Senate Transportation Committee

February 7, 2019

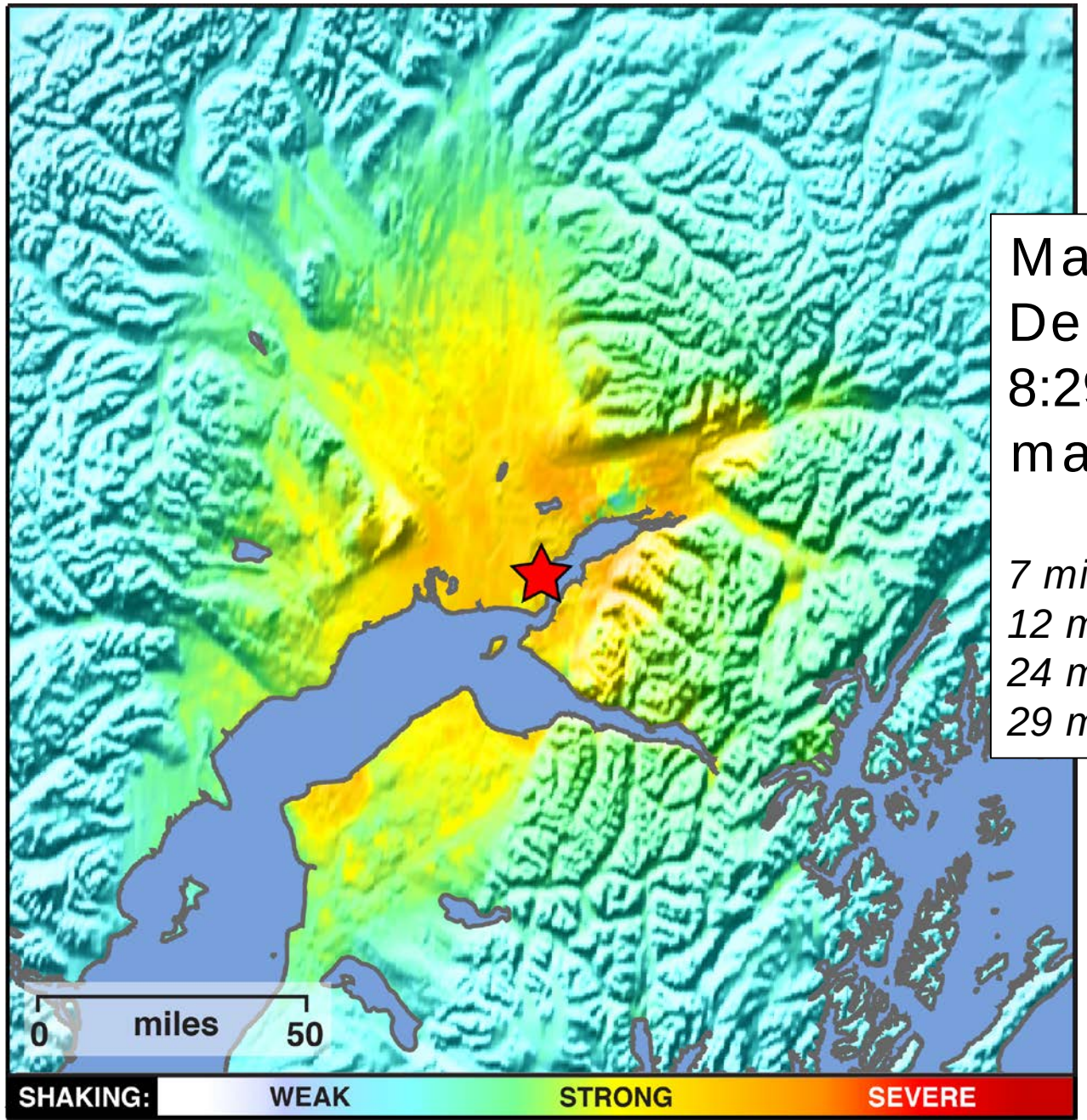
Michael West

State Seismologist

Research Professor

University of Alaska Fairbanks

rapid assessment

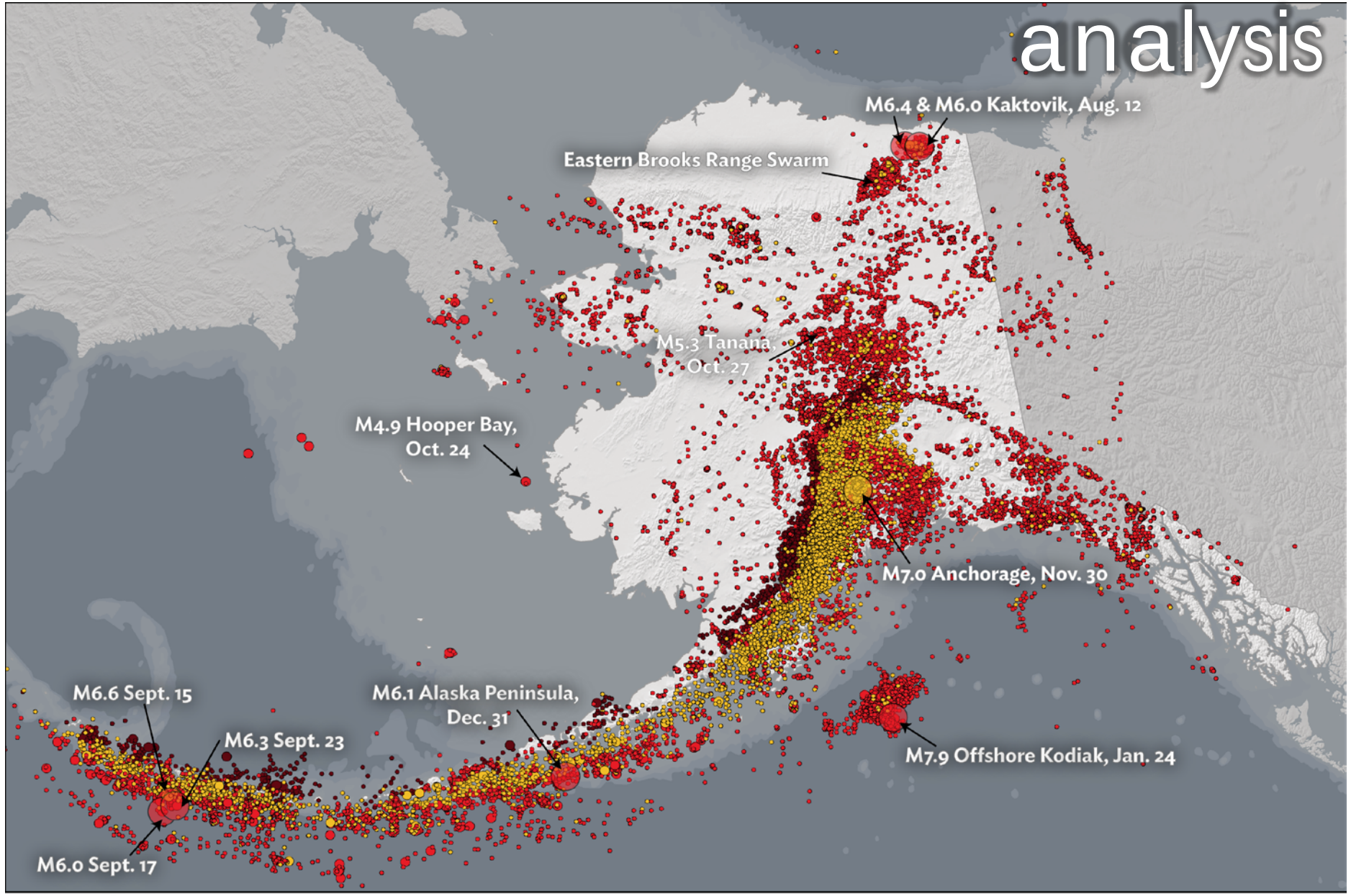


Magnitude 7.0
Depth 29 miles
8:29:29 AKST
maximum intensity: VIII

7 miles NW of Elmendorf AFB
12 miles W of Eagle River
24 miles SW of Wasilla
29 miles S of Willow

