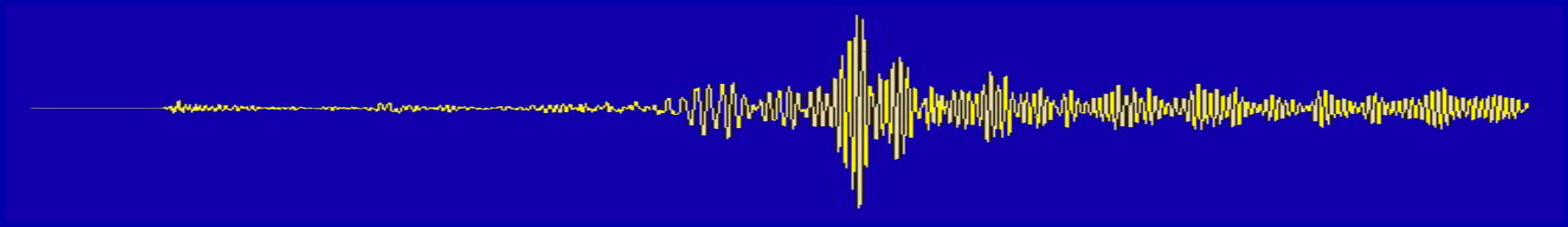
12.103
Strange Bedfellows: The Science and Policy of Natural Hazards

Earthquake preparedness and warning systems



Spring 2008

Earthquake prediction

- Location, time, intensity
- One successful prediction in Haicheng, China, 1975
- Problems: (i) we don't know the strain field and friction coefficient everywhere along the fault plane; (ii) we don't understand all the physical factors involved in earthquake processes

Earthquake potential and preparedness

- Current research is based on statistical analysis of paleo-seismicity and foreshocks, measures of ground motion (GPS), imaging of seismogenic zones
- Results help construct seismic hazard maps, which guide building codes and development of emergency response procedures
- Results help determine medium and long-term earthquake potential

Seismic hazard map (peak shaking)

