



Resilience in the Ring of Fire

(a potential USGS Initiative)

Motivations (why now?)

The 'SZI Working Group'

Activities to Date

Our Evolving Vision



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Motivations (why now?)

Heightened awareness

- Recent megathrust earthquakes & tsunamis
- 2016 Cascadia Rising Exercise
- 'The Big One' New Yorker Article
- Earthquake Early Warning

The Washington Post

Health & Science

Emergency planners plan for deadly 'Big One'

By Terrence Petty January 25, 2016

As military helicopters ferry search-and-rescue teams, below them is the devastation caused by a giant earthquake. Tsunami waters surge through coastal communities. Buildings, bridges and roads lie in ruins. Fires burn out of control. Survivors are stranded on rooftops, cling to floating debris or are trapped inside wrecked structures.



An earthquake and tsunami in the Pacific Northwest could cripple such transportation links as Interstate 5, which runs through Portland, Ore. (Don Ryan/Associated Press)

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Motivations (why now?)

Partner Momentum

- NTHMP success
- Subduction Zone Observatory

IRIS INCORPORATED RESEARCH INSTITUTIONS FOR SEISMOLOGY

RESEARCH: Data, derived products, software, web services
EDUCATION: Lessons, lectures, videos, public displays
FACILITIES: Directorates, programs, networks, centers
EARTHQUAKES: Recent earthquakes, teachable moments
ABOUT IRIS: Organization, governance, news, jobs, annual reports
RESOURCES: Publications, webinars, posters, newsletters, proposals

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Subduction Zone Observatory

Motivation

The subduction zone observatory (SZO) concept is a multidisciplinary facility stretching along a significant portion of one or more of the circum-Pacific subduction zones, providing a comprehensive suite of onshore and offshore observations to understand the entire subduction zone system. IRIS and UNAVCO have both included in their recent 5-year proposals a conceptual description of a joint SZO as a possible follow-on activity that would build on the success of EarthScope. This website serves as one potential forum to stimulate further development of the idea amongst a wide range of disciplines, engage the international community, and identify strategies to move the concept forward.

Upcoming Events

Workshop - September 28-30, 2016 in Boise, Idaho

Past Events

2015 AGU Town Hall

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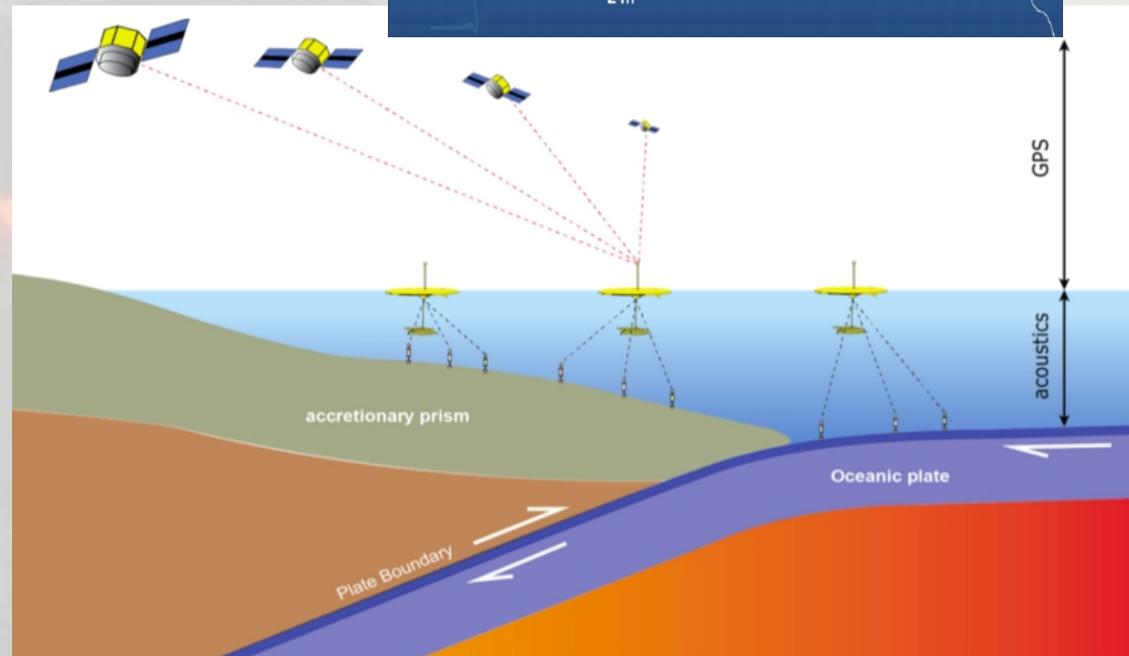
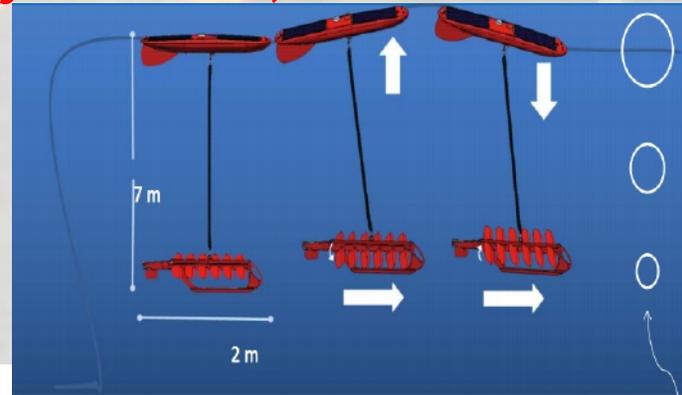
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Motivations (why now?)

