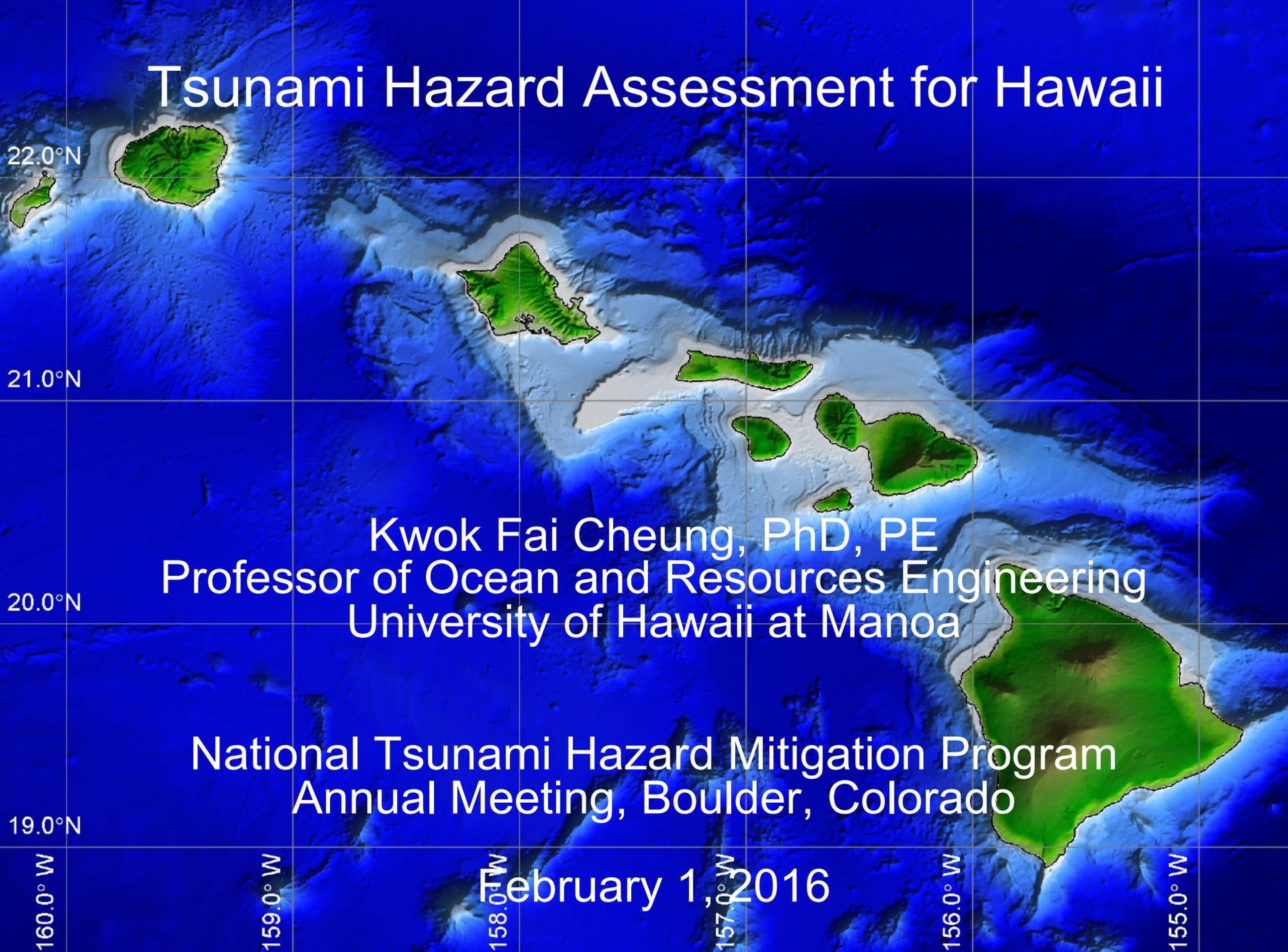


# Tsunami Hazard Assessment for Hawaii



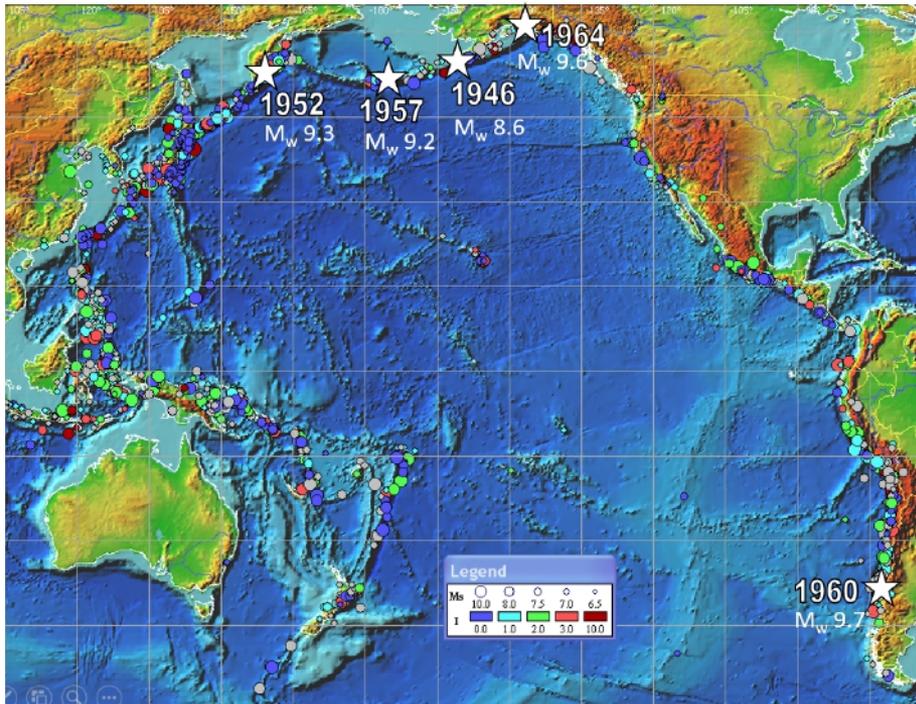
Kwok Fai Cheung, PhD, PE  
Professor of Ocean and Resources Engineering  
University of Hawaii at Manoa