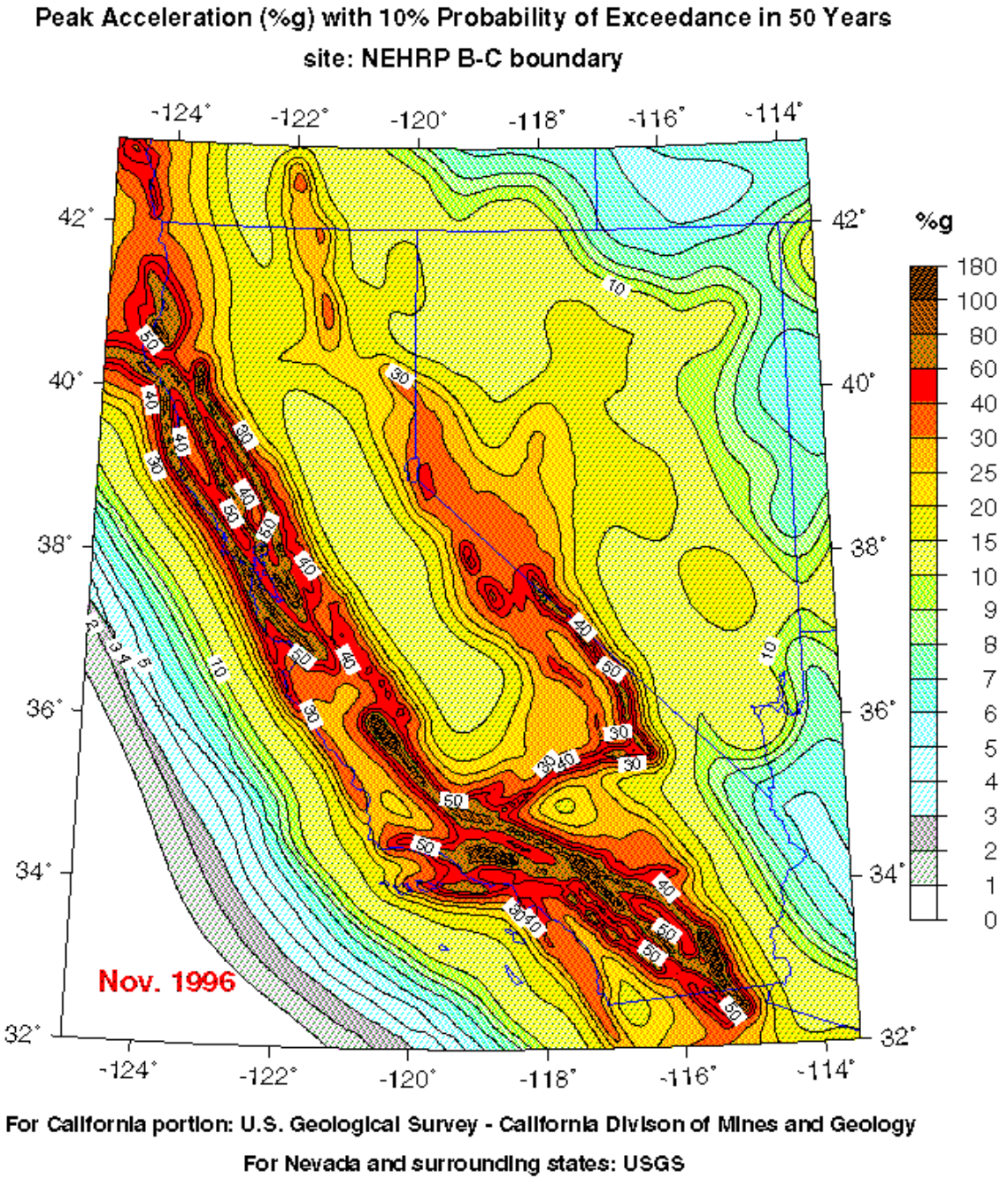


Image courtesy of USGS.

Seismic hazard map (peak shaking)