tsunami hazards

analysis



2018 Seismicity

0 50 100 200 300 Miles
0 50 100 200 300 400 500 Kilometers

Magnitude
M>6 M<4

Depth
Shallow, <30km
Intermediate, 30-120km
Deep, >120km

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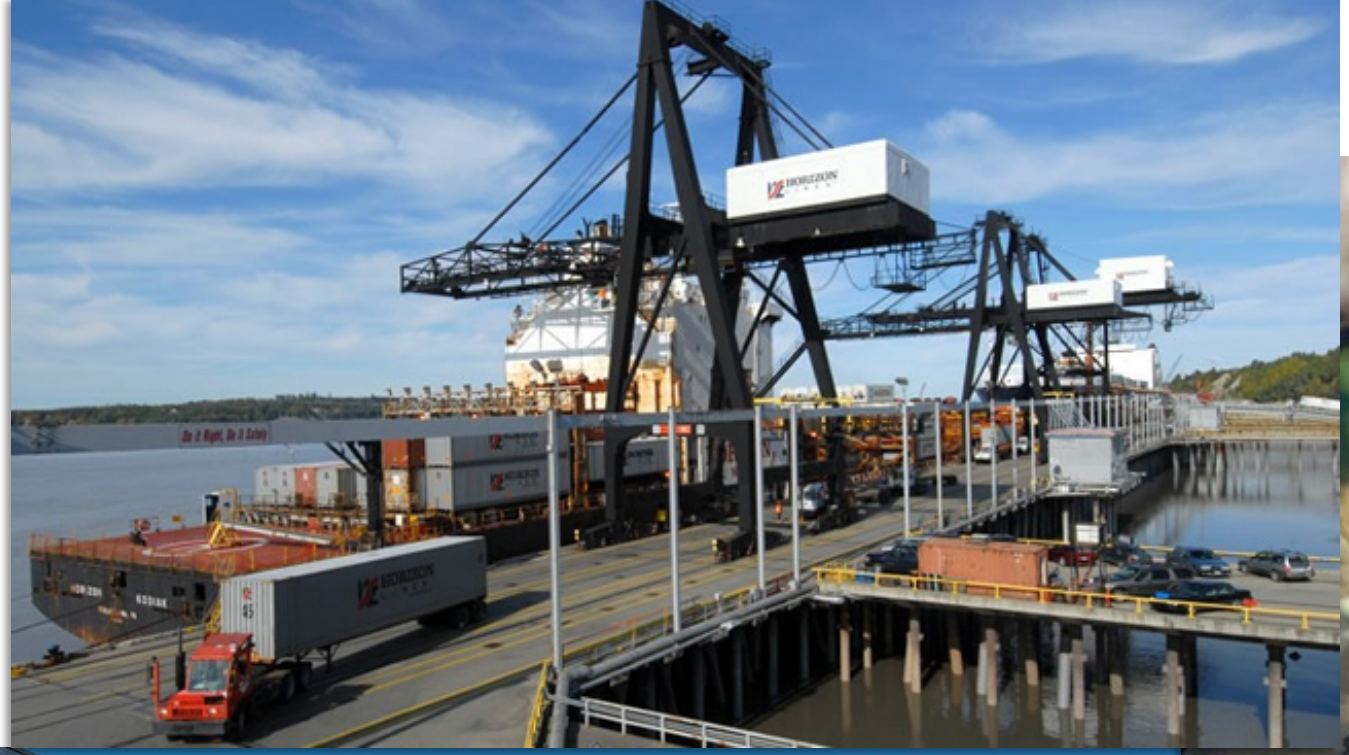
who cares?

→ building codes
→ environmental review
→ insurance rates
→ evacuation routes & shelters
→ hazard mitigation plans

M. Tunseth, ADN

who cares?



why we do it?

The Alaska State Legislature

HOME | SENATE | HOUSE | BILLS & LAWS | SEARCHES | MEDIA CENTER | PUBLICATIONS | GET STARTED

SEARCH Display ?

29th Legislature(2015-2016)

Alaska Statutes 2015

AS 14.40.075

Sec. 14.40.075. Alaska Earthquake and Volcanic Hazards Assessment Project; state seismologist.

(a) The University of Alaska shall establish an Alaska Earthquake and Volcano Hazards Assessment Project within the seismology program of the geophysical institute. The project shall

(1) collect, record, process, and archive seismic data on earthquakes and volcanic eruptions in the state;

(2) conduct seismological studies relating to earthqua assessment;

(3) evaluate earthquake and volcanic seismic d identification and assessment of earthquake and volcanic haz significant risk to lives and property in the state;

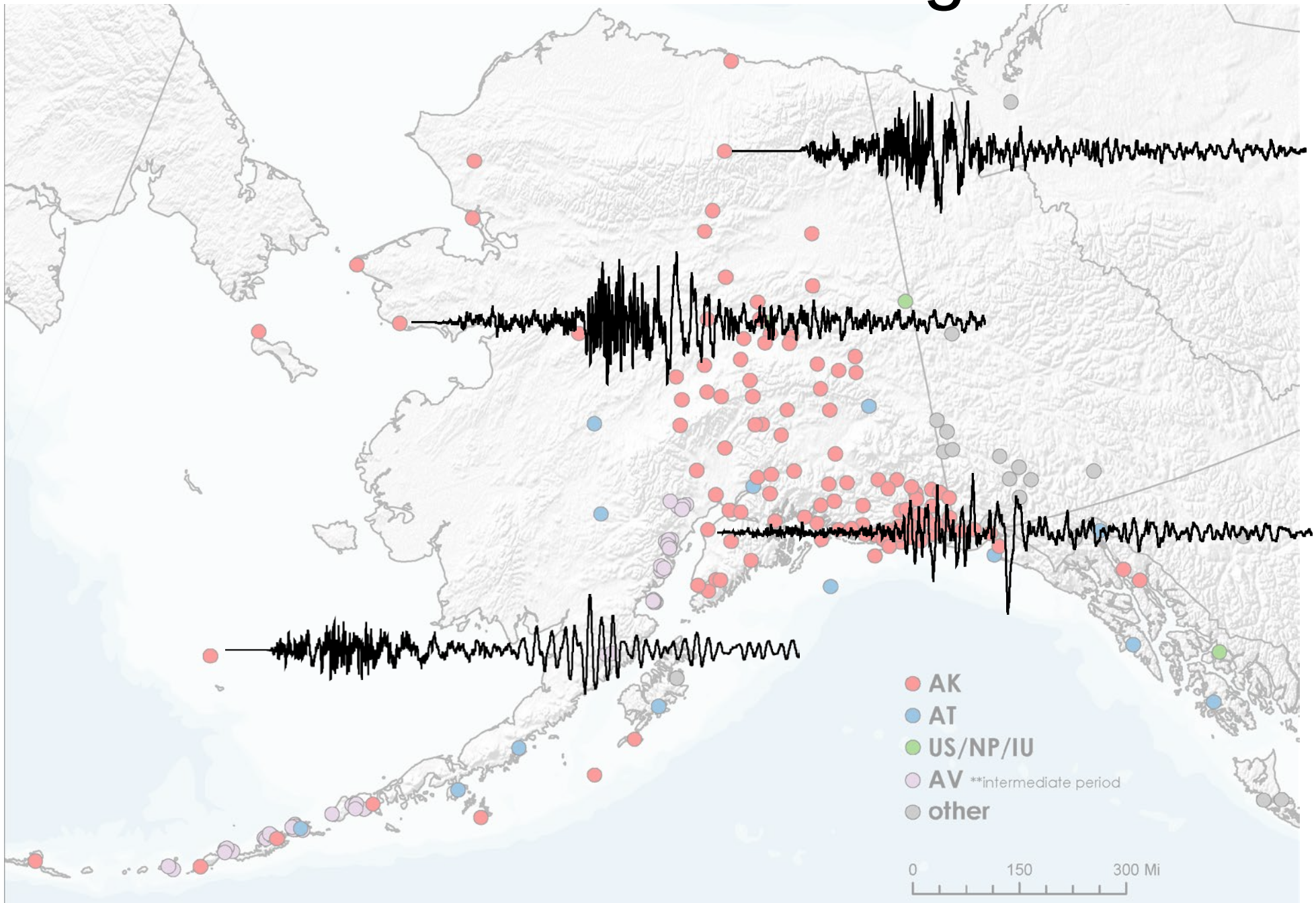
(4) inform public officials, industry, and private citizens of potential earthquake or volcanic risks and assist in planning to reduce risks to lives and property; and

(5) coordinate its activities with other organizations and agencies that monitor, collect, assess, and conduct research on earthquake and volcano hazards in order to avoid duplication of effort.

(b) The administration and management of the project are under a university employee designated the state seismologist. The state seismologist shall provide timely information concerning earthquake and volcano hazards to public officials, industry, and private citizens and serve as liaison to state and federal agencies in the event of emergencies due to seismic and volcanic activities.

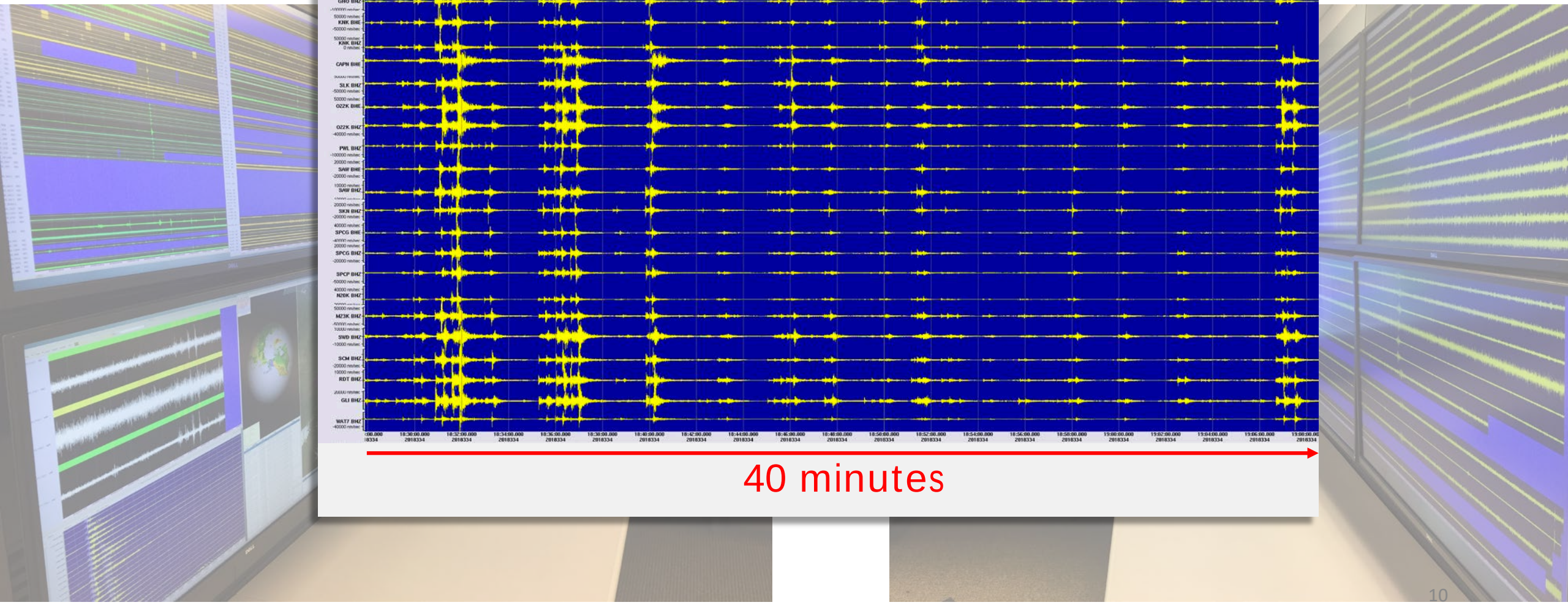
tration and management o
the state seismologist.
oncerning earthquake and