National Tsunami Hazard Mitigation Program  
Annual Meeting, Boulder, Colorado

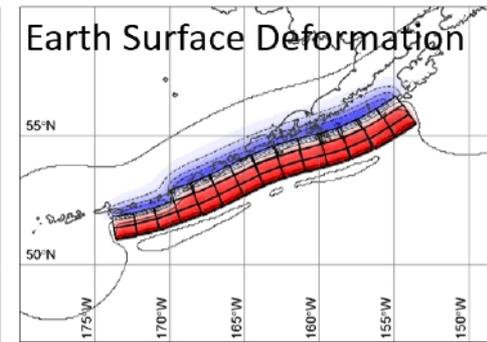
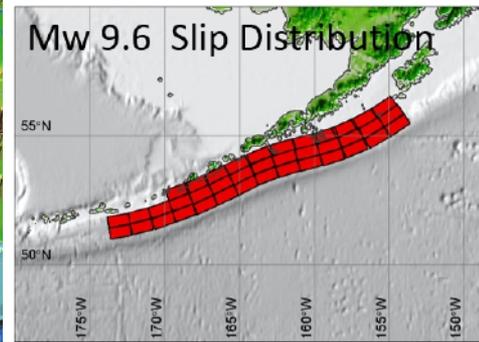
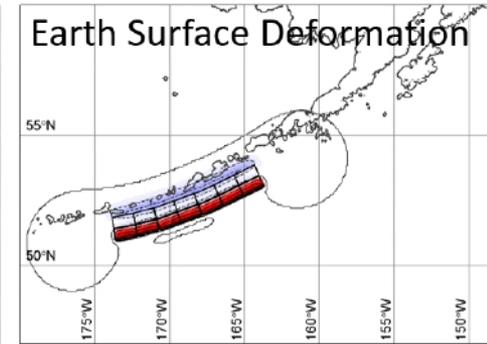
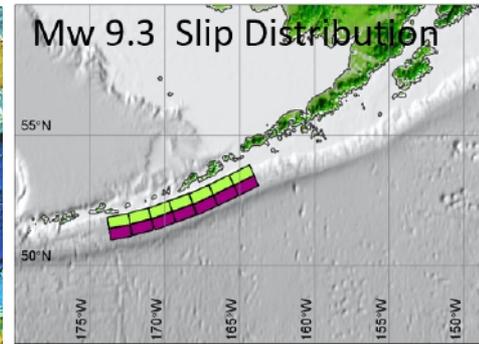
February 1, 2016

