

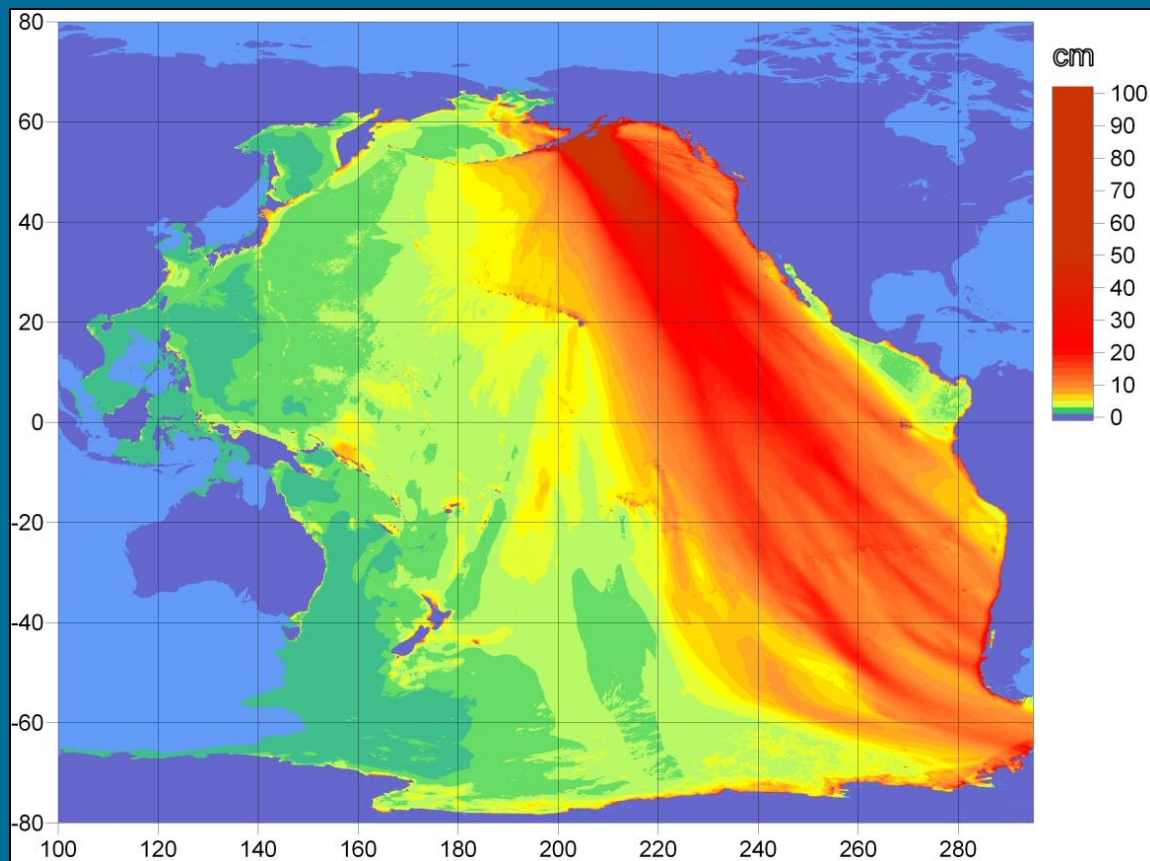


Tsunami Warning Services for the Pacific Northwest



Paul Whitmore; Director – NOAA/West Coast and Alaska Tsunami Warning Center

October 11, 2007

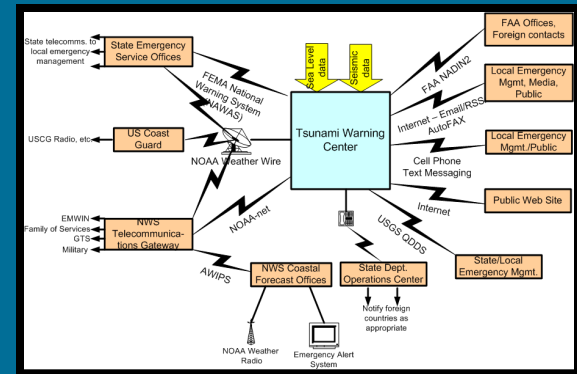
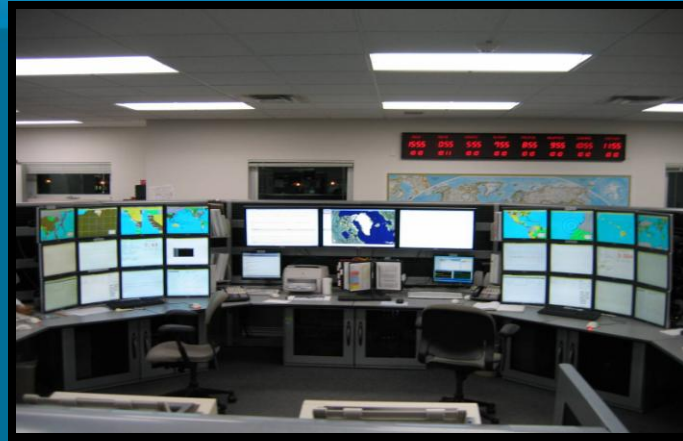