monitoring network

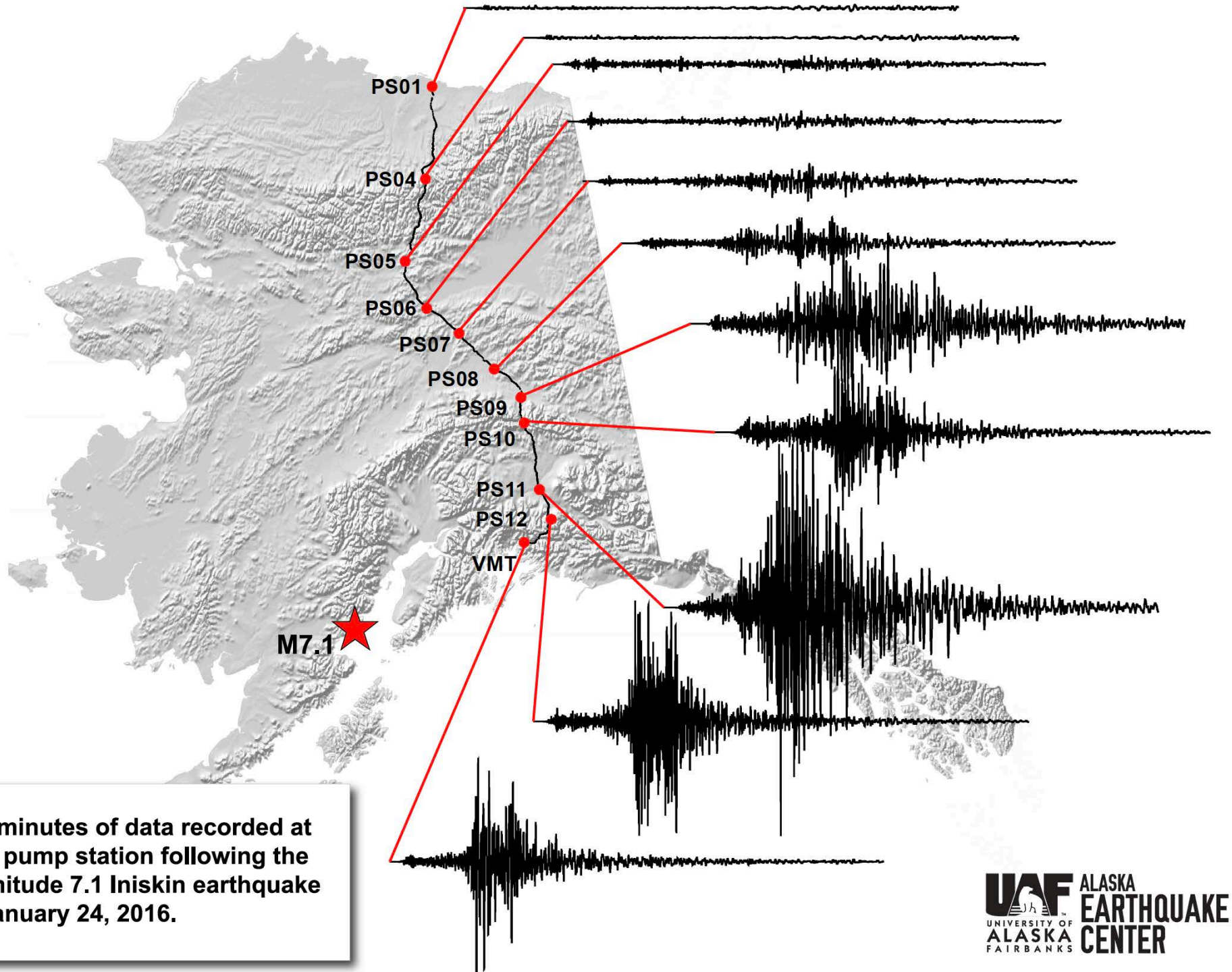


seismic station

Alaska Earthquake Center



decision support



Five minutes of data recorded at each pump station following the magnitude 7.1 Iniskin earthquake on January 24, 2016.

