

Tsunami Flooding Assessment Using Forecast Tools

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Workshop on probabilistic flood hazard assessment

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Panel 5: Tsunami flooding

NOAA's Tsunami Forecast Methodology

Detection

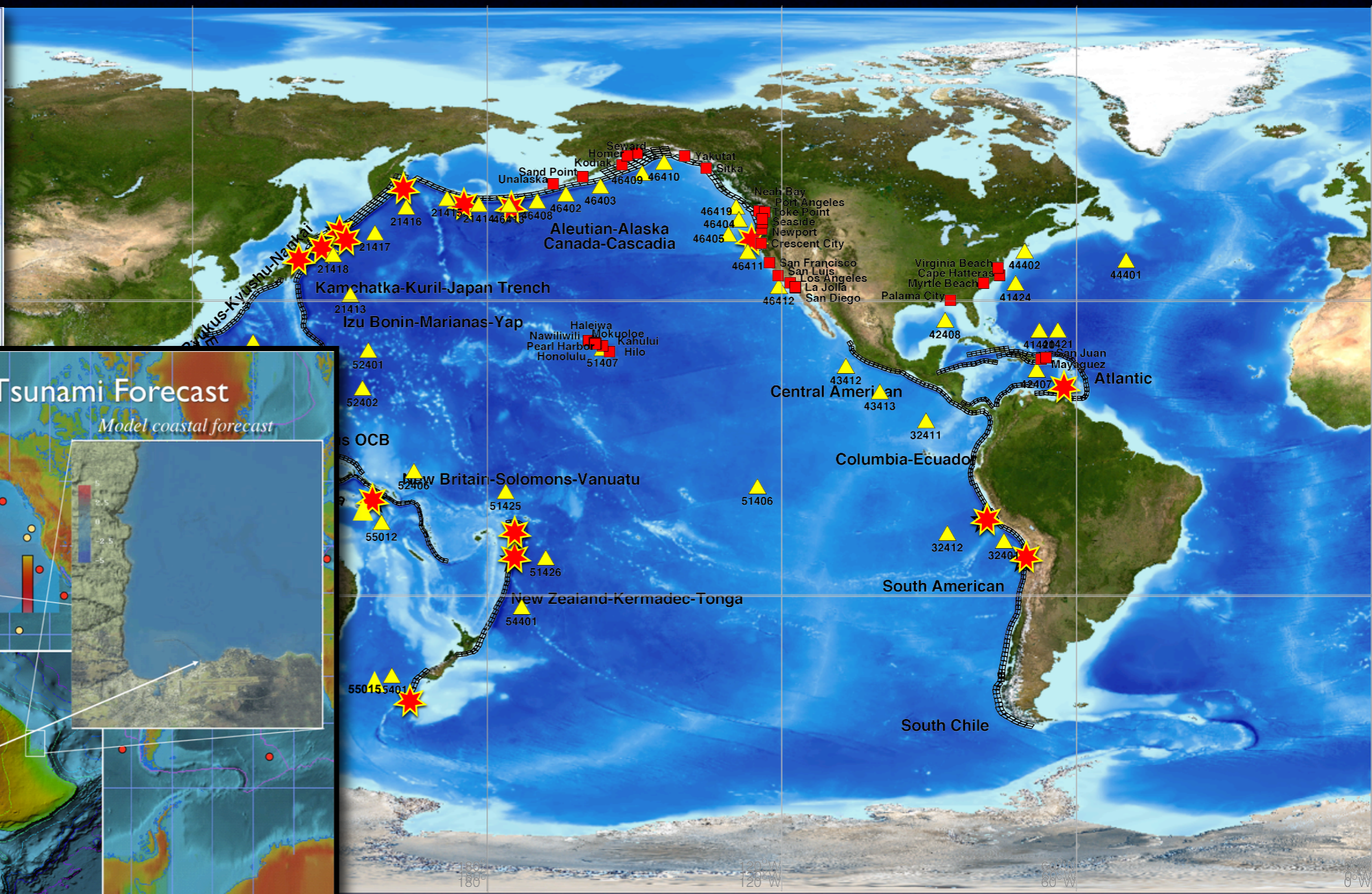
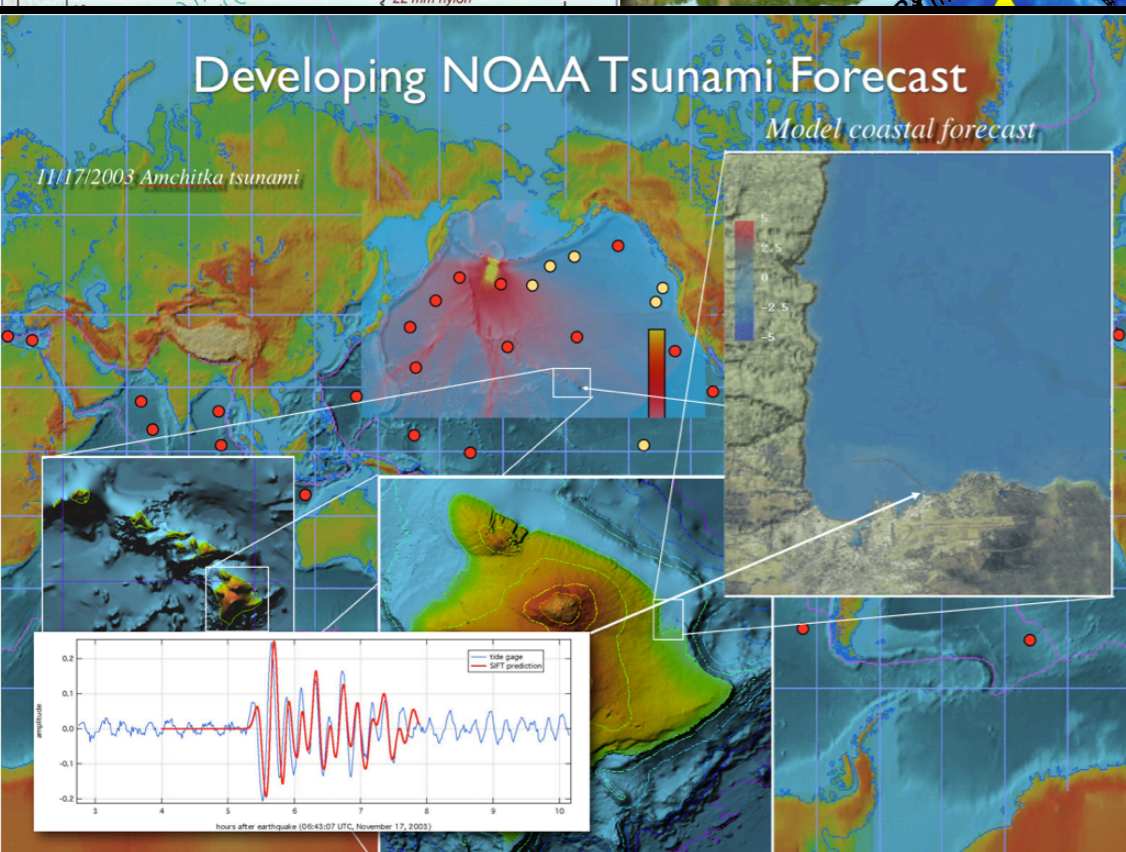
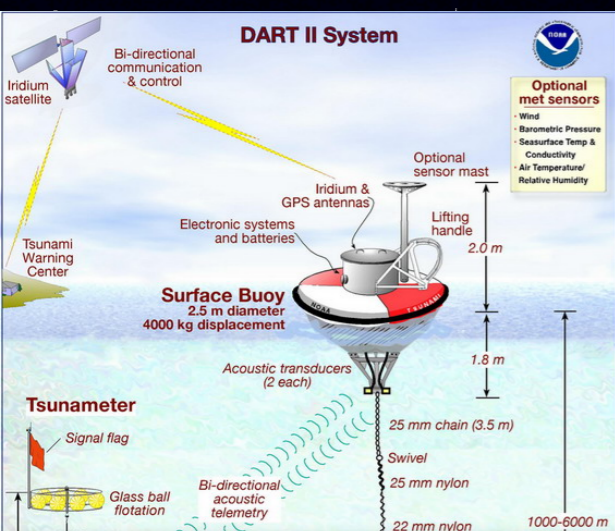
 **Tsunami**