# Earthquake Sources for Tsunami Inundation Mapping

## Historical Tsunamis (Equivalent Mw)



## Probable Maximum Tsunamis



- Used in Hawaii for development of tsunami evacuation maps since 1963 (included the 1964 Alaska tsunami in the 1991 update)
- Updated inundation maps with 2D numerical modeling in 2013
- Inferred from technical literature and recorded runup in Hawaii

- Required by Hawaii Emergency Management Agency in the aftermath of the 2011
- Developed by Rhett Butler (2013) with modeling support from the University of Hawaii
- Consistent with Berryman et al. (2013, GEM Faulted Earth Project)
- Reviewed by a USGS team led by Lucy Jones
- Completed inundation mapping in 2015

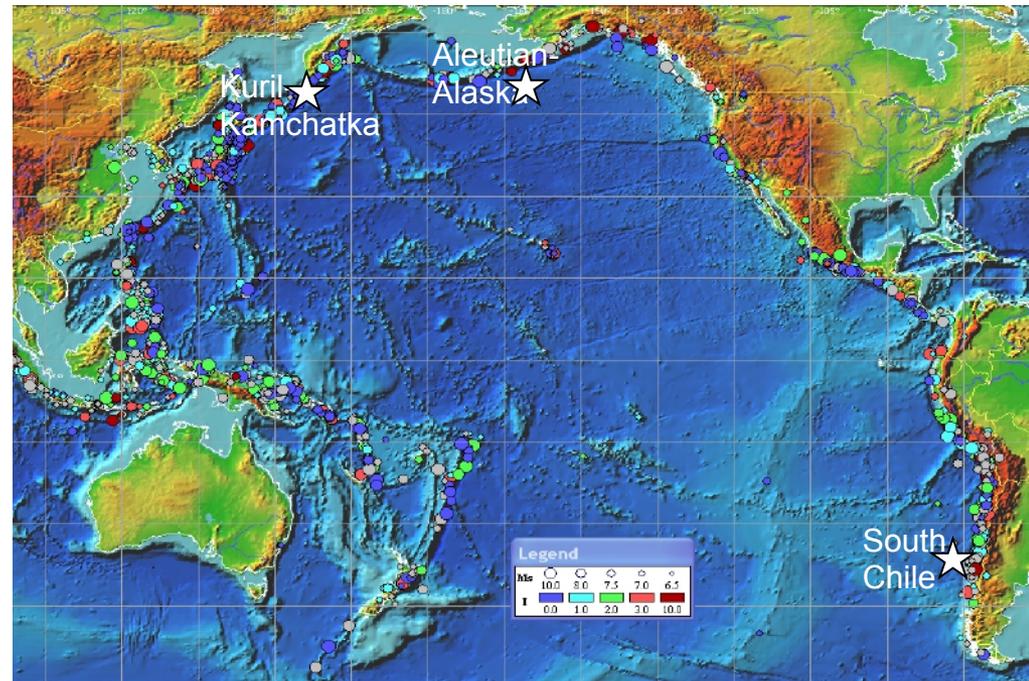
# Maritime Hazard Mapping Project

## USCG 14<sup>th</sup> District

- Hawaii, American Samoa, and the Mariana Islands

## USCG Advisory Group

- In-harbor hazard maps of current speed, surge elevation, and drawdown
- Offshore current speed for definition of safe zones, and
- Attenuation time  
*for forecast near-shore wave amplitude from PTWC*



## Primary project task

- Development of pre-computed tsunami scenarios from three potential sources around the Pacific
- Potential decision support tool – Playbook-type database system

# Technical Support

Comment on the seismic sources parameter in Berryman et al. (2013, GEM Faulted Earth Project)