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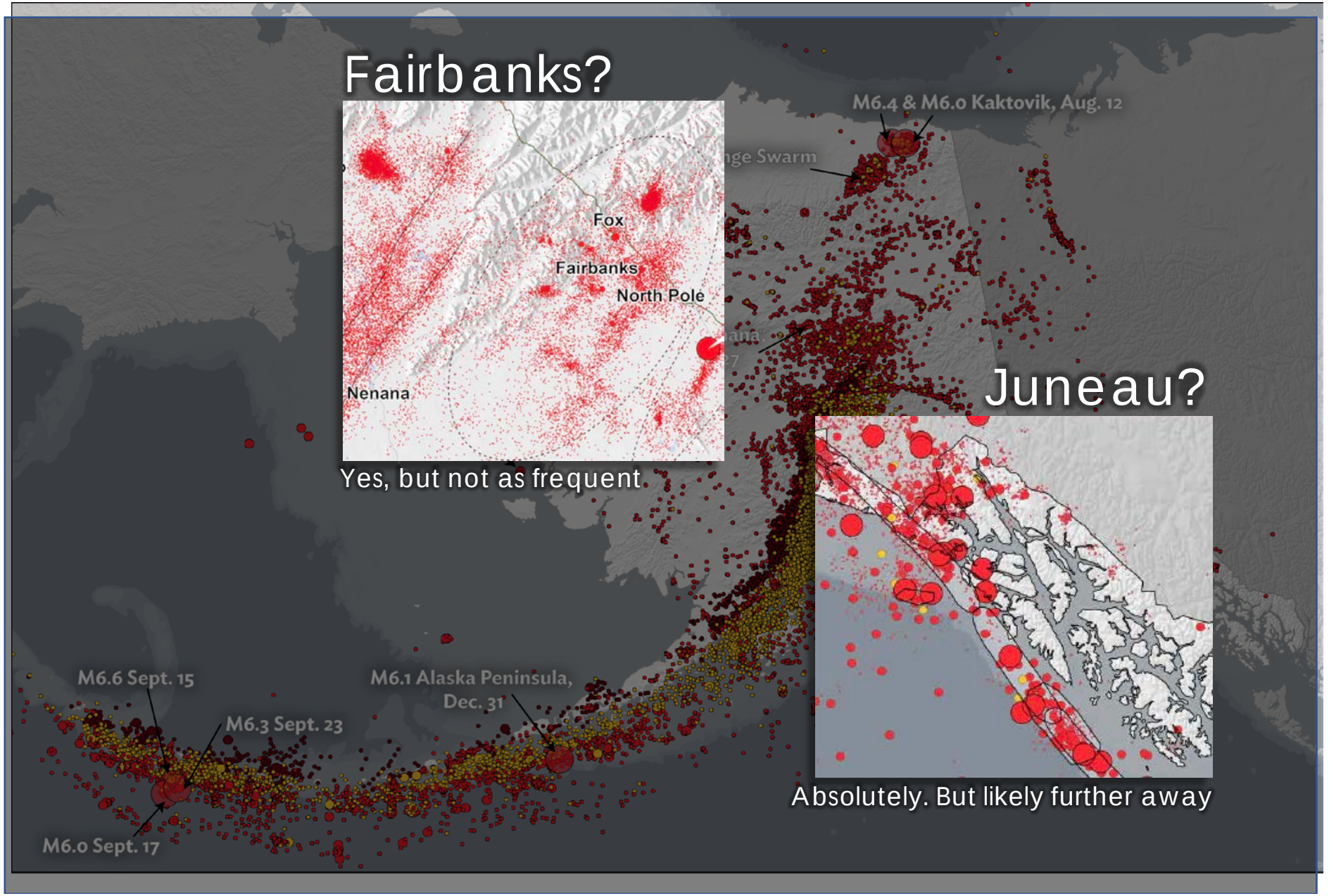
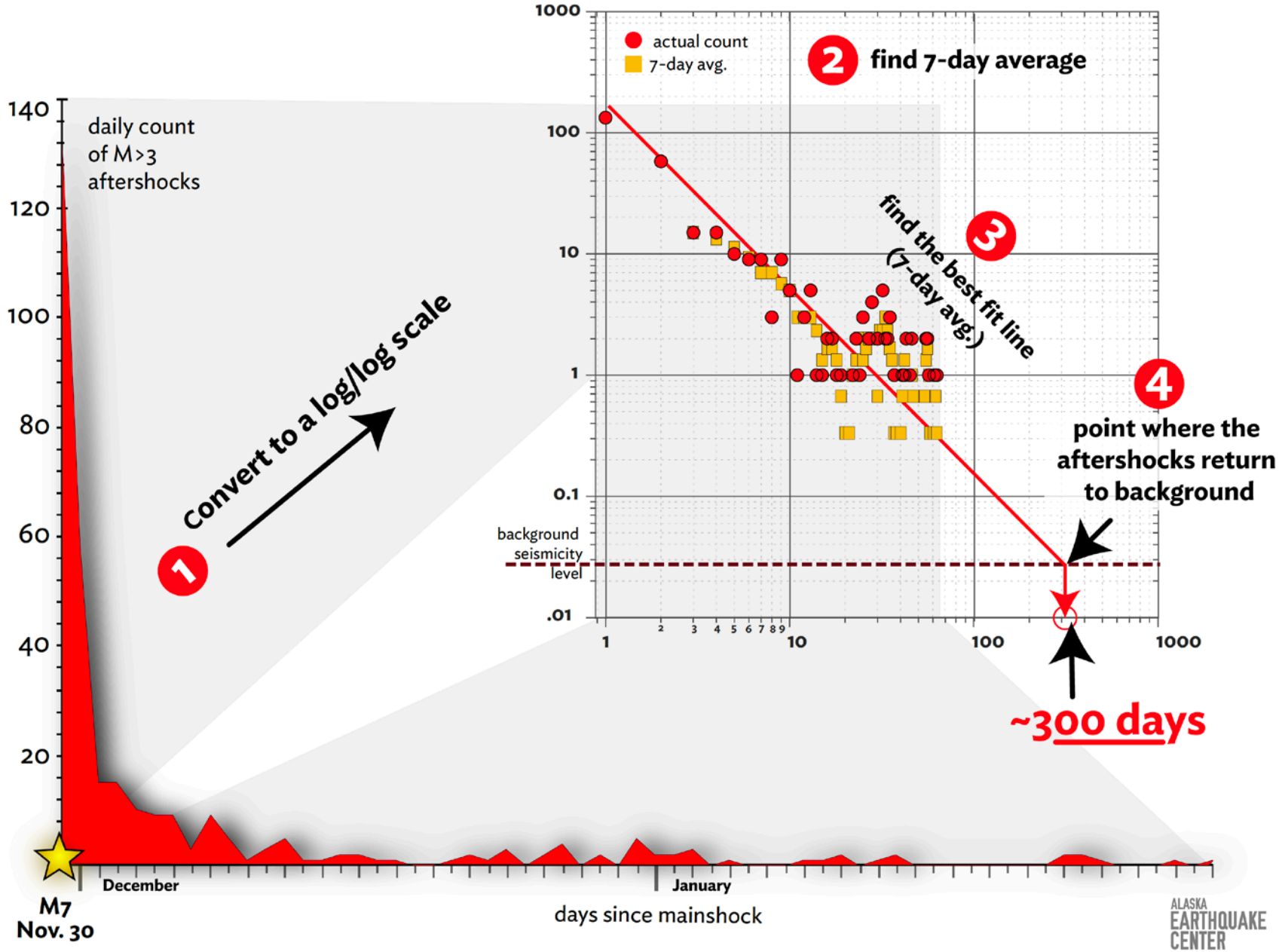
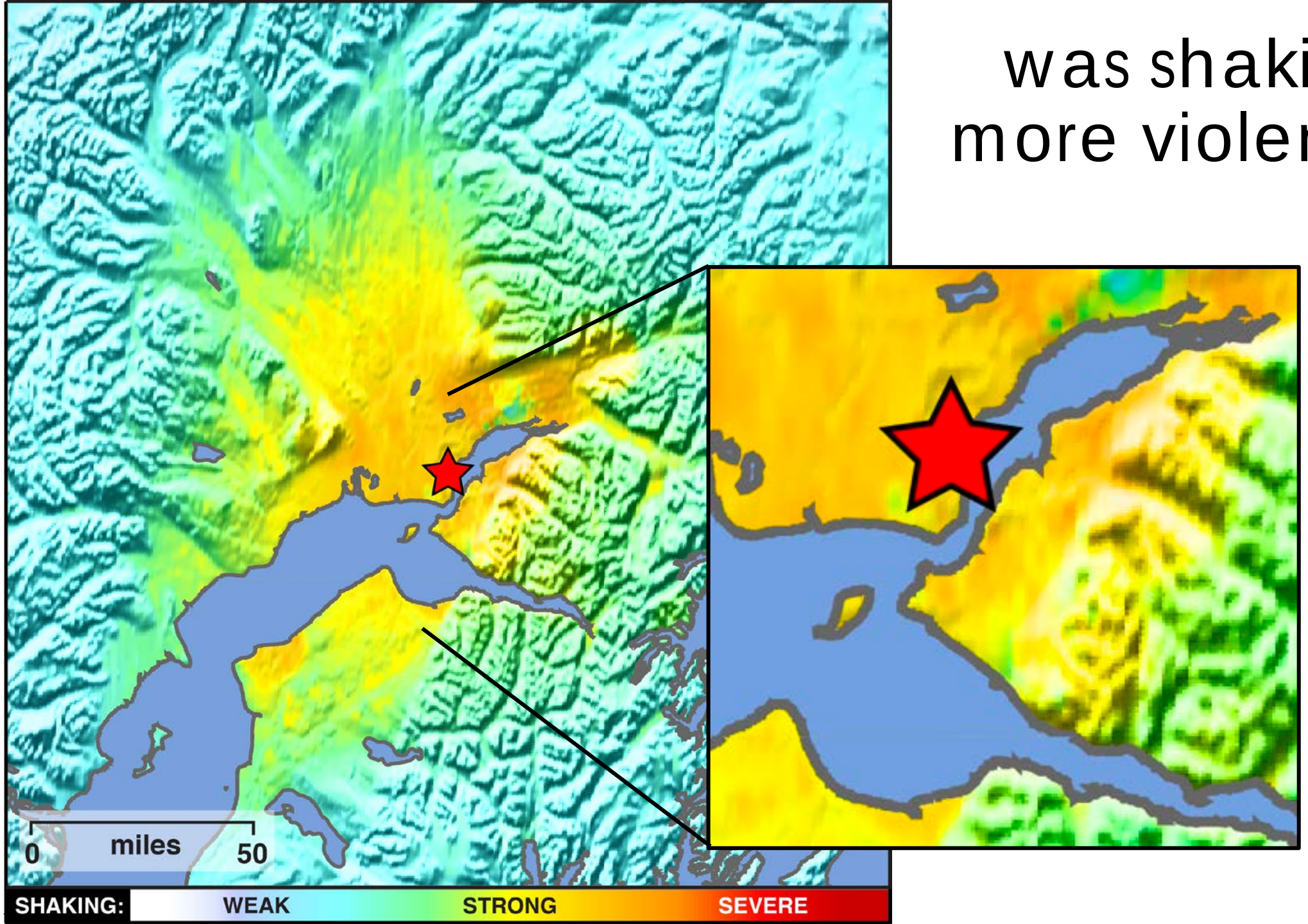
worst case?


Fairbanks?
Fox
Fairbanks
North Pole
Nenana
Yes, but not as frequent
M6.4 & M6.0 Kaktovik, Aug. 12
Juneau?
Absolutely. But likely further away
M6.6 Sept. 15
M6.3 Sept. 23
M6.0 Sept. 17
M6.1 Alaska Peninsula, Dec. 31

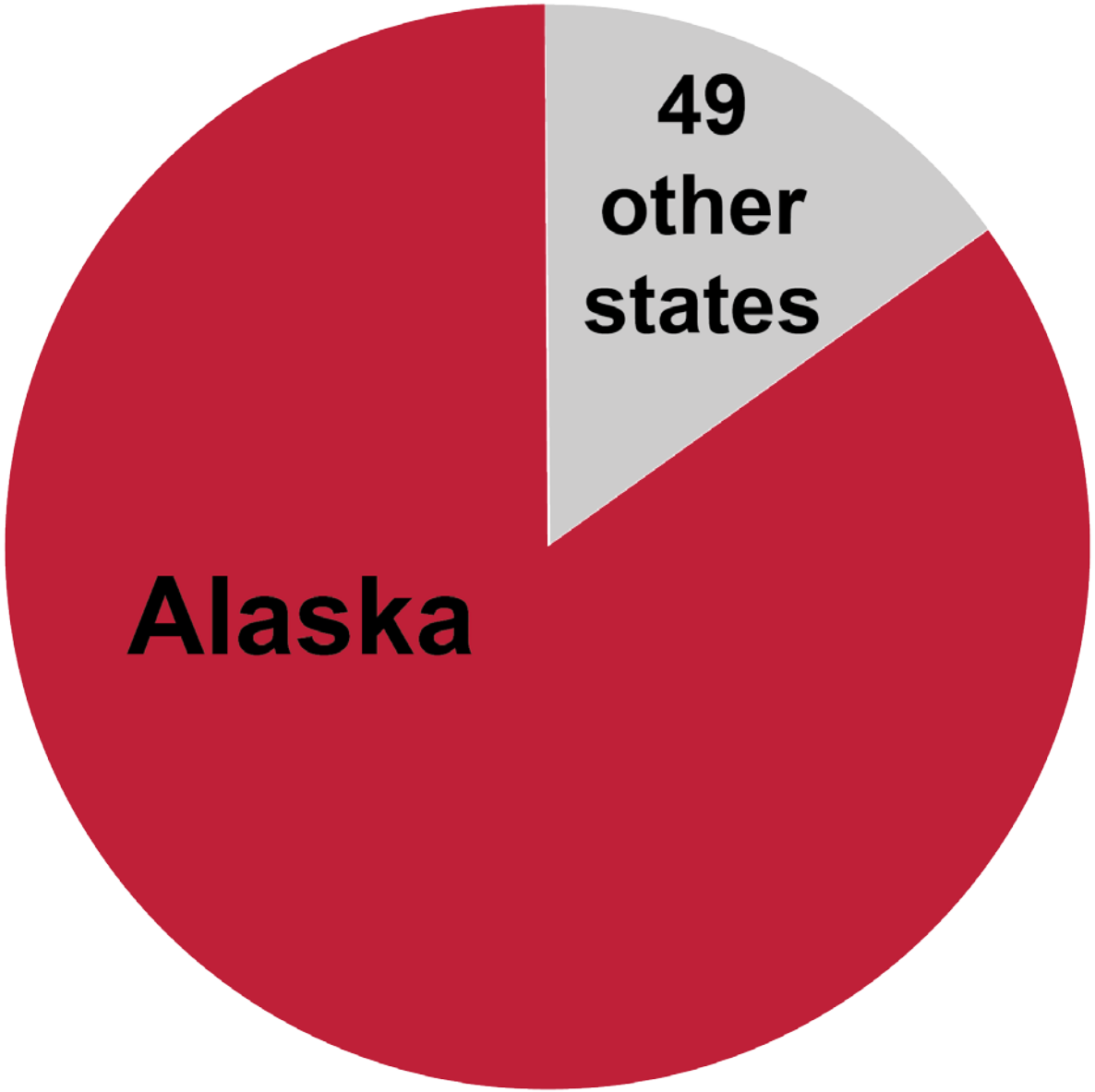
when will aftershocks end?