Inversion

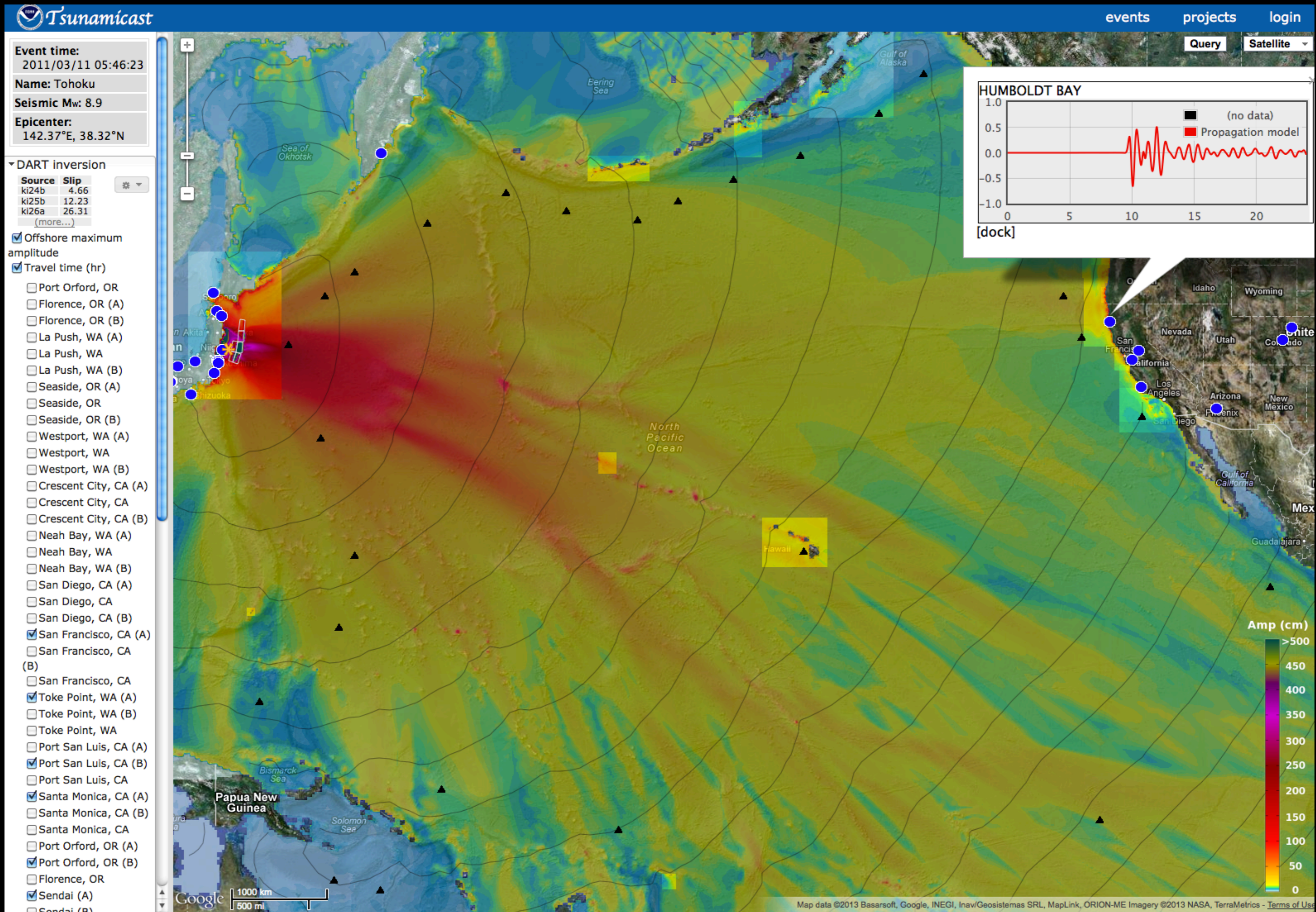

Prop. Database

Inun. forecast

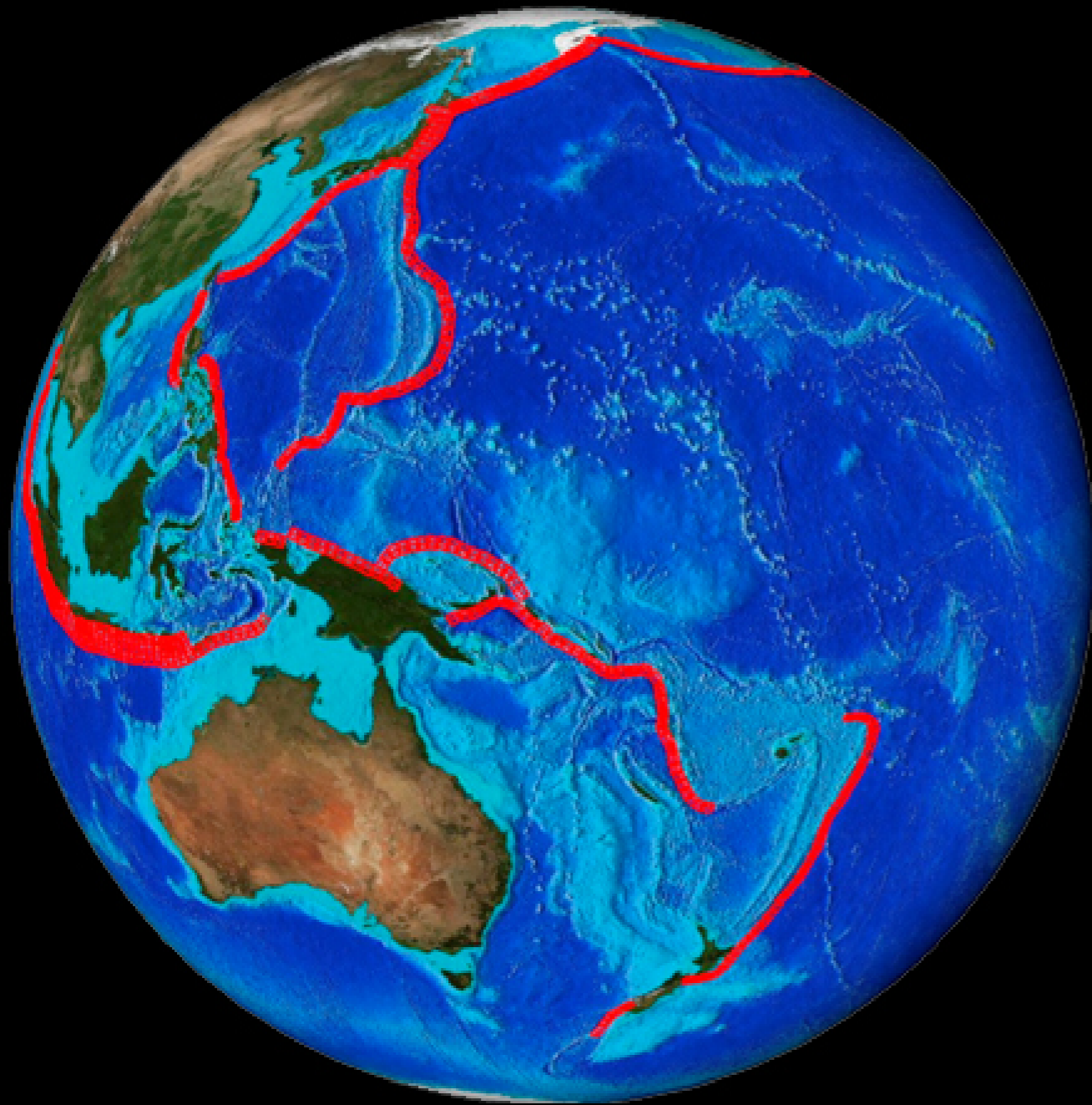