Tsunami Warning Systems

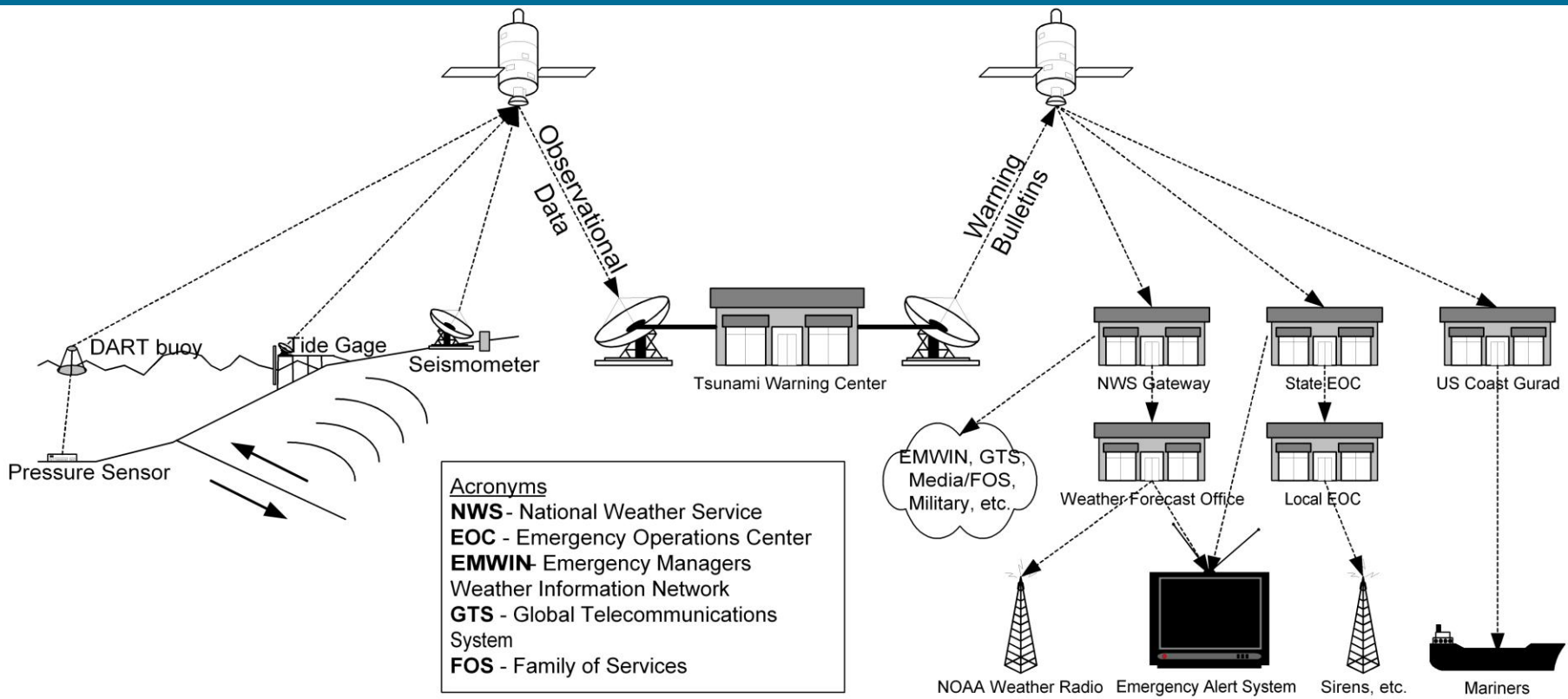


- A Tsunami Warning System:
 - *Tsunami Warning Centers*
 - *Data Acquisition*
 - *Data Analysis and Forecasting*
 - *Message Dissemination*
 - *Communications*
 - *NOAA Weather Wire*
 - *Global Telecom System*
 - *National Warning System*
 - *Emergency Response Orgs.*
 - *Carry out evacuations*
 - *Prepare Communities*