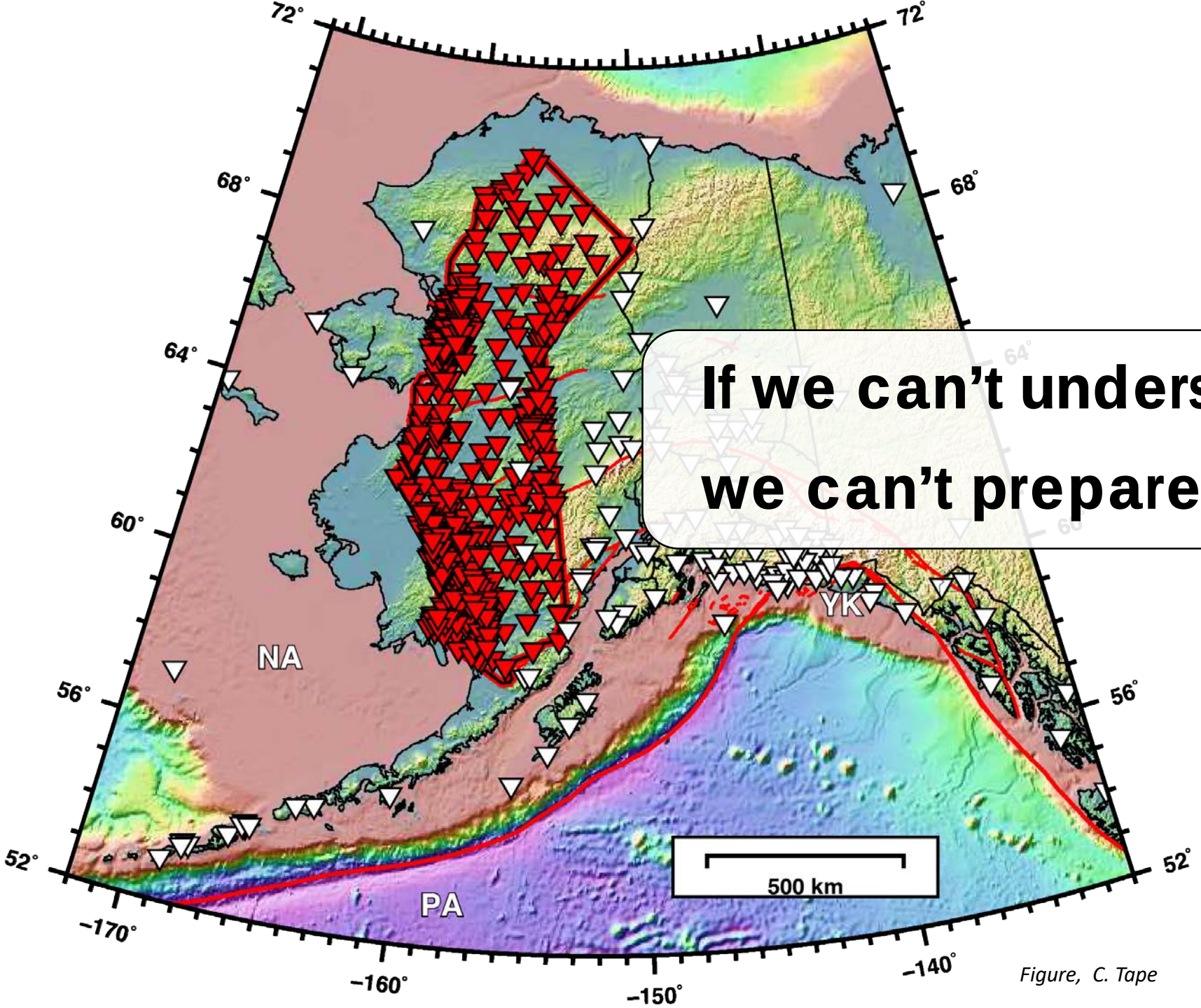
was shaking more violent?