Technologic Successes

- Offshore instrumentation

- Powerful computing



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The 'SZI Working Group'

Coastal Marine Geology:

Santa Cruz - Danny Brothers, Amy East,
Guy Gelfenbaum
Woods Hole - Jason Chaytor

SAFRR

Menlo Park - Stephanie Ross

Volcano Hazards

Reston - Charlie Mandeville
Vancouver - Weston Thelen
Anchorage - Aaron Wech,
John Power, Stephanie Prejean,
Peter Cervelli
Menlo Park - Mike Lisowski

Water:

Menlo Park - Barbara Bekins

GeoMagnetism:

Golden - Anna Kelbert

Geology, Minerals, Energy & Geophysics

Menlo Park - Ray Wells

Natural Hazards Mission Area

Seattle - Kristin Ludwig
Reston - Charlie Mandeville

Geography

Menlo Park - Anne Wein

Landslide Hazards:

Golden - Kate Allstadt

Earthquake Hazards:

Vancouver - Nicholas Beeler, Evelyn Roeloffs
Seattle - Scott Bennett, Lydia Staisch, Joan Gomberg
Reston - Michael Blanpied
Golden - Rich Briggs, Gavin Hayes, Robert Williams
Menlo Park - Thomas Brocher, Benjamin Brooks, Todd
Ericksen, Eileen Evans, Stephen Hickman,
Anchorage - Peter Haeussler, Robert Witter