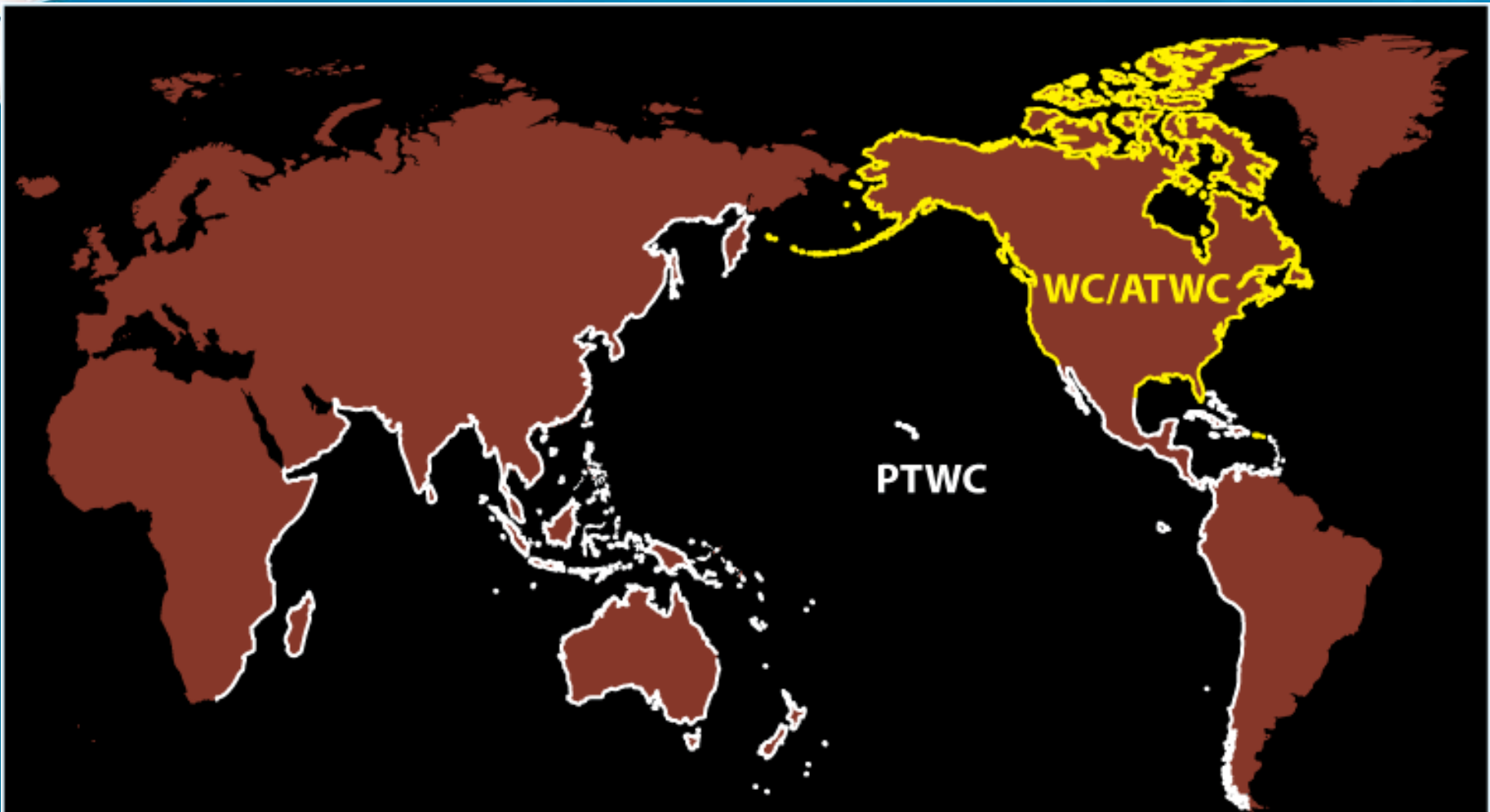


Tsunami Warning Systems





NOAA Tsunami Warning Centers



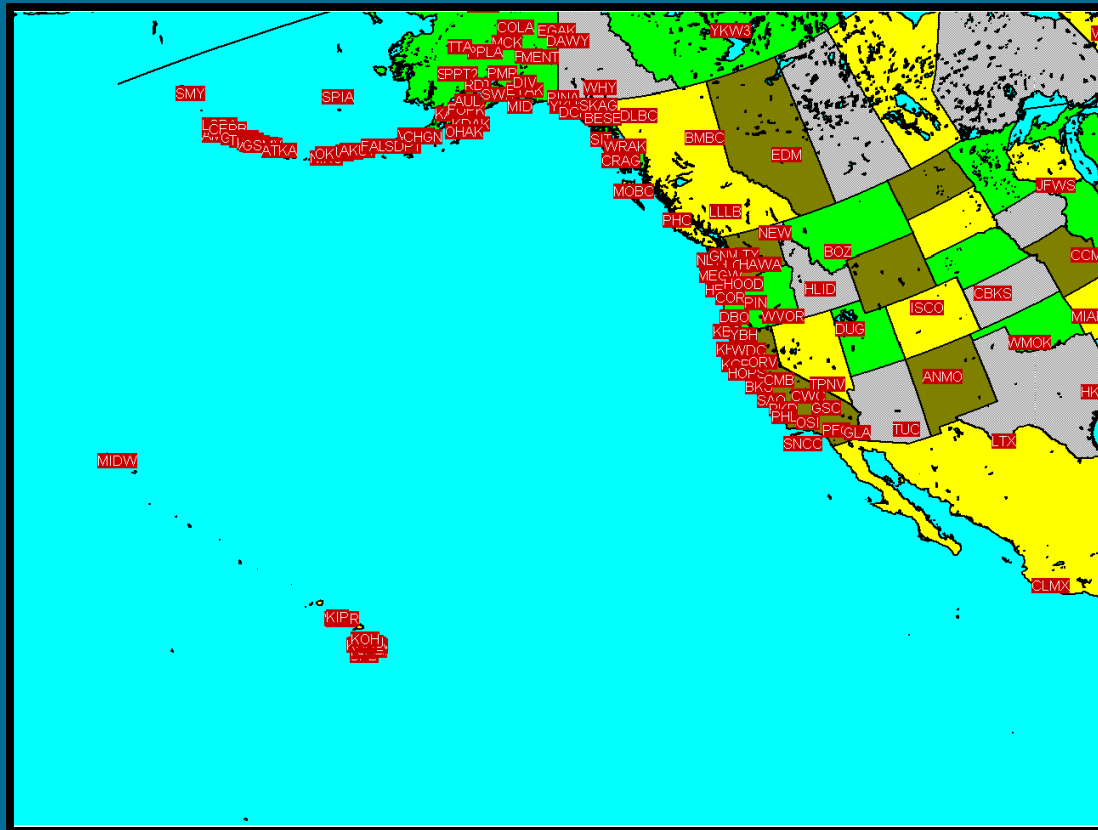
NOAA TSUNAMI WARNING SYSTEM AREAS OF RESPONSIBILITY

West Coast/Alaska Tsunami Warning Center (**WC/ATWC**)
and Pacific Tsunami Warning Center (PTWC)