Forecast Models



Tsunamicast – a forecast tool developed for NRC



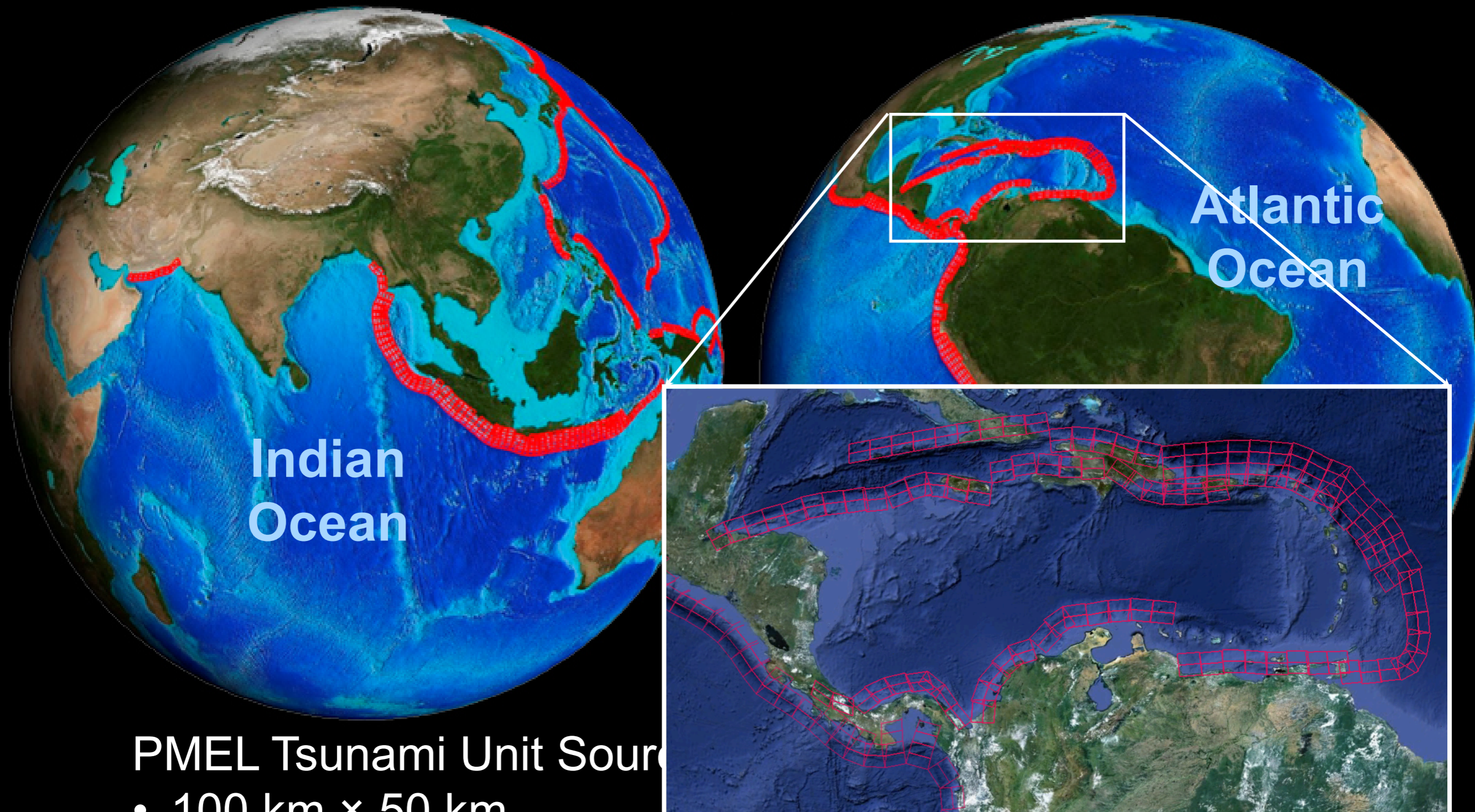
Tsunami Propagation Database: 1725 unit sources for pre-computed tsunami events.