National Geospatial

Fort Collins - Jason Stoker

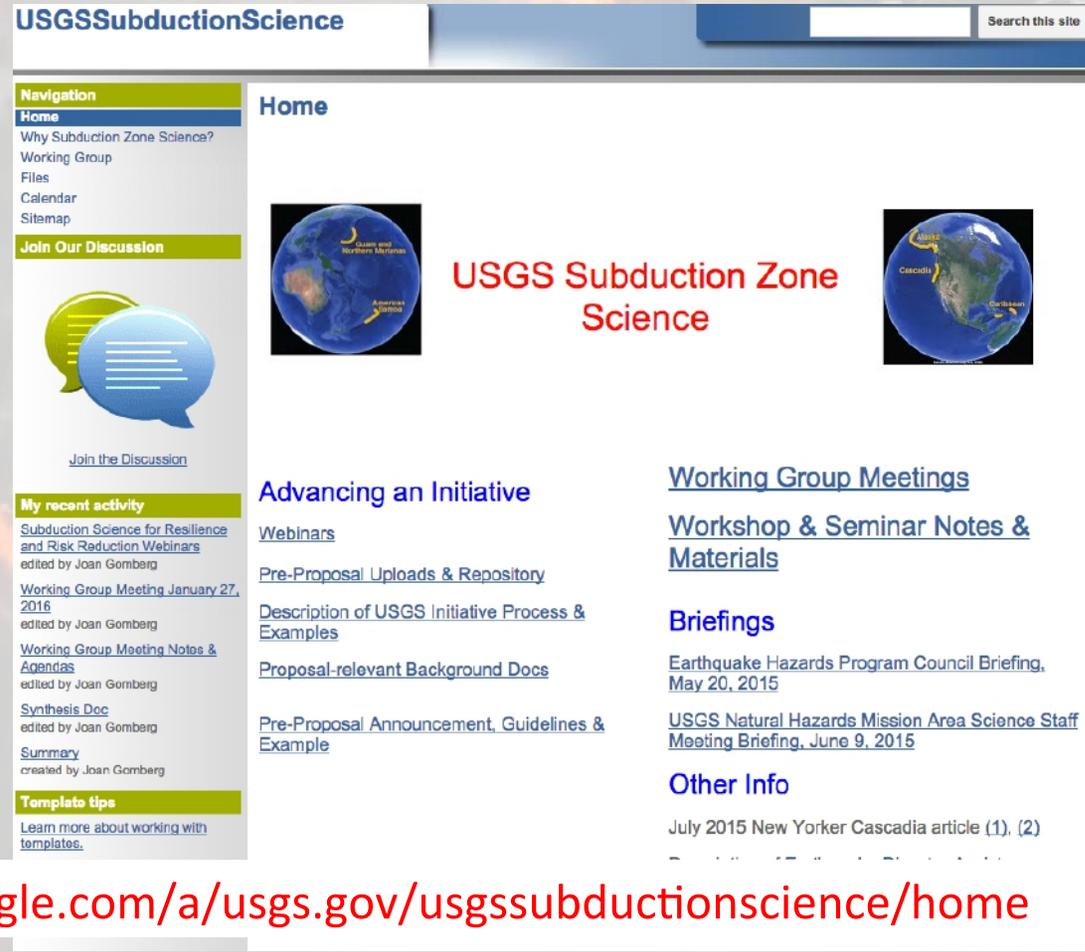
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Activities

- Website
- Workshop
- Seminars
- Webinars
- Partner Promotion
- Proposals



USGS Subduction Science

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edited by Joan Gomberg
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edited by Joan Gomberg
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Template tips

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USGS Subduction Zone Science

Advancing an Initiative

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Working Group Meetings

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Briefings

- [Earthquake Hazards Program Council Briefing, May 20, 2015](#)
- [USGS Natural Hazards Mission Area Science Staff Meeting Briefing, June 9, 2015](#)

Other Info

- [July 2015 New Yorker Cascadia article \(1\), \(2\)](#)