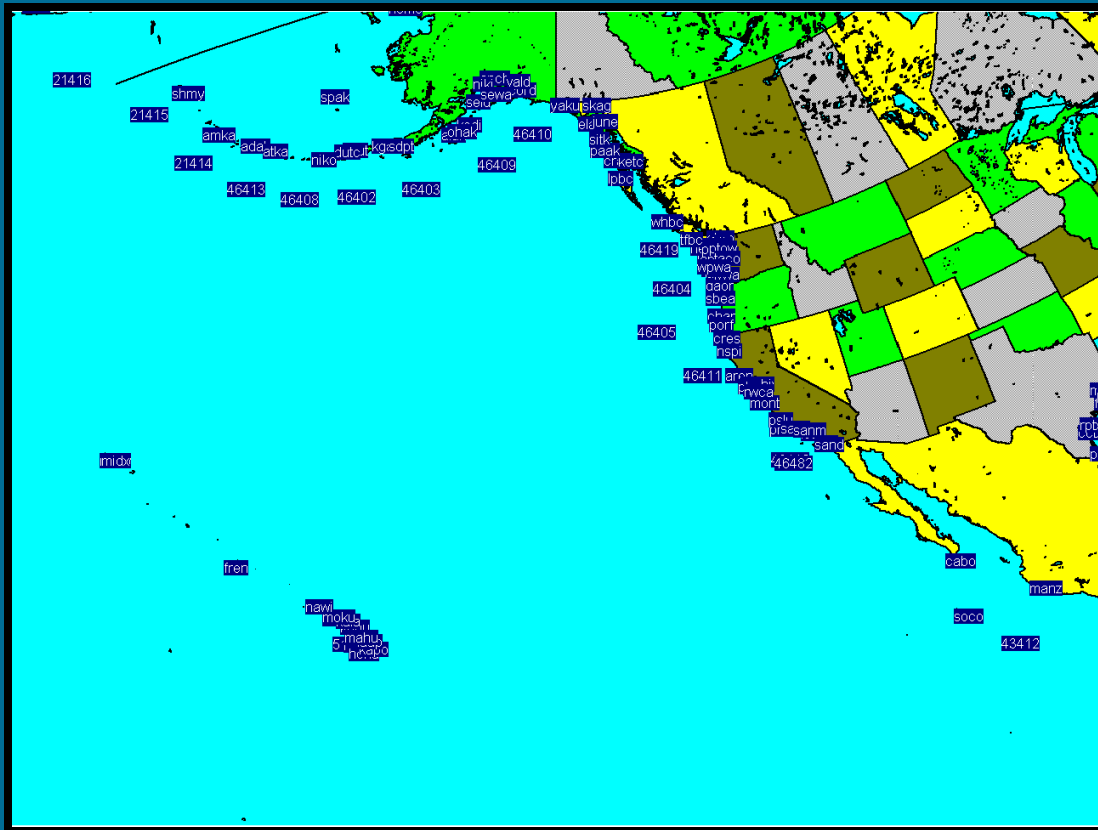
Tsunami Warning Center Seismic Data Acquisition



- 250+ Seismic Stations recorded at center
- USGS, University, Global, and NOAA networks
- Pacific NW network improved in late '90s as part of NTHMP



Tsunami Warning Center Sea Level Data Acquisition



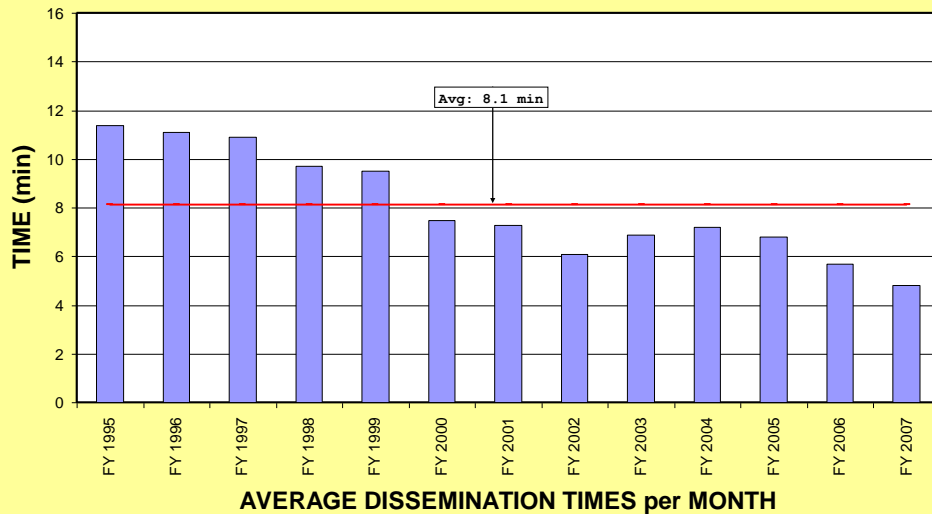
- 400+ Sea Level Sites recorded at center
- Most NOAA or international
- Coastal and DART
- Network improved greatly post-2004 Tsunami