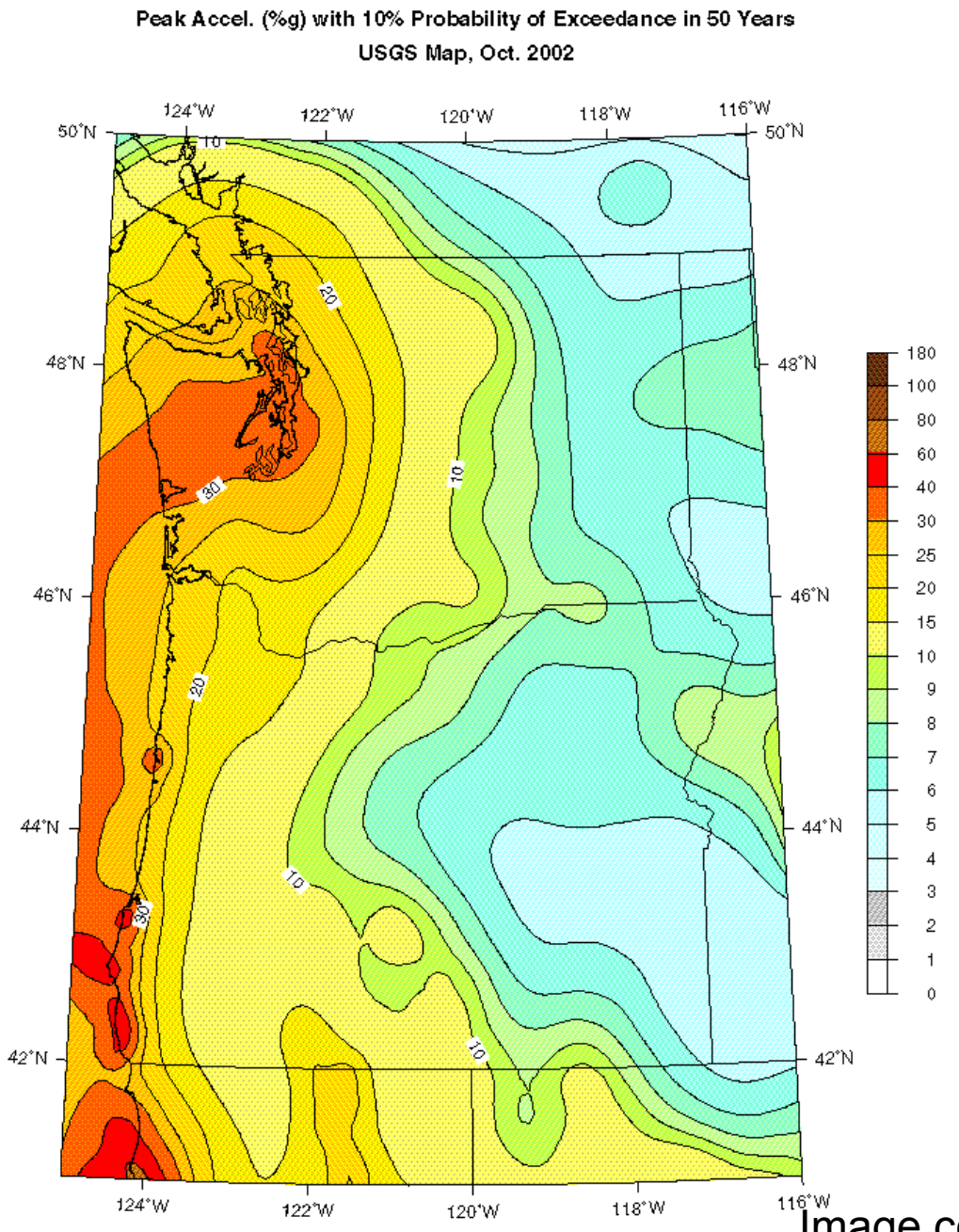


Image courtesy of USGS.

Seismic hazard map (peak shaking)