4 out 5 earthquakes



Alaska & lower 48

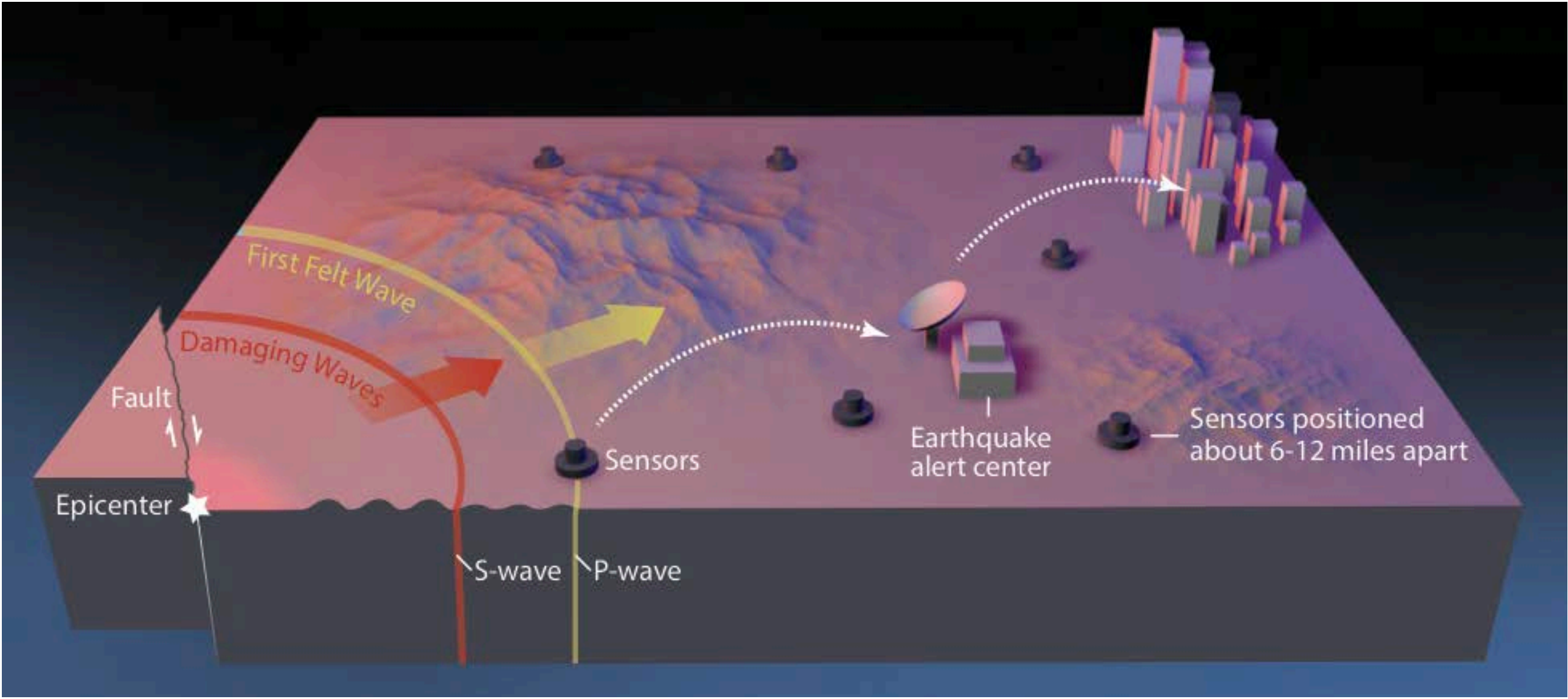


If we can't understand it,

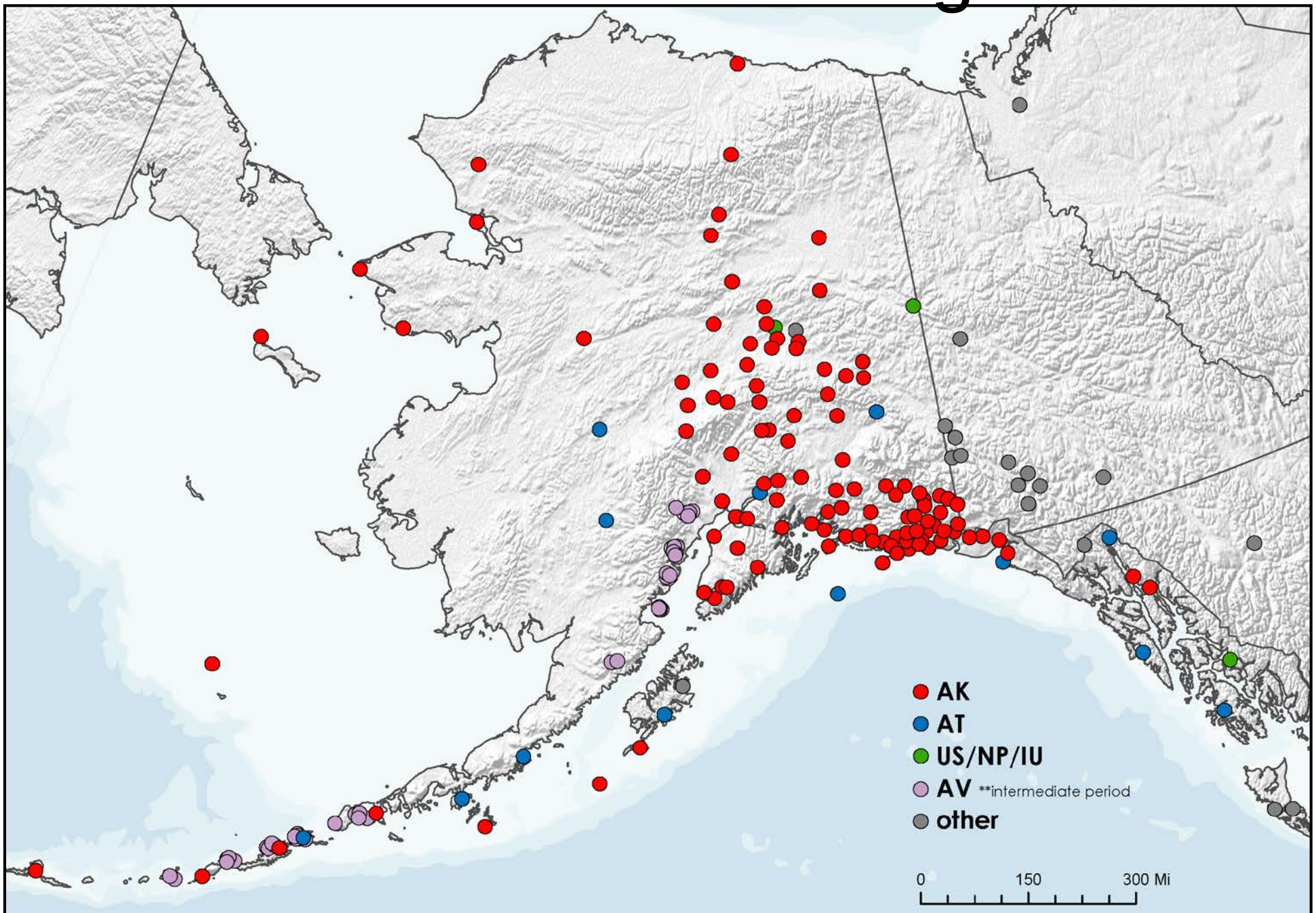
we can't prepare for it

Figure, C. Tape

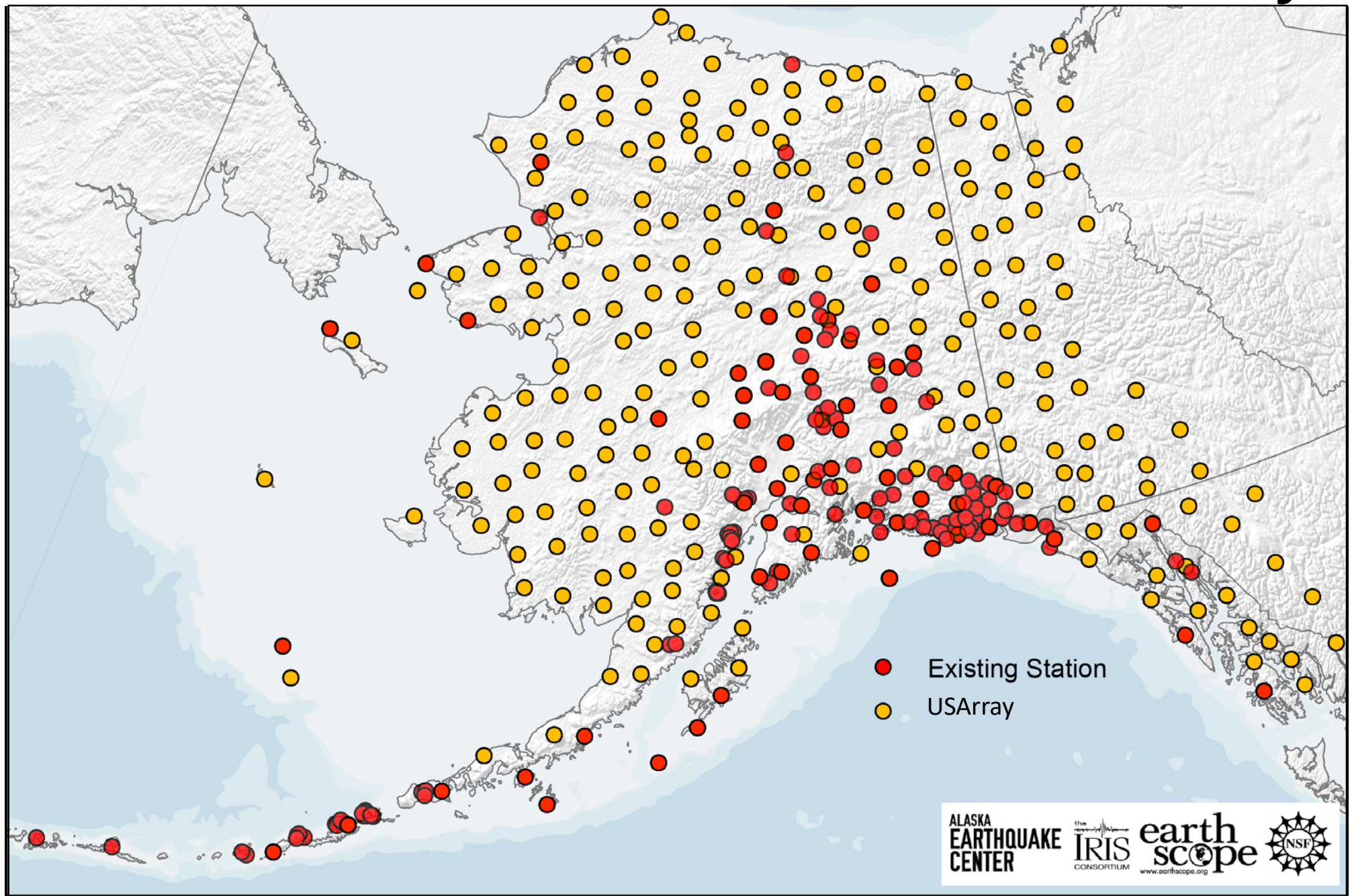
earthquake early warning



monitoring network



with USArray



CRITICAL EARTHQUAKE AND WEATHER MONITORING

HOW TO RETAIN CAPABILITIES:
This capital project would activate long-term federal support for this network of monitoring stations

Help Alaska build safely

Accurate earthquake information allows major development projects, bridges, utilities and private residences to be built safely. This information is the foundation for building codes, insurance rates and environmental reviews.

Leverage the sensor backbone across the state

Agencies access the meteorological sensors, cameras, and surveying equipment to enhance weather forecasts and support aviation, marine, military and private sector interests across Alaska and surrounding waters.

Earthquake early warning

Alaska is the only high-hazard state that is not pursuing an early warning system. USArray will make it feasible to consider this.

Issue reliable tsunami warnings

Reliable tsunami warnings require a comprehensive network that can remain operational during a damaging earthquake.

Demostrated success

Precise earthquake data helped calibrate building codes, limiting the catastrophic potential of the M7 earthquake in Nov. 2018.

Determine how earthquakes happen

High-quality seismic data enables the research necessary to forecast future earthquake activity.