Tsunami Warning Center Response Time



YEARLY(FY) AVERAGE of WCATWC RESPONSE TIMES



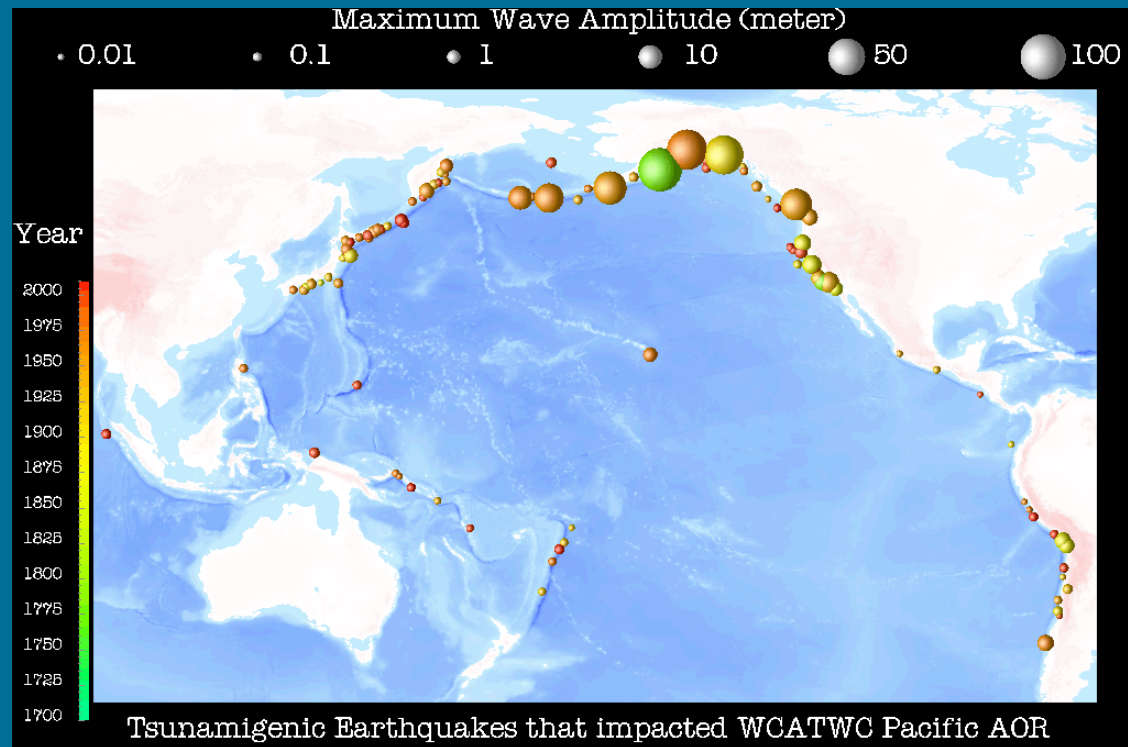
- Dropped to < 5 minutes in FY '07
- Decrease due to:
 - *Observational Net Improvements*
 - *Enhanced processing*
 - *24/7 staffing*