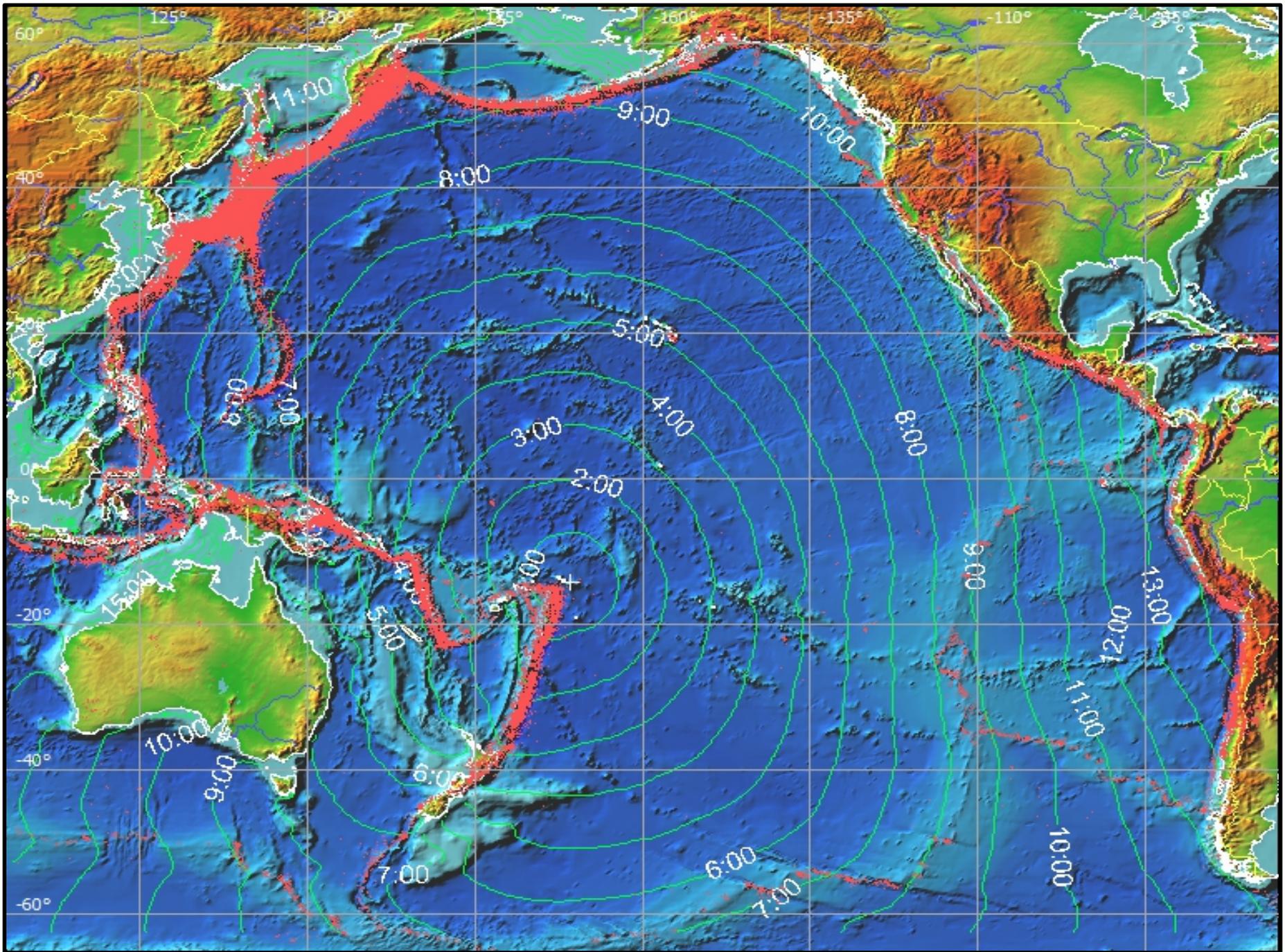
Consultation in development of seismic sources for maritime hazards mapping that satisfy requirements from USCG 14<sup>th</sup> District