West Pacific



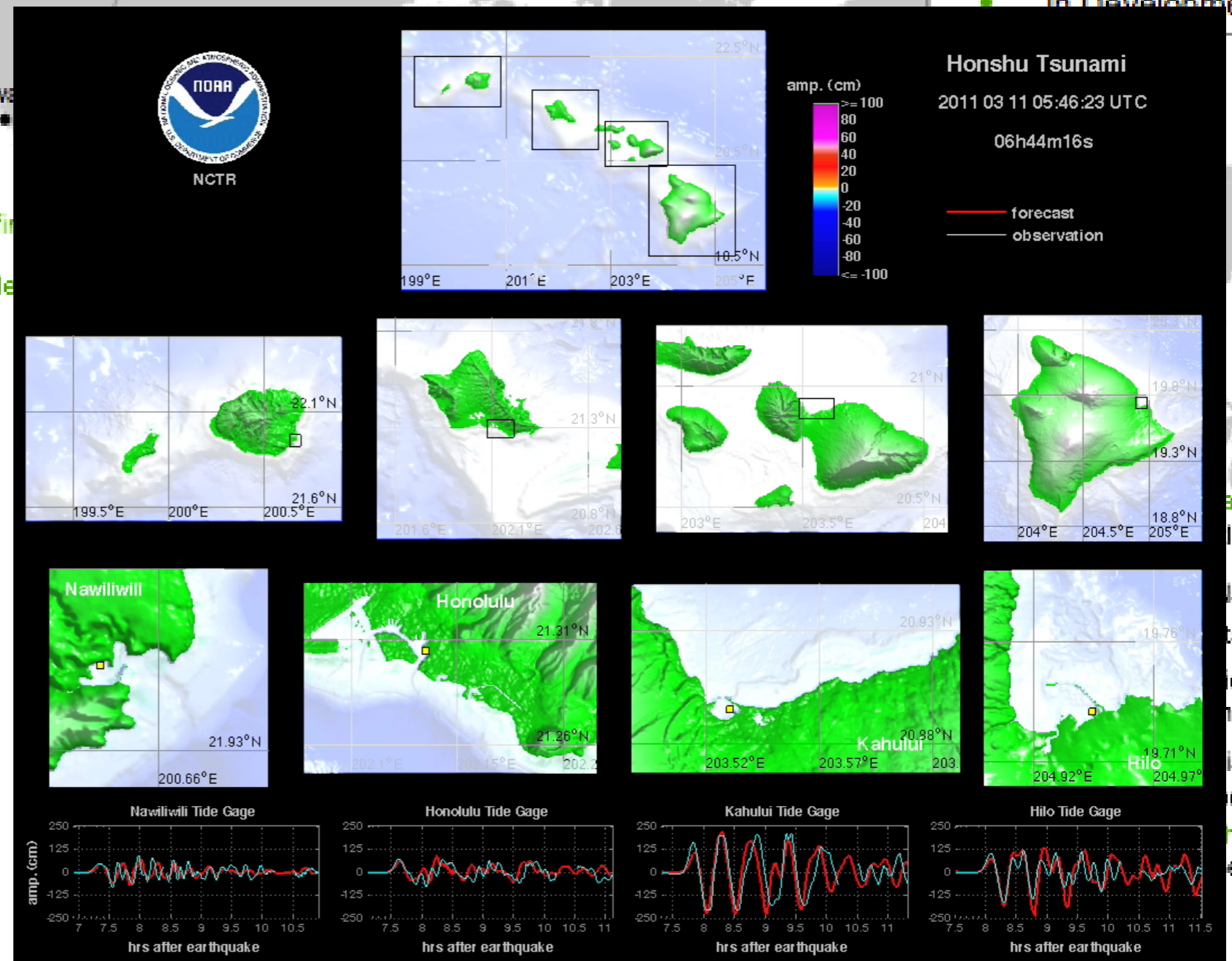
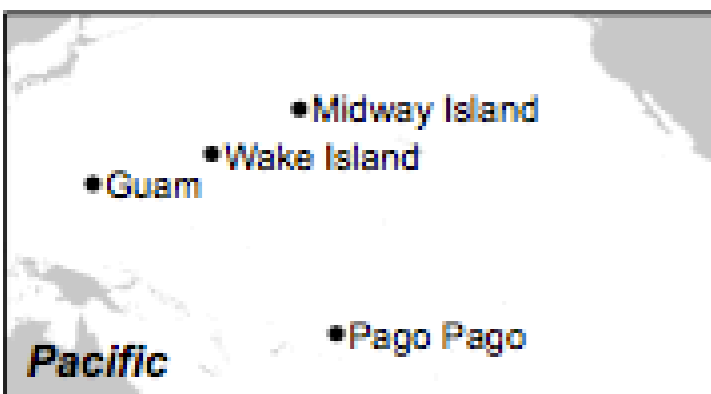
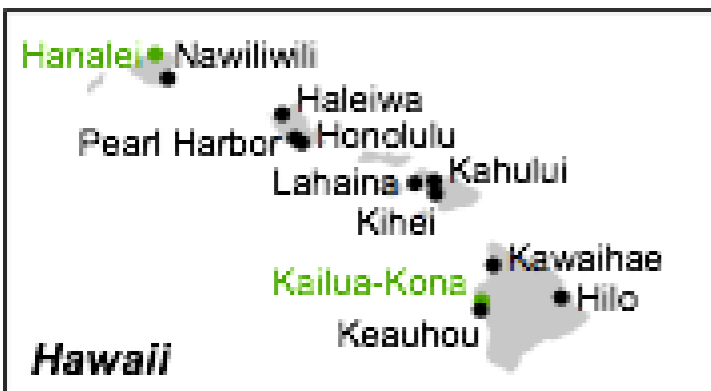
East Pacific