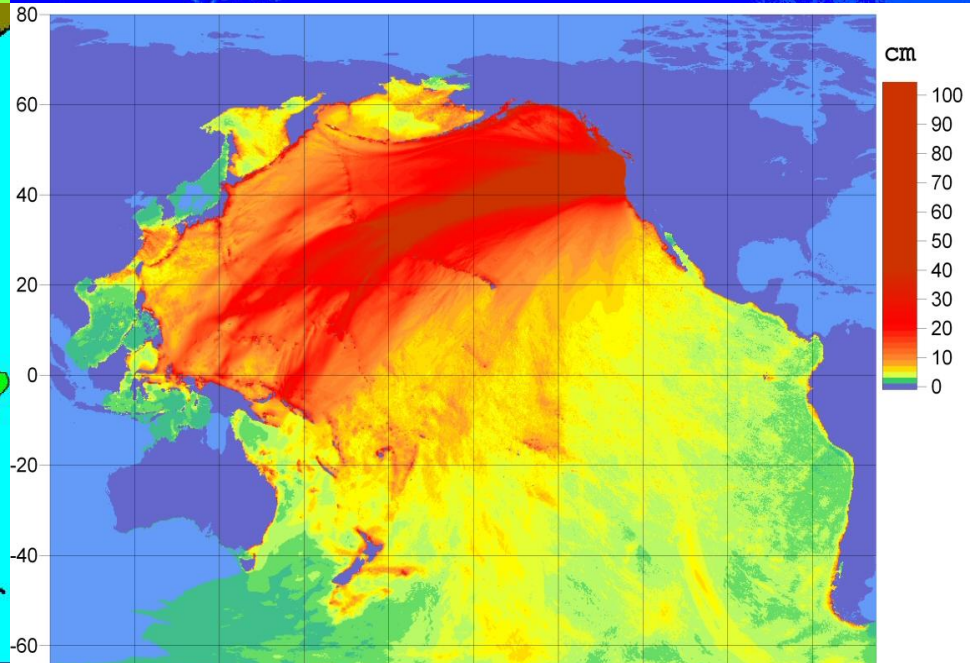
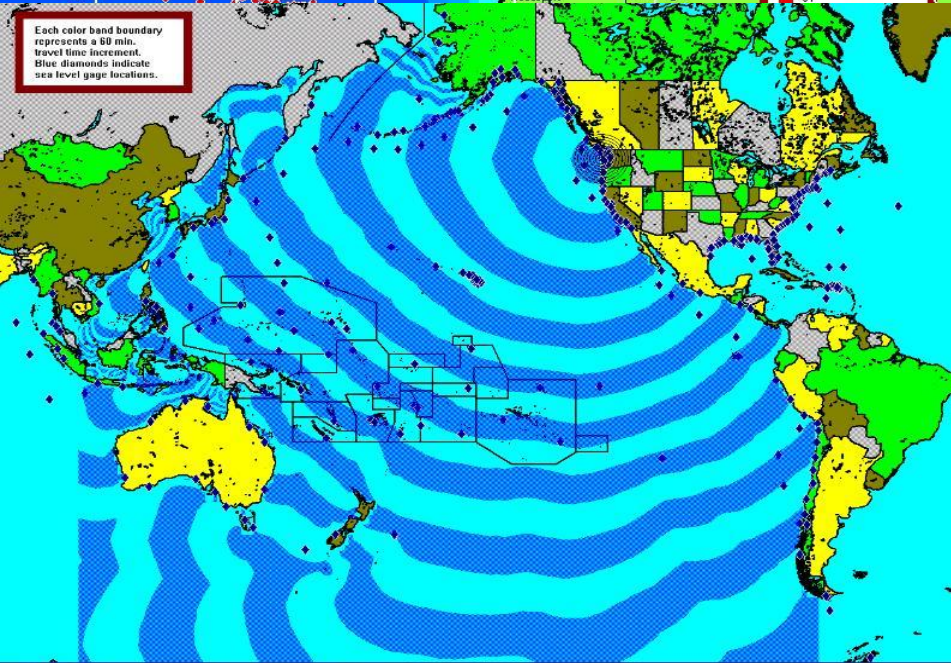
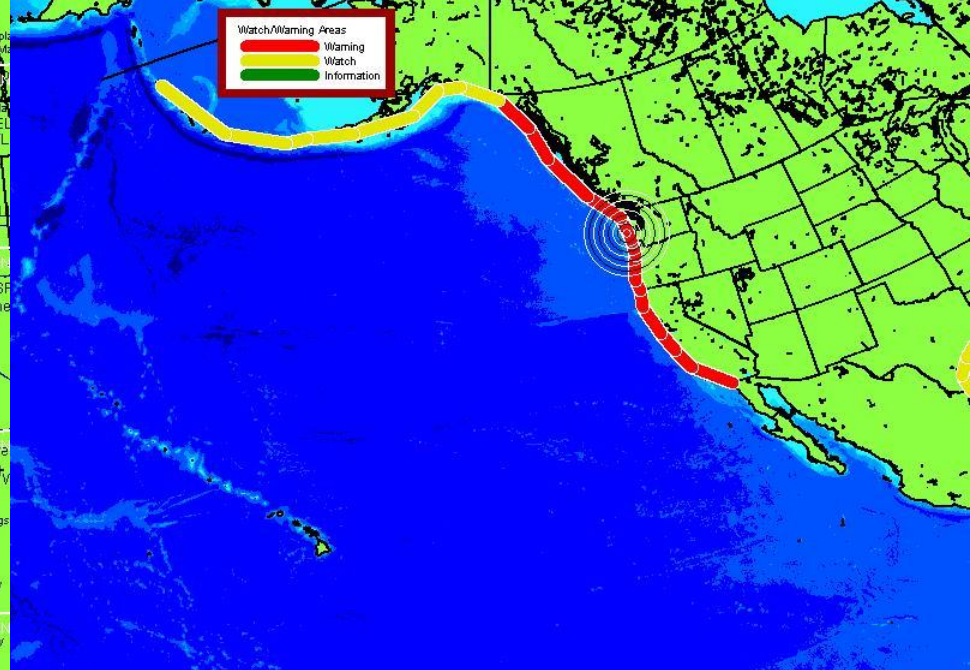
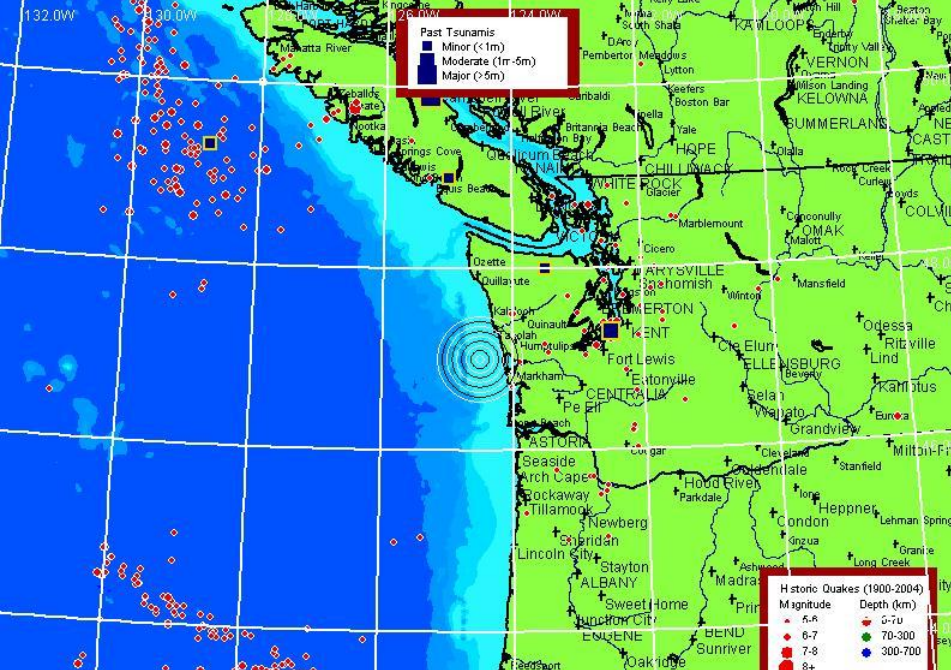


Pacific Northwest Tsunami Threat



- Local – tens of minutes:
 - *Cascadia*
 - *Landslide generation*
 - *Secondary faults*
- Regional – about one hour
 - *Cascadia segment*
- Distant – several hours away
 - *Alaska*
 - *NW Pacific*
 - *South America*