# Tsunami Hazard Assessment for American Samoa



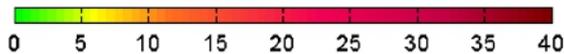
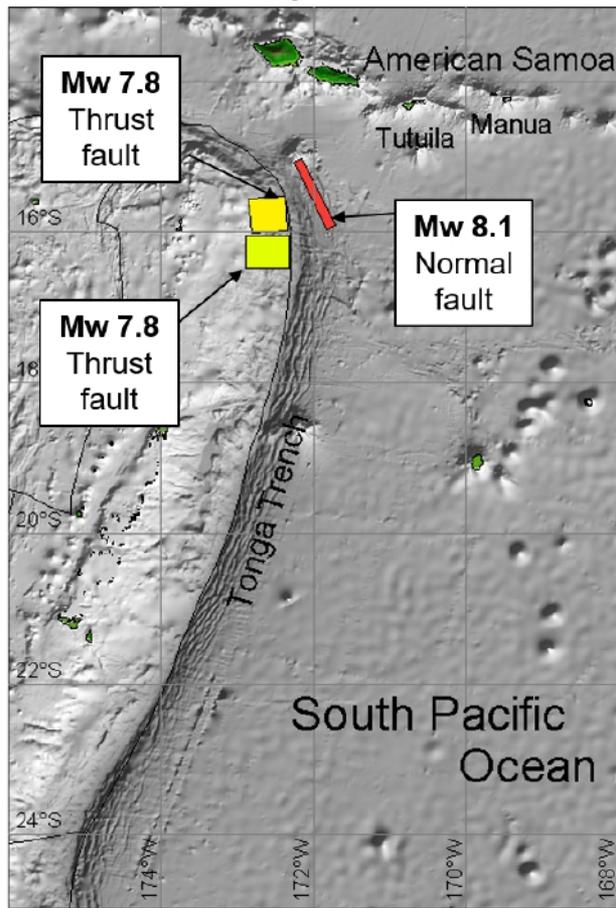
Elinor Lutu-McMoore  
General Forecaster (Meteorologist)  
Tsunami Focal Point, National Weather  
Service, American Samoa

Kwok Fai Cheung, PhD, PE  
Professor of Ocean and Resources  
Engineering, University of Hawaii,  
Honolulu, Hawaii



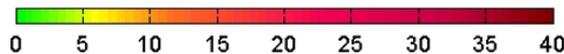
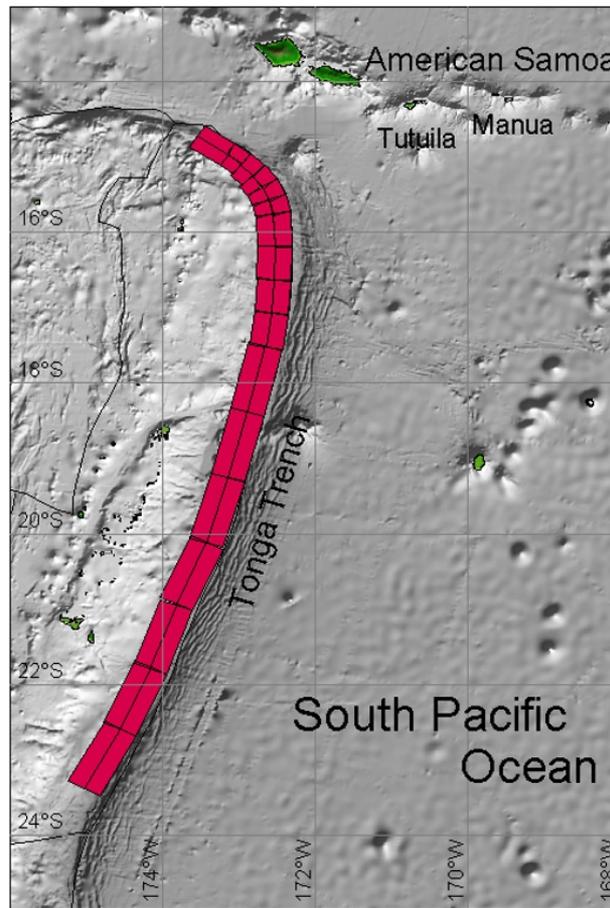
# Tsunami Sources for Inundation Mapping