Learn more online at:
https://earthquake.alaska.edu/usarray-sustainability

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ALASKA EARTHQUAKE CENTER

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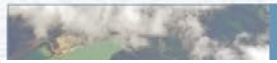

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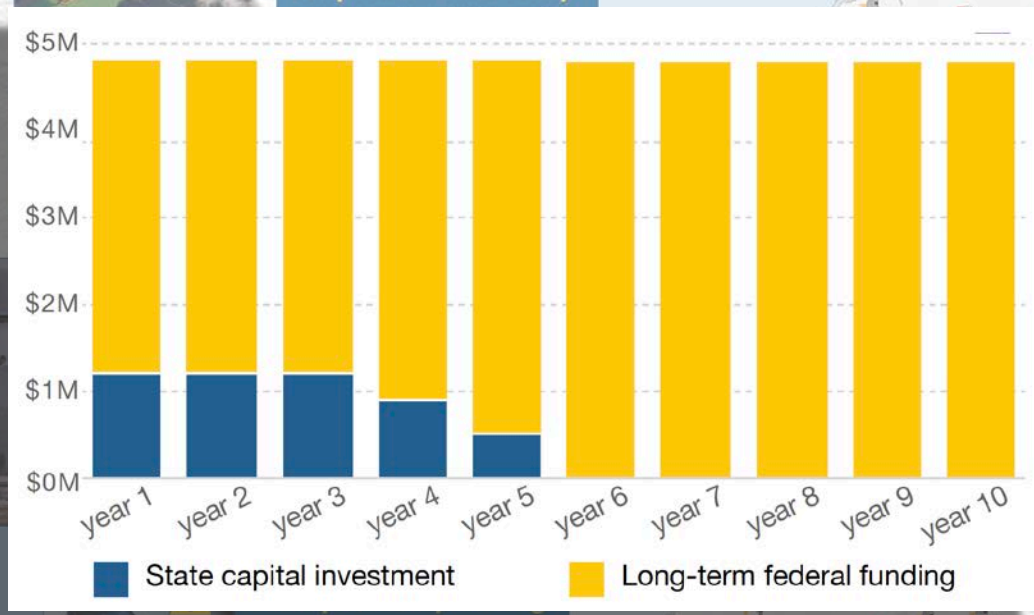

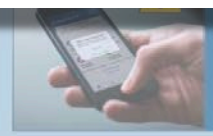

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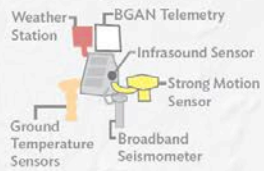

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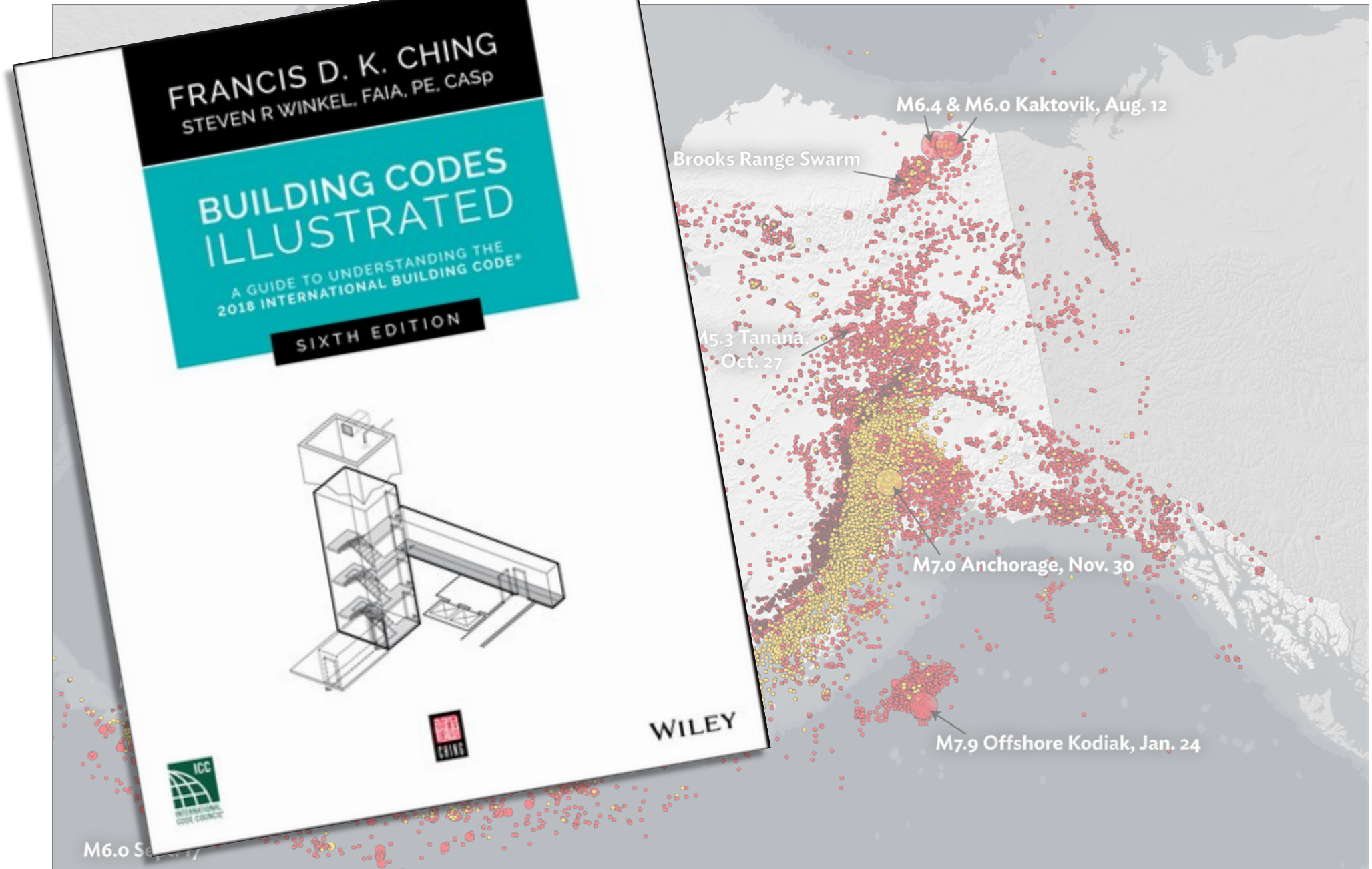
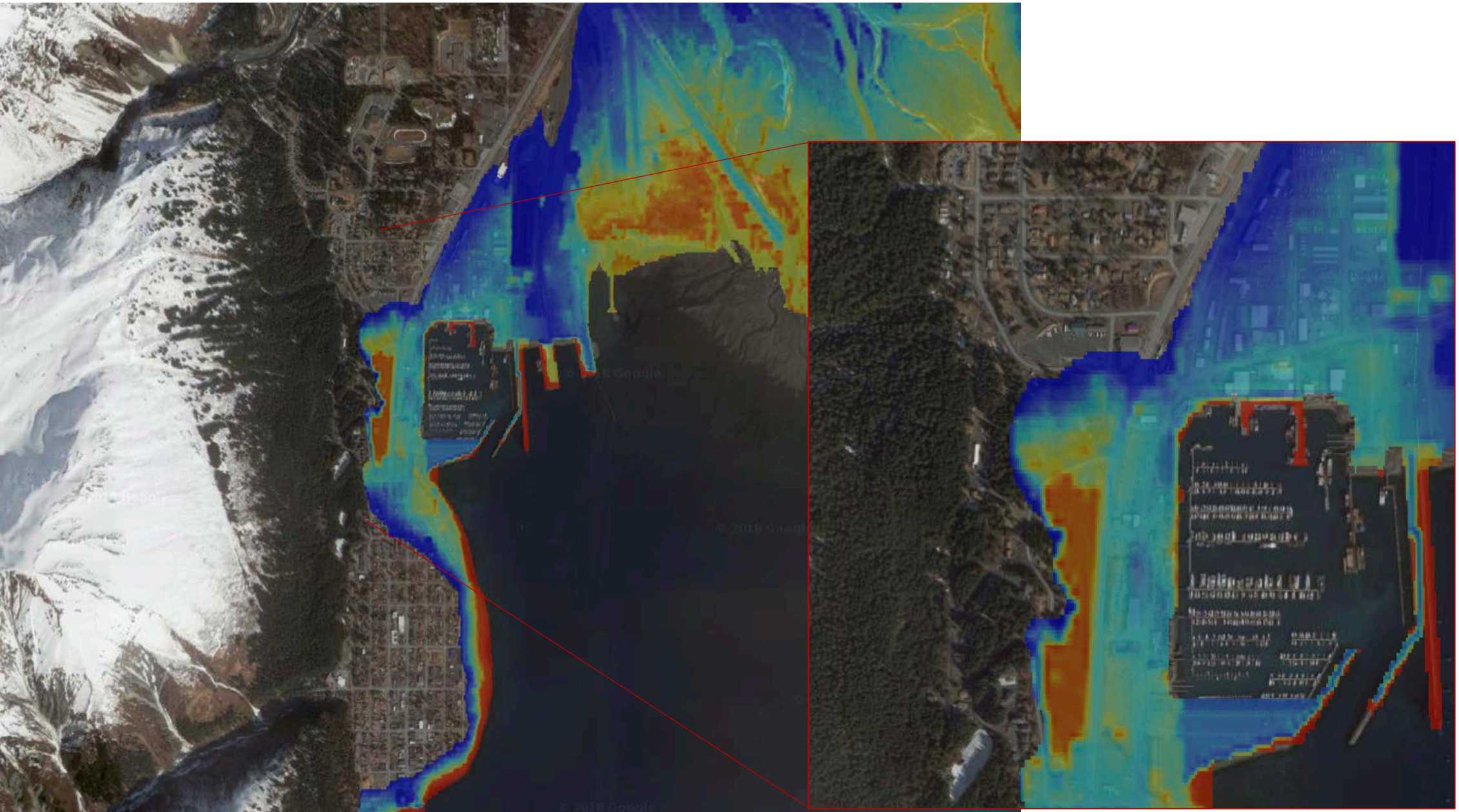
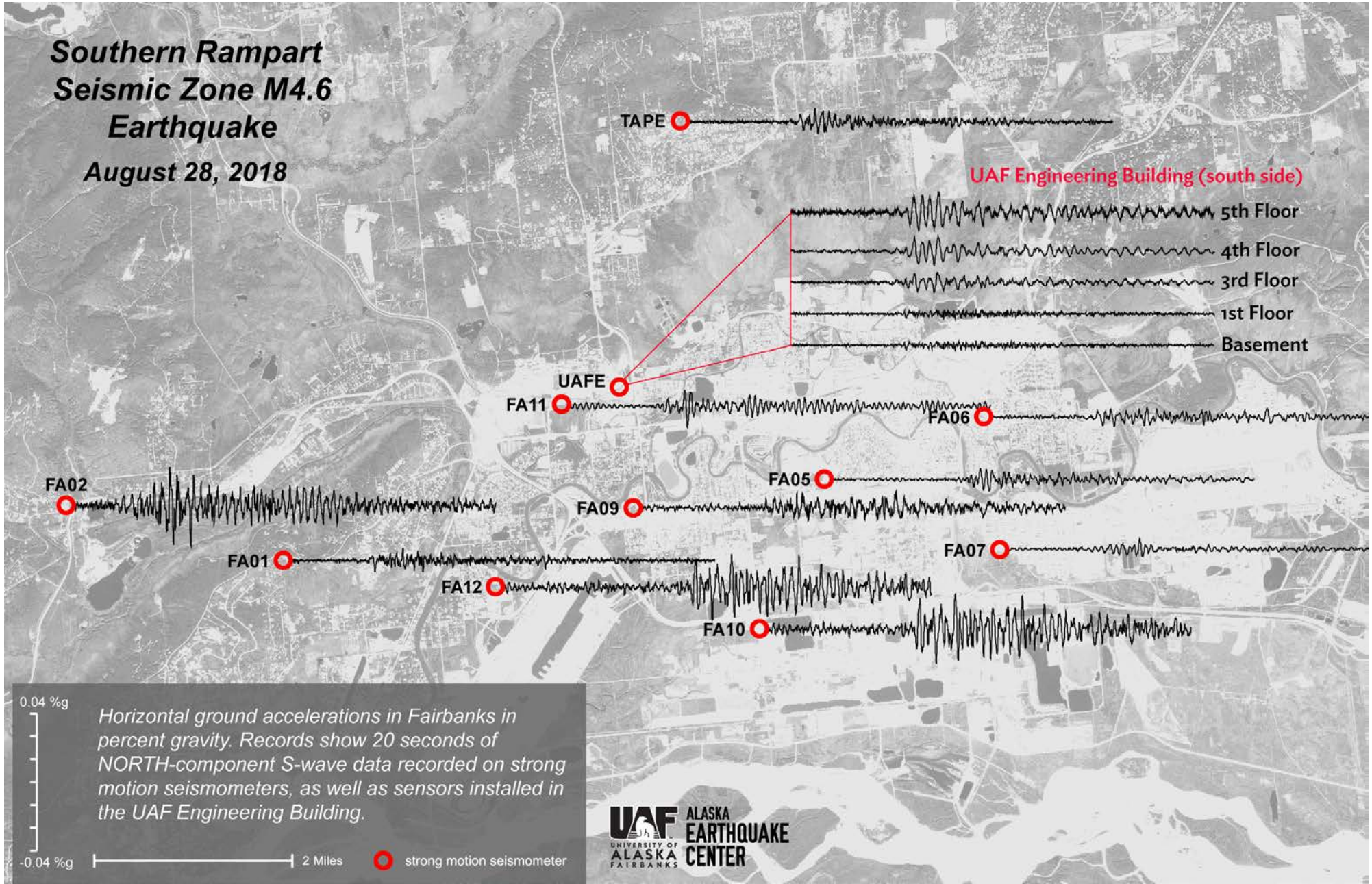
building codes