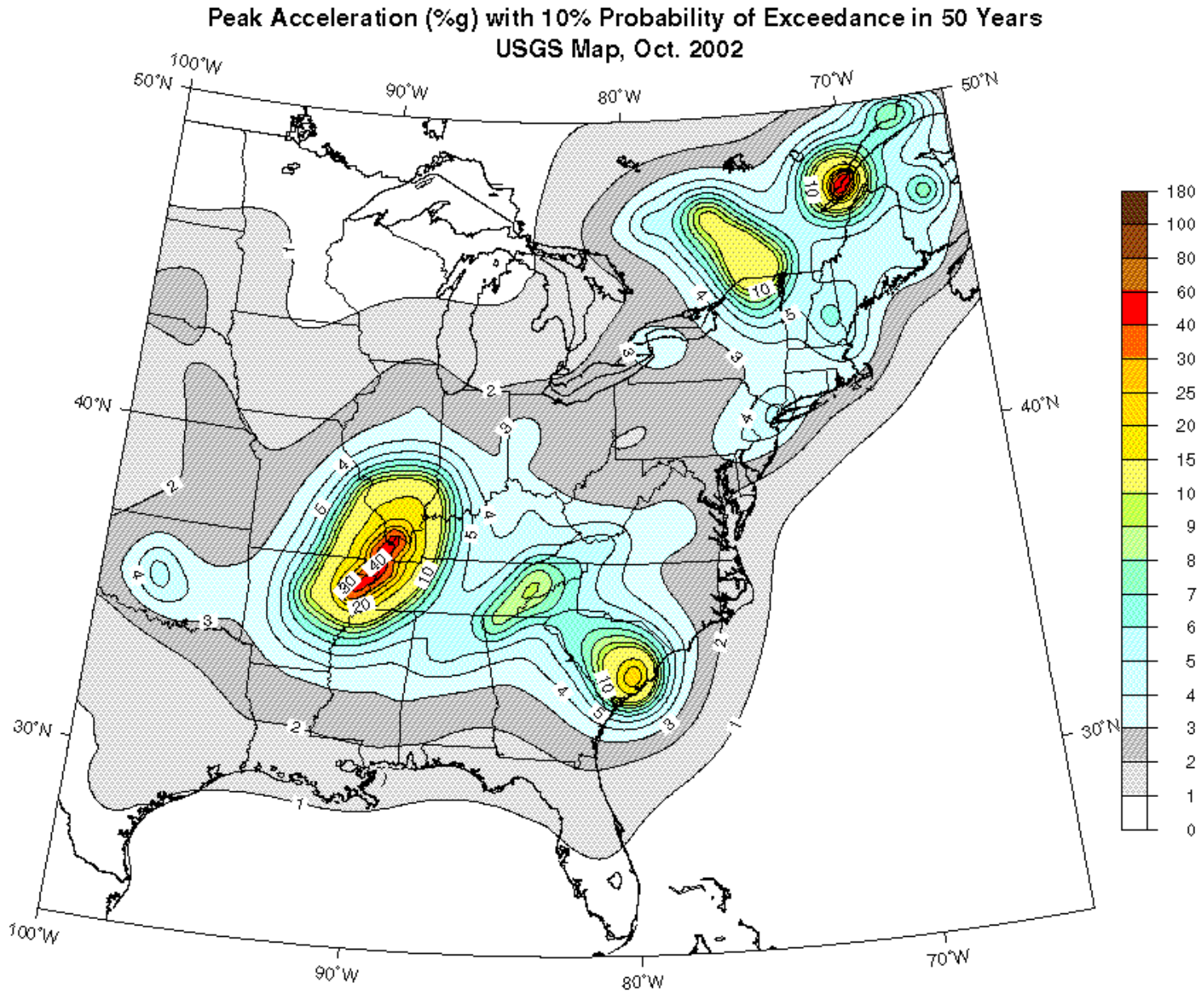


Image courtesy of USGS.

Assessing building vulnerability

- location relative to active faults
- type of soils on which building rests
- age and type of building

Earthquake preparedness: 7 steps

1. Before

Identify potential hazards in your home and begin to fix them

2.

Create your disaster plan

3.

Create your disaster supply kits

4.

Identify your home's potential weaknesses and begin to fix them

5. During

During earthquakes and aftershocks: Drop, cover and hold on

6. After

After the shaking stops, check for damage and injuries needing immediate attention

7.

When safe, follow your disaster plan

California Earthquake Authority

Deep-ocean Assessment and Reporting of Tsunamis (DART)