## 2009 Tonga Tsunami

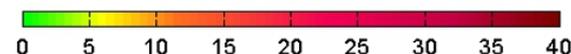
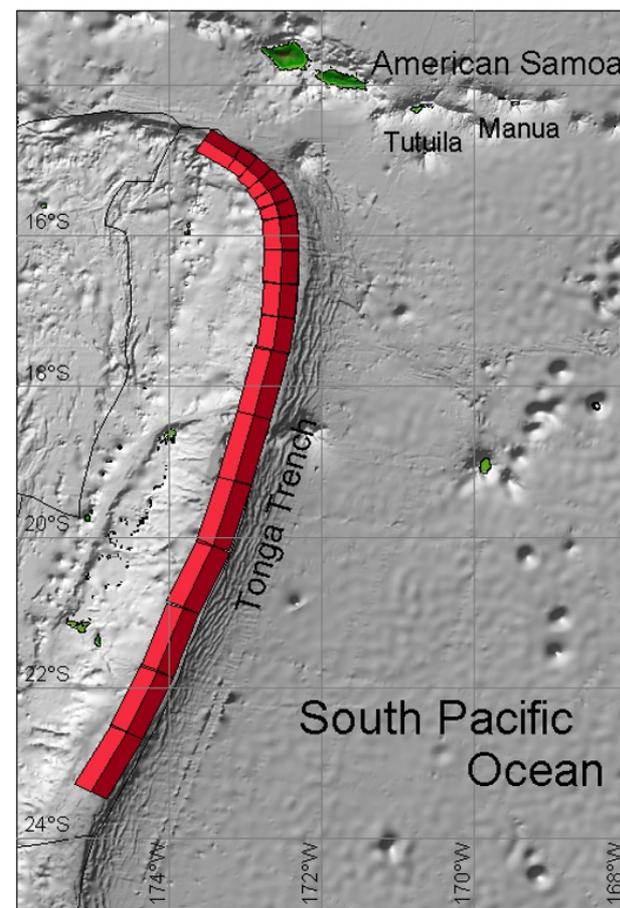


Slip (m)

## Probable Maximum Tsunamis



Slip (m)



Slip (m)

- Developed from Lay et al. (2009 Nature) and recorded runup in consultation with Thorne Lay, UCSC

- Required by American Samoa Territorial Emergency Management Coordination Office
- Developed from Berryman et al. (2013, GEM Faulted Earth Project) in consultation with Thorne Lay, UCSC

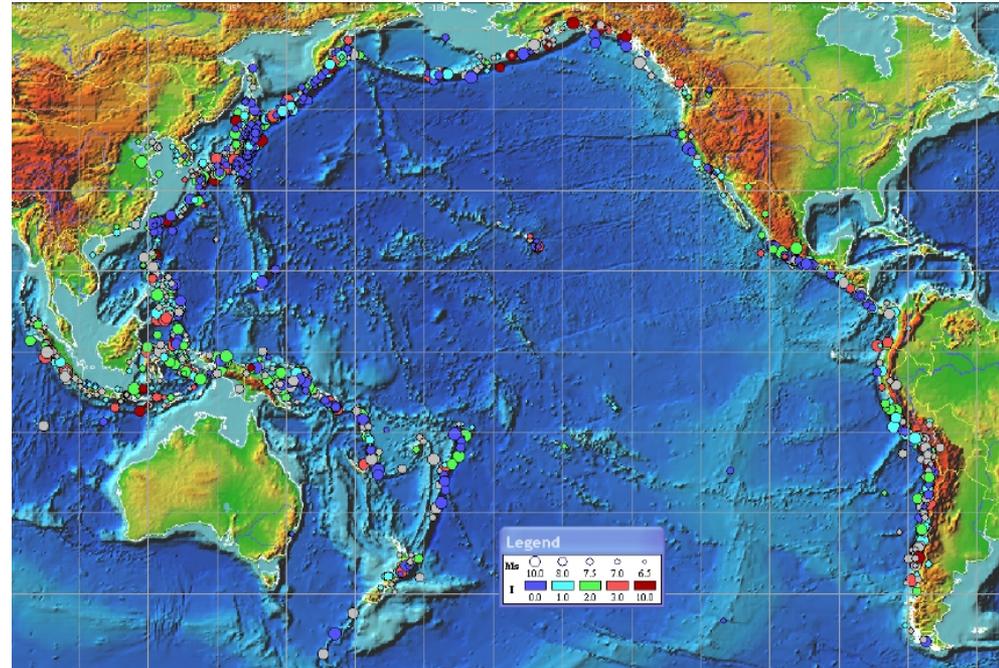
# Proposed Maritime Hazard Mapping Project

## USCG 14<sup>th</sup> District

- Hawaii, American Samoa, and the Mariana Islands

## USCG Advisory Group

- In-harbor hazard maps of current speed, surge elevation, and drawdown,
- Offshore current speed for definition of safe zones, and
- Attenuation time  
*for forecast near-shore wave amplitude from PTWC*



## Primary project task

- Development of pre-computed tsunami scenarios from potential sources around the Pacific
- Potential decision support tool – Playbook-type database system

# Technical Support

Review and endorsement of seismic sources for tsunami inundation mapping.

Consultation in development of seismic sources for maritime hazards mapping that satisfy requirements from USCG 14<sup>th</sup> District.