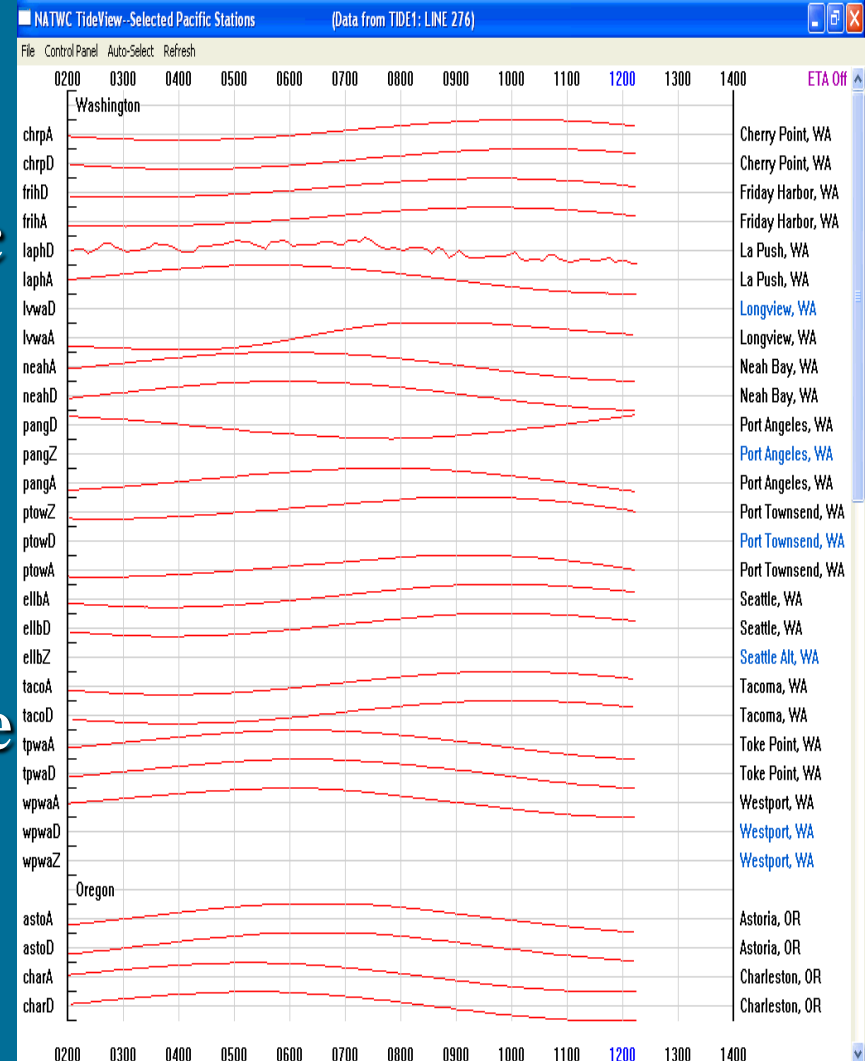




Typical Event Timeline - 2



- 5-10 min Verify receipt
- 10-30 min Further Seismic Analysis
- 10+ min Monitor Sea Level
- 30+ min Forecast
- Every 30' Update Message