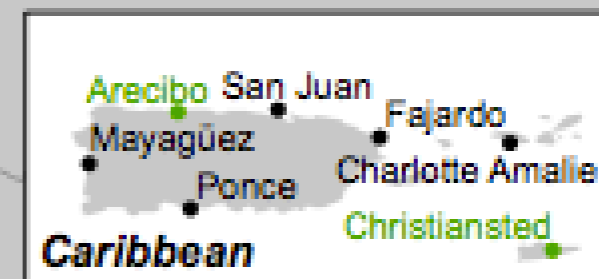
PMEL Tsunami Unit Sources

- 100 km × 50 km
- Placed along subduction zones and known tsunamigenic faults
- Aligned to fit known fault geometries
- Computed using linear shallow-water equations
- Can be linearly combined for source magnitude > 7.5

NOAA Tsunami Forecast Models



Los Angeles
San Diego

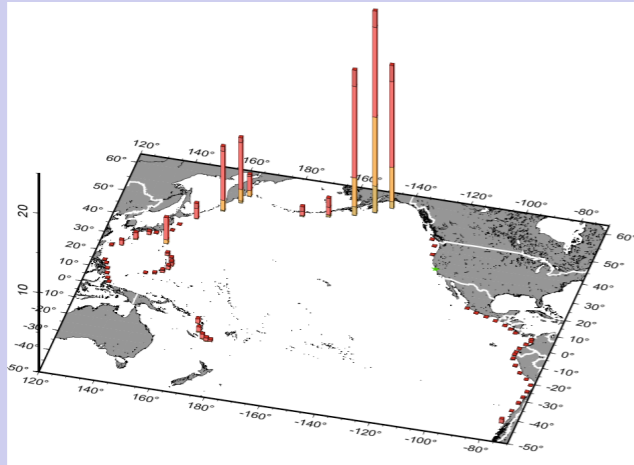


Daytona Beach
Palm Beach
Key West

Tsunami Flooding Assessment Using Forecast Tools

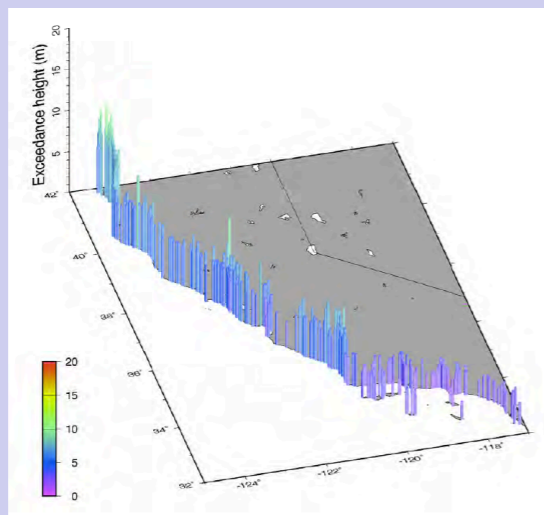
PTHA tsunami hazard
maps

- Source disaggregation and selection



Courtesy of Thio et al.
(2010)

- Offshore tsunami height for an ARP level



Courtesy of Thio et al.
(2010)

PMEL tsunami forecast
tools

Reconstruct disaggregated scenarios using a combination of PMEL “unit tsunami sources”:

- source location
- magnitude
- rupture area
- slip

Tsunami inundation modeling for reconstructed sources

Tuning for PTHA tsunami height using unit tsunami sources

Derive probabilistic flooding hazard maps using an envelop of inundation lines obtained from above steps