<https://sites.google.com/a/usgs.gov/usgssubductionscience/home>

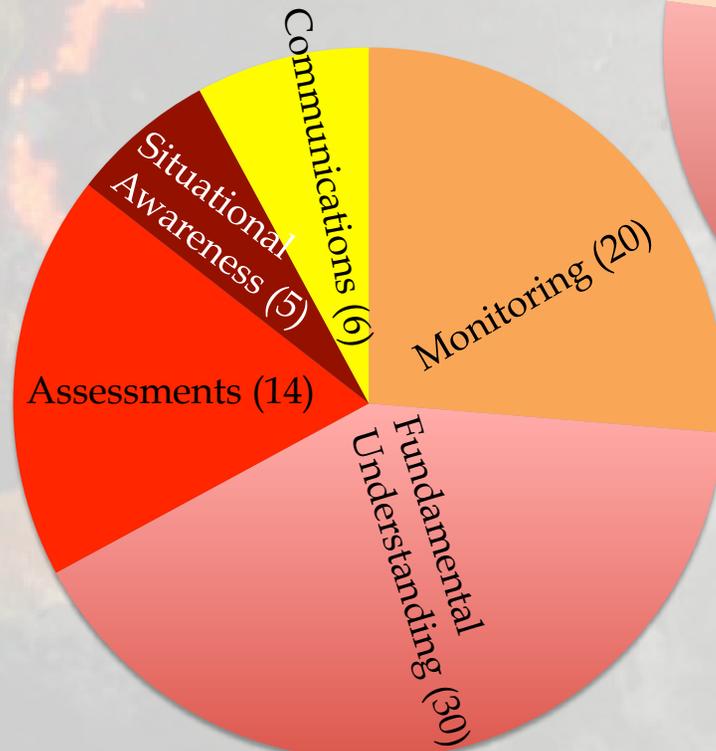
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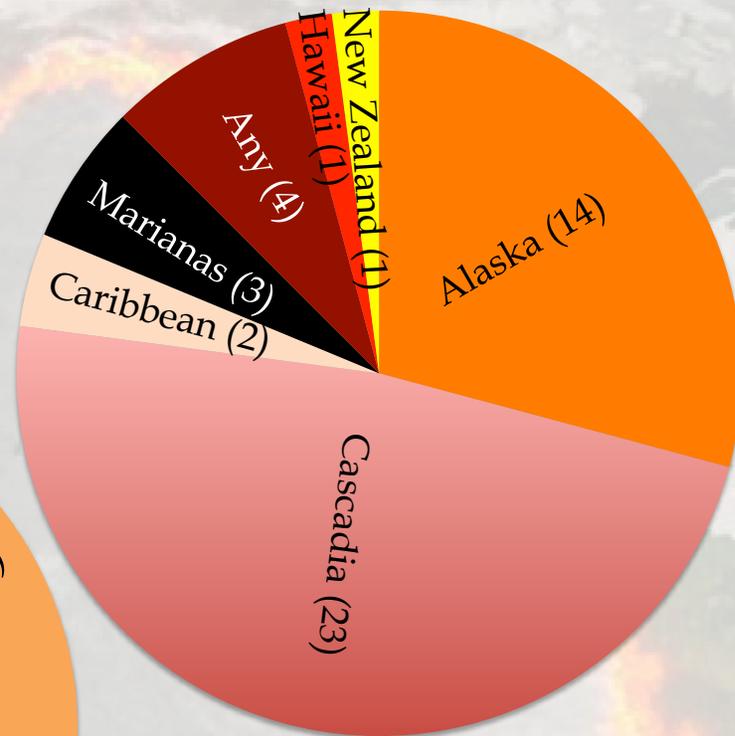
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Activities

Proposals (45!)



Natural Hazards Mission Area Goals



Subduction Zones

**Many involve
tsunami studies
& products!**

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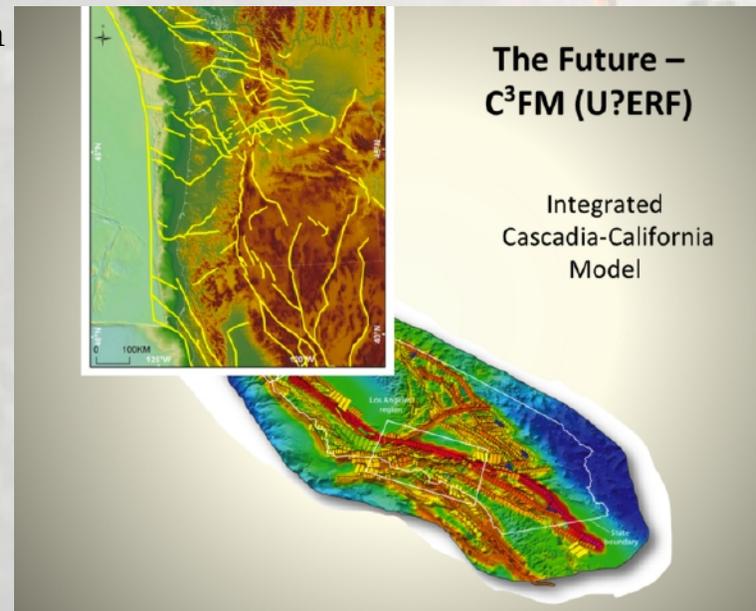
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Our Evolving Vision

State-of-the-art information products to facilitate research (conceptualize & communicate complex relationships)

Deliverables: - multi-layered geologic and geophysical Digital Map Series,

- community fault models,
- 3D, web-enabled visualization software



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