don’t forget tsunamis



seismometers in key locations



ASHSC policy recommendations

ASHSC Alaska Seismic Hazards Safety Commission

POLICY RECOMMENDATION 2013-1

VALUE OF SEISMIC INSTRUMENTATION FOR CRITICAL FACILITIES
(ADOPTED 7 OCTOBER 2013: UNANIMOUS)

Government, public and private owners of important facilities should incorporate and maintain seismic instrumentation as part of their routine operating systems, especially in the moderate to high seismic and more densely populated areas of Alaska. The Commission believes there is near-term economic value and life-safety benefit to state and local governments, facility owners, and the public from maintaining on-site or in-structure seismic instrumentation.

BACKGROUND

Based on a recent study by the Federal Emergency Management Agency[1] (FEMA) Alaska was ranked second only to California in terms of the estimated annualized earthquake loss (AEL), or damage, versus the replacement value of the total infrastructure. Additionally, the risk along the rail belt, from Anchorage to Fairbanks, compares with the greater Los Angeles and San Francisco metropolitan areas in terms of AEL per capita.

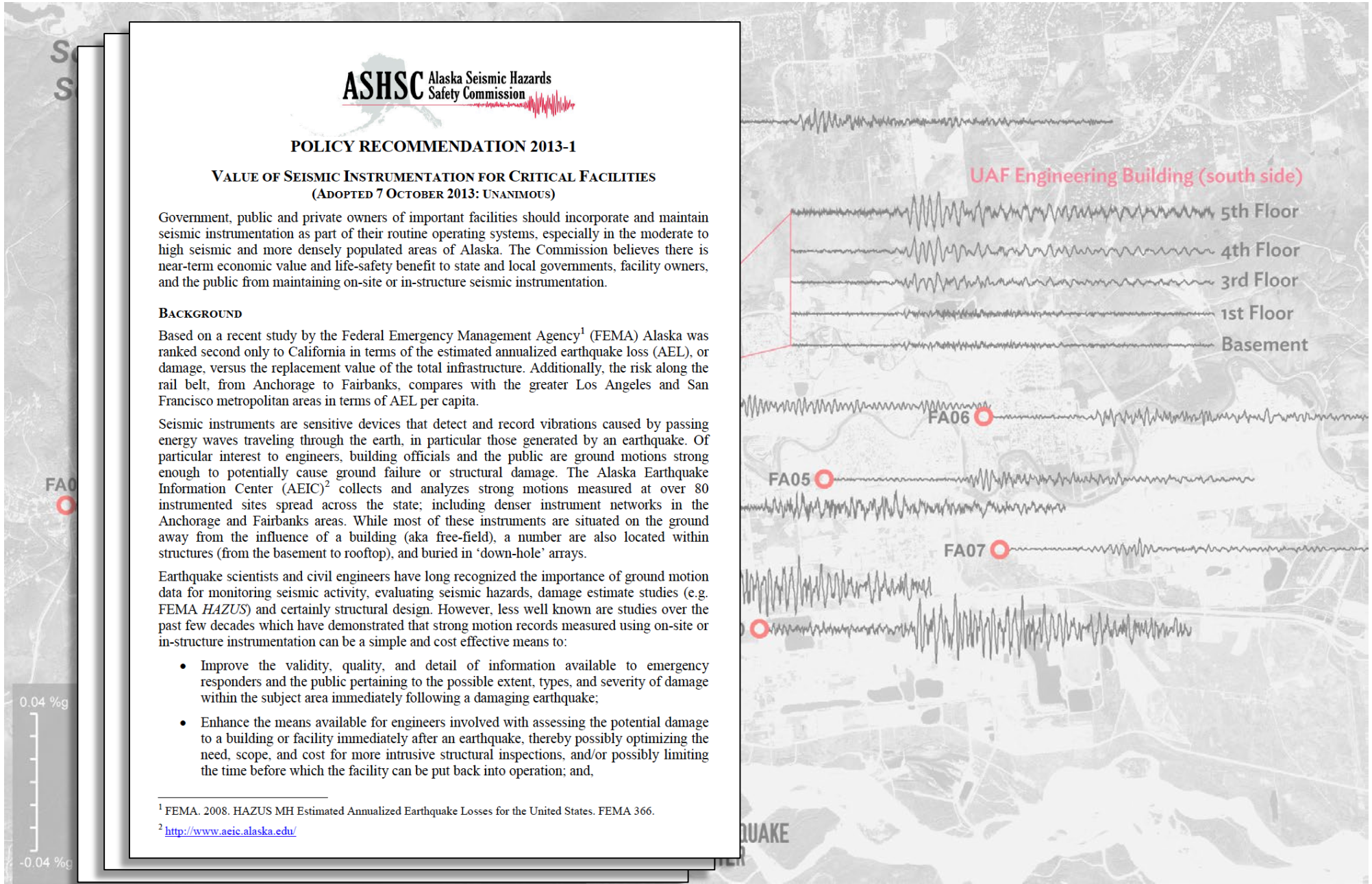
Seismic instruments are sensitive devices that detect and record vibrations caused by passing energy waves traveling through the earth, in particular those generated by an earthquake. Of particular interest to engineers, building officials and the public are ground motions strong enough to potentially cause ground failure or structural damage. The Alaska Earthquake Information Center (AEIC)[2] collects and analyzes strong motions measured at over 80 instrumented sites spread across the state; including denser instrument networks in the Anchorage and Fairbanks areas. While most of these instruments are situated on the ground away from the influence of a building (aka free-field), a number are also located within structures (from the basement to rooftop), and buried in 'down-hole' arrays.

Earthquake scientists and civil engineers have long recognized the importance of ground motion data for monitoring seismic activity, evaluating seismic hazards, damage estimate studies (e.g. FEMA *HAZUS*) and certainly structural design. However, less well known are studies over the past few decades which have demonstrated that strong motion records measured using on-site or in-structure instrumentation can be a simple and cost effective means to:

- Improve the validity, quality, and detail of information available to emergency responders and the public pertaining to the possible extent, types, and severity of damage within the subject area immediately following a damaging earthquake;
- Enhance the means available for engineers involved with assessing the potential damage to a building or facility immediately after an earthquake, thereby possibly optimizing the need, scope, and cost for more intrusive structural inspections, and/or possibly limiting the time before which the facility can be put back into operation; and,

[1] FEMA. 2008. HAZUS MH Estimated Annualized Earthquake Losses for the United States. FEMA 366.

[2] http://www.aeic.alaska.edu/



next earthquake will be different!