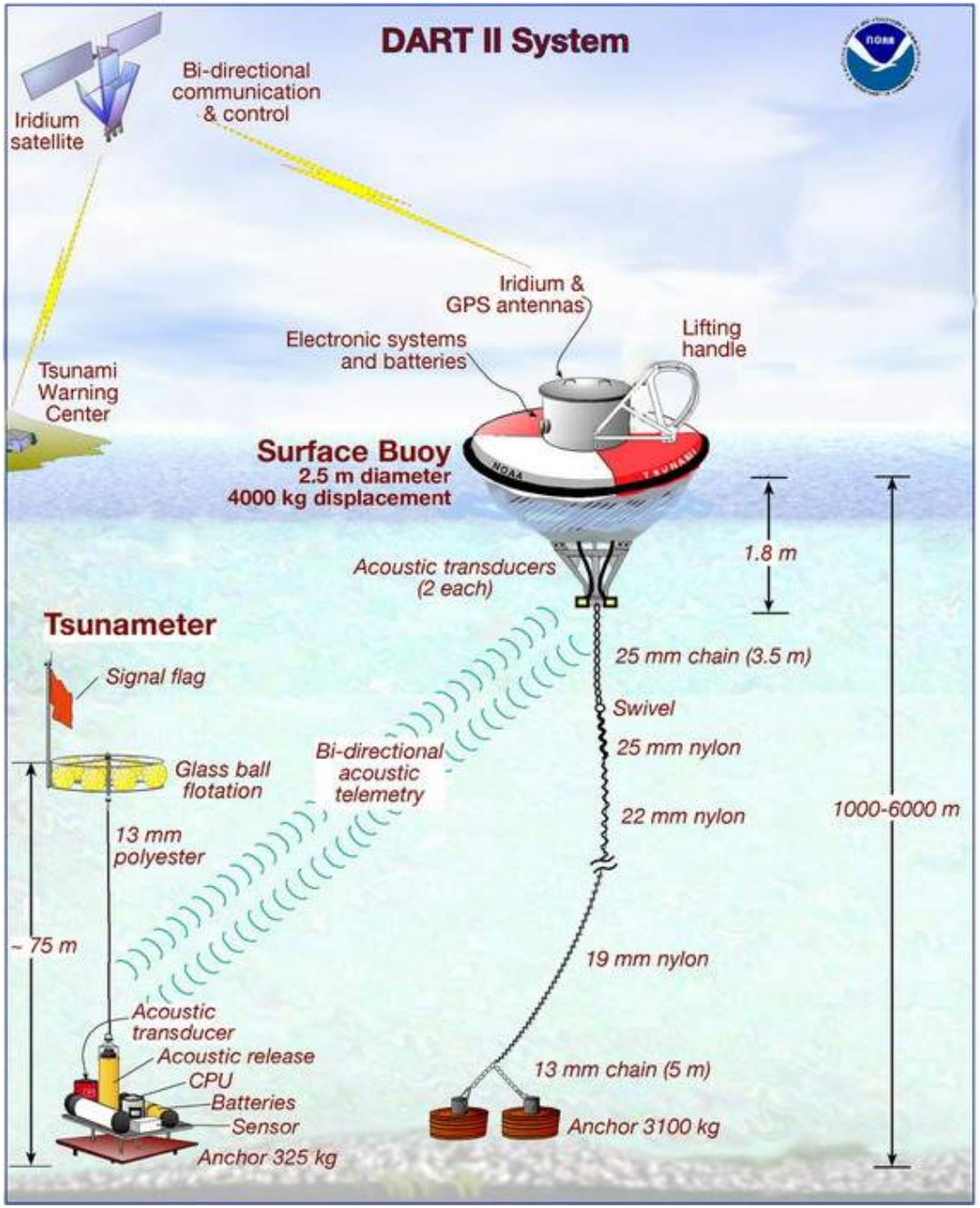


Image courtesy of NOAA.