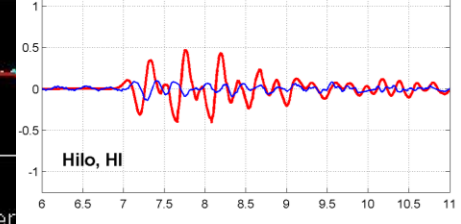
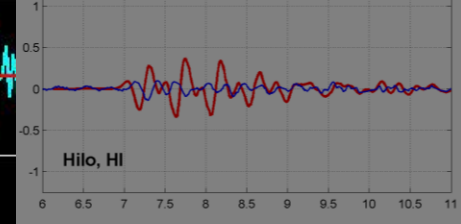
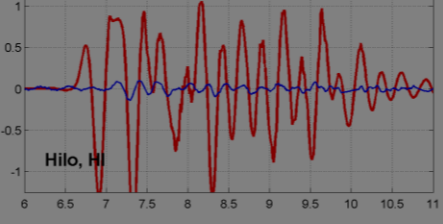
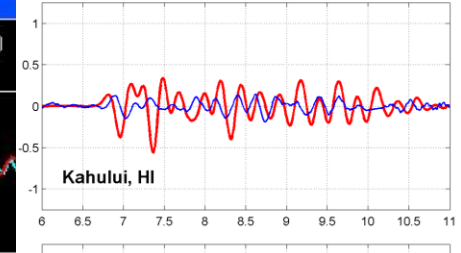
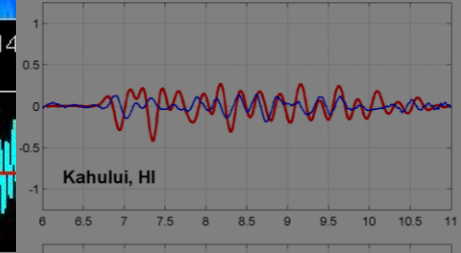
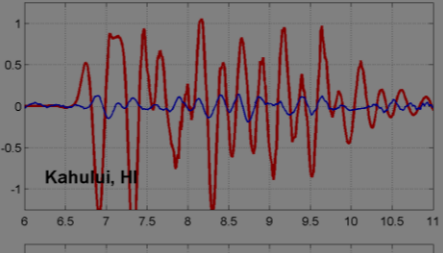
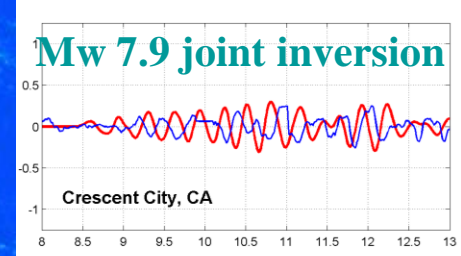
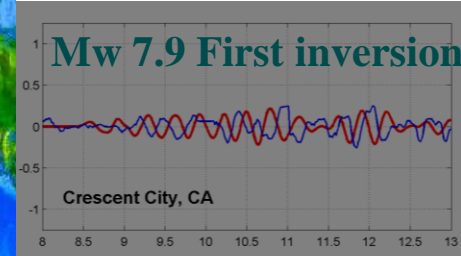
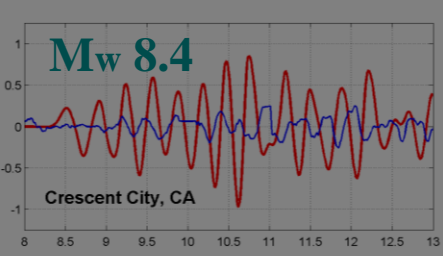
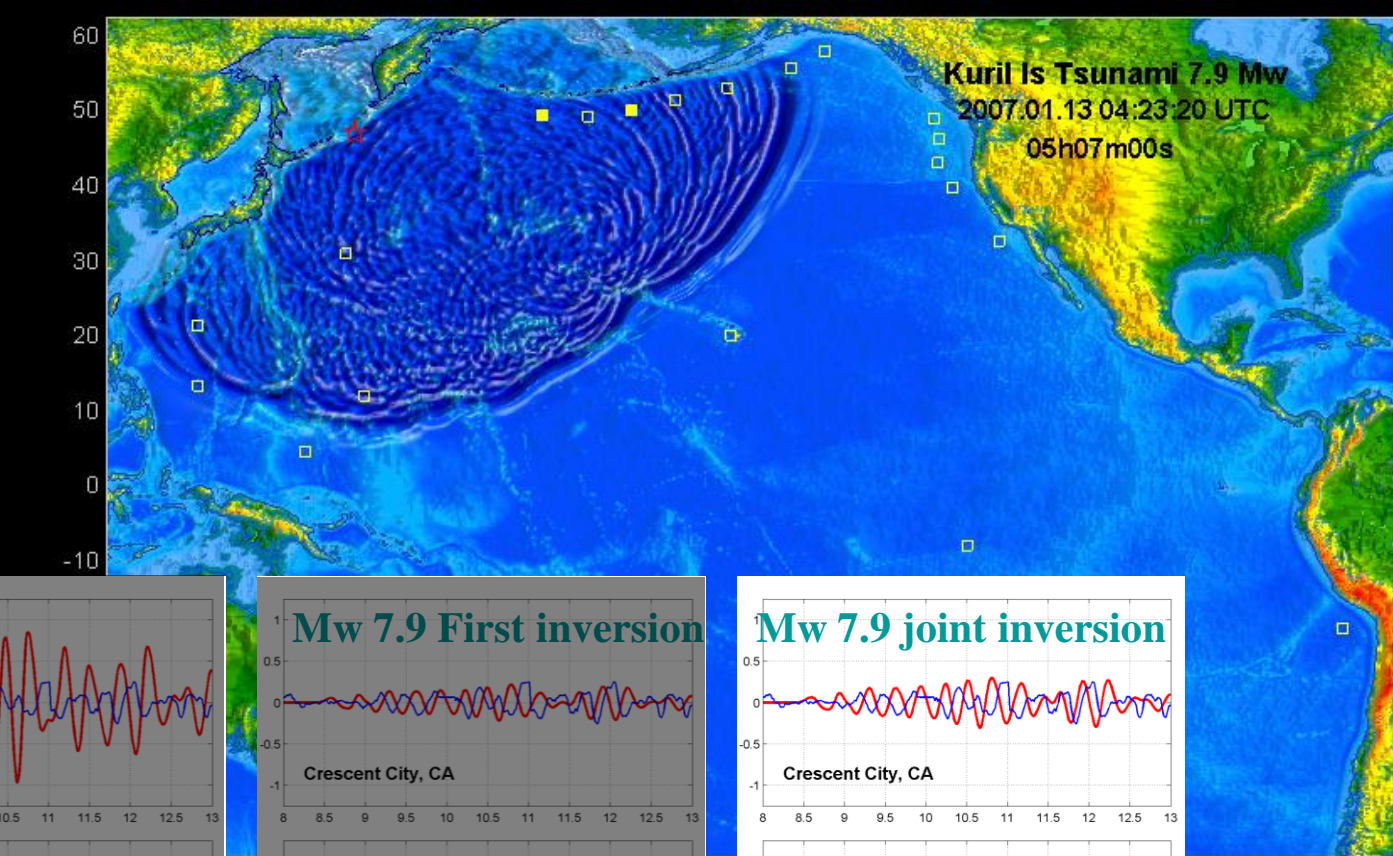


Tsunami Forecasting

Kuril Islands Event
 Magnitude 8.2
 Origin Time 2024 PST January 12, 2007

Tide Gauge	Estimated Tsunami Arrival Time	Forecasted Amplitude * (above sea level)	Observed Amplitude (above sea level)
Midway Island	2320 AKST 1/12	-----	0.19 M
Kodiak AK	0111 AKST 1/13	0.04 M	not measurable (<0.05 M)
Nawiliwili HI	0032 HST 1/13	0.07 M	0.10 M
Seward AK	0136 AKST 1/13	0.01 M	not measurable (<0.05 M)
Yakutat AK	0146 AKST 1/13	0.08 M	0.05 M
Sitka AK	0146 AKST 1/13	0.12 M	0.08 M
Honolulu HI	0047 HST 1/13		0.06 M
Langara BC	0156 AKST 1/13	0.07 M	not measurable (<0.05 M)
Kahului HI	0104 HST 1/13	0.33 M	0.17 M
Hilo HI	0112 HST 1/13		0.11 M
Juneau AK	0308 AKST 1/13	-----	not measurable (<0.05 M)
Neah Bay WA	0431 PST 1/13	0.02 M	0.03 M
La Push WA	0433 PST 1/13		0.13 M
Arena Cove CA	0436 PST 1/13	0.22 M	0.25 M
Port San Luis CA	0525 PST 1/13	0.19 M	0.11 M
Charleston OR	0539 PST 1/13	0.13 M	0.09 M
Crescent City CA	0543 PST 1/13	0.34 M	0.23 M
Point Reyes CA	0559 PST 1/13	0.17 M	0.12 M
San Francisco CA	0629 PST 1/13	0.09 M	0.05 M
Santa Barbara	0638 PST 1/13	0.05 M	0.10 M

NOAA – SIFT Tsunami Forecast





Message Dissemination

