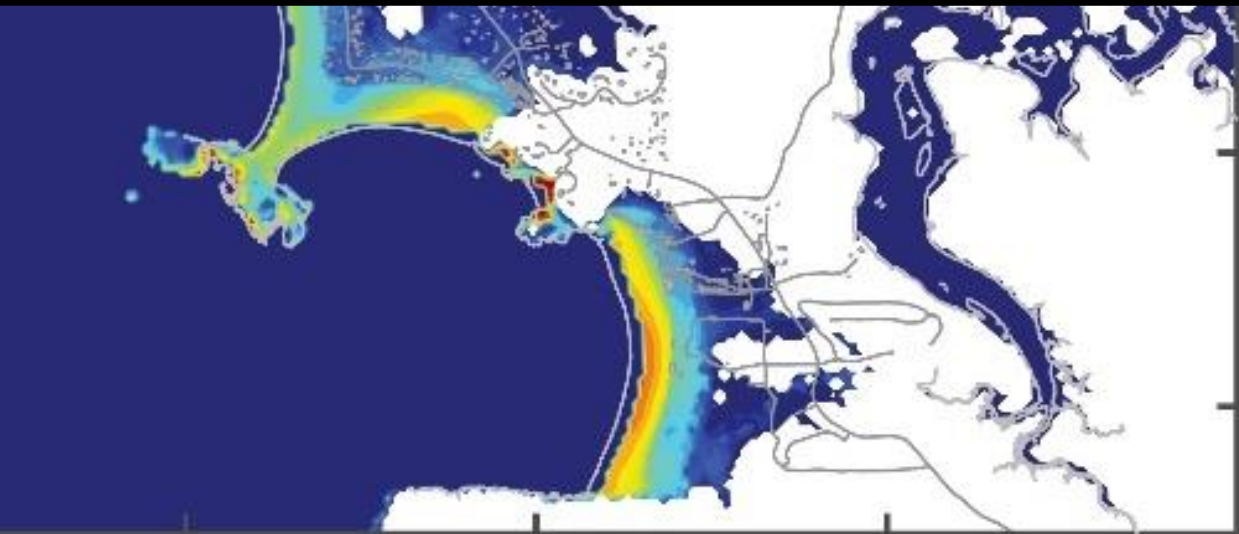


(a) 50th percentile, Tidal level = 0 m

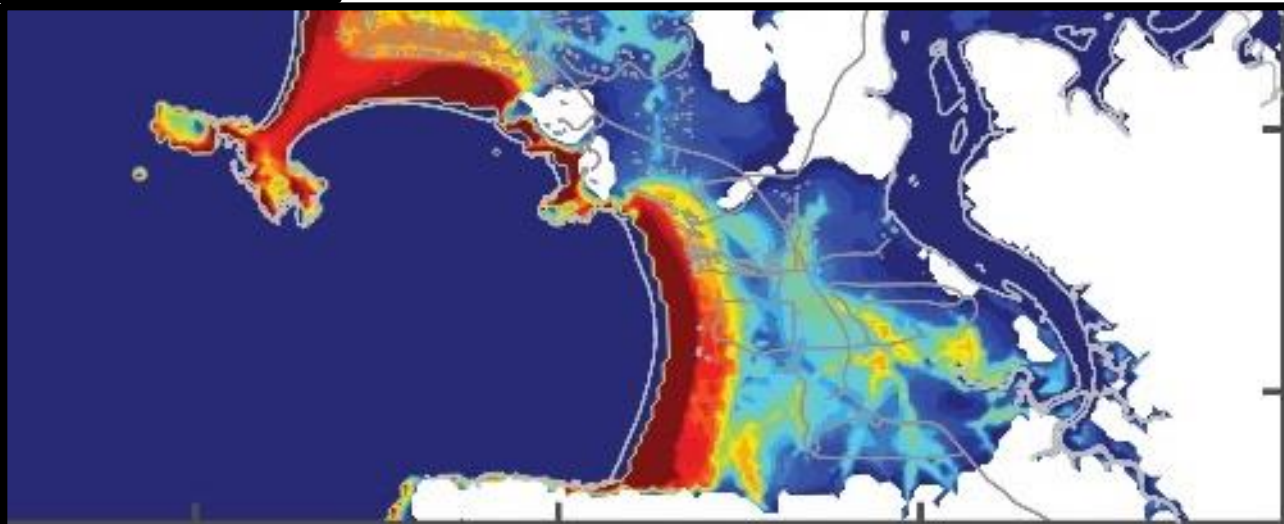


(b) 90th percentile, Tidal level = 0 m





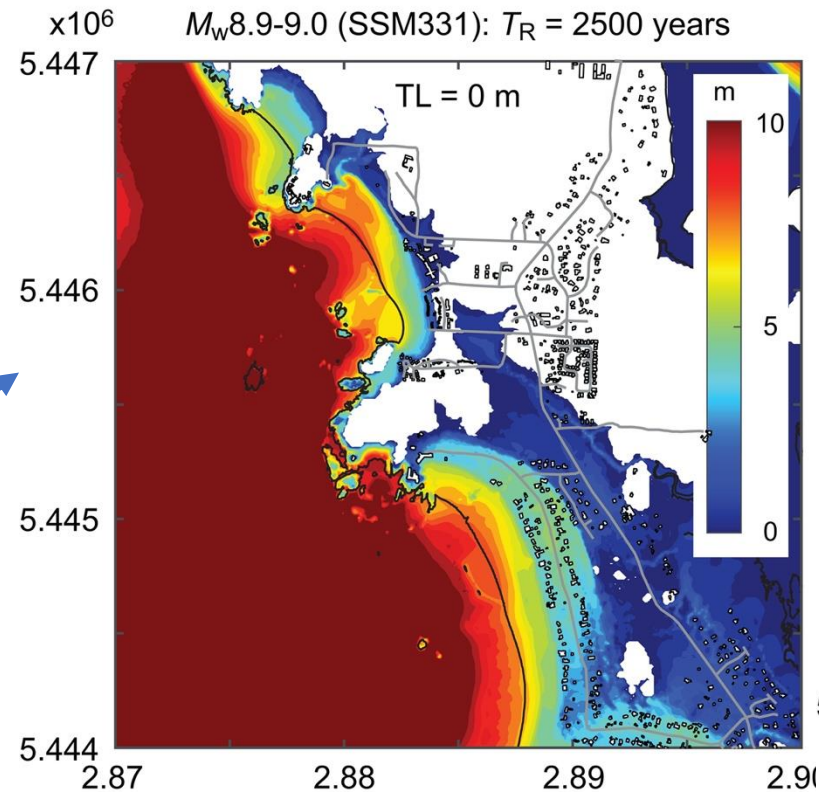
125.90°W 125.88°W 125.86°W 125.84°W



125.90°W 125.88°W 125.86°W 125.84°W

Scenario-based Inundation Maps

Rarer scenario



Rarer tidal condition