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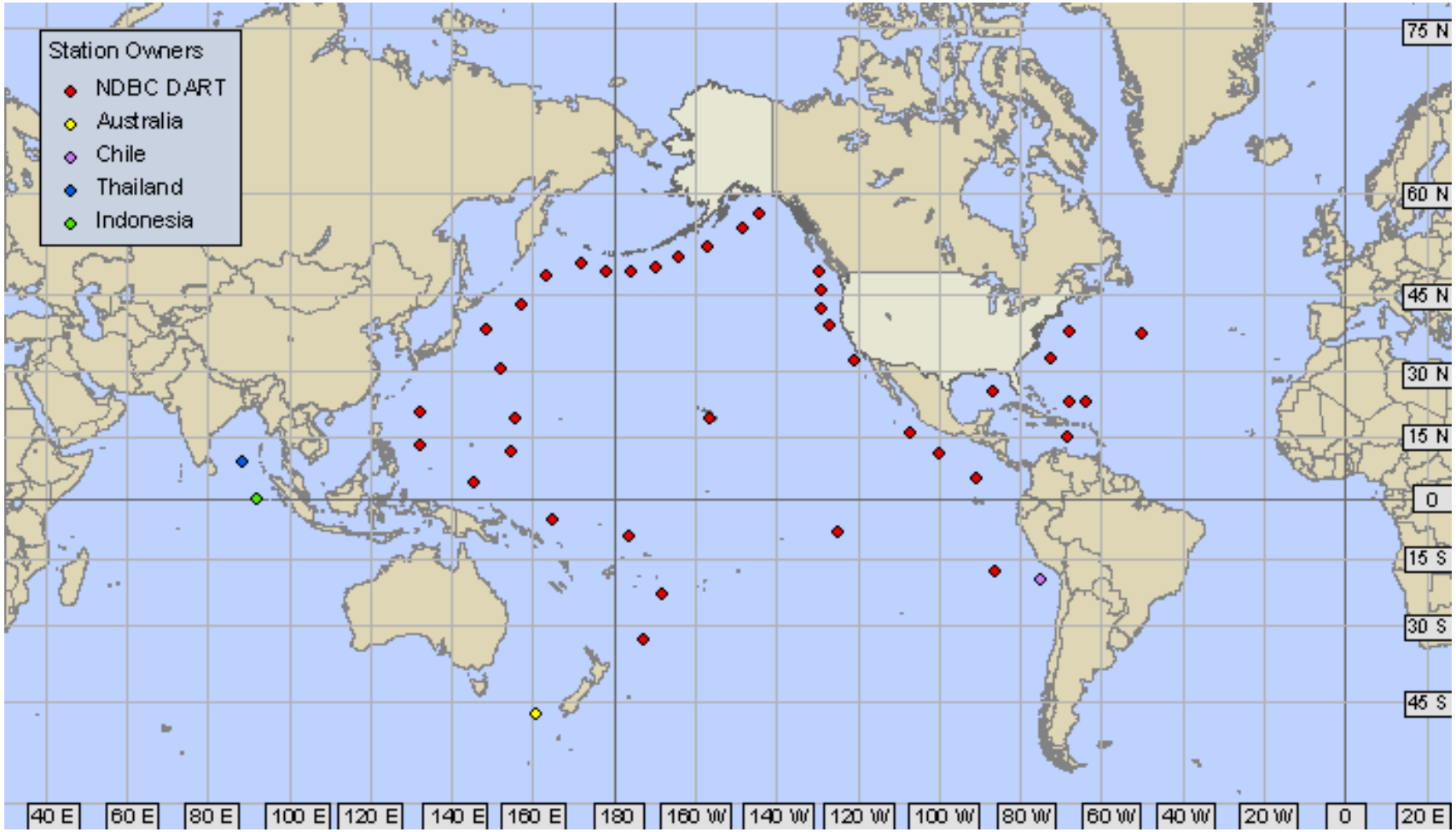
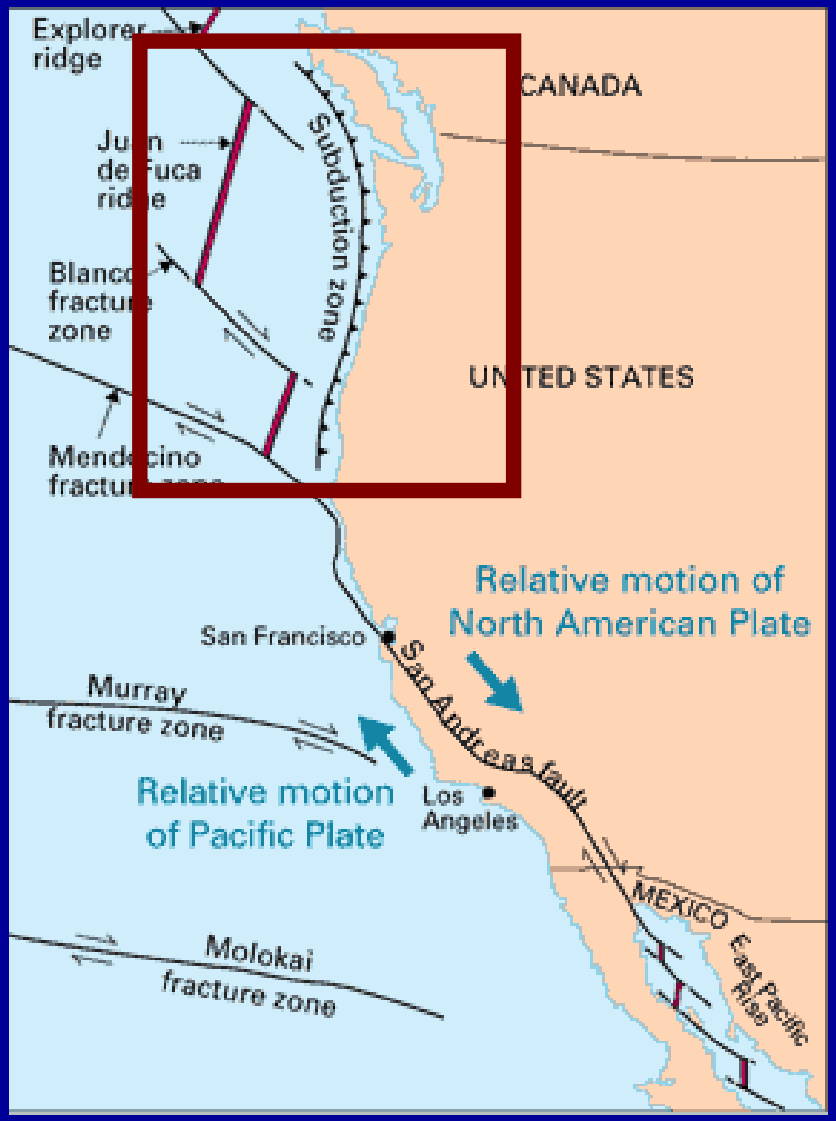


Image courtesy of NOAA.

Image from public domain.

Where can we expect the next "Big One" in the contiguous 48 states?



USGS

- Cascadia subduction zone
- Last earthquake: 26 January 1700, ~9pm, M > 9.0
- Archeoseismology: tree stumps, tsunami deposits in PNW estuaries and tsunami records in Japan
- Recurrence: 300-500 years for the last ~10,000 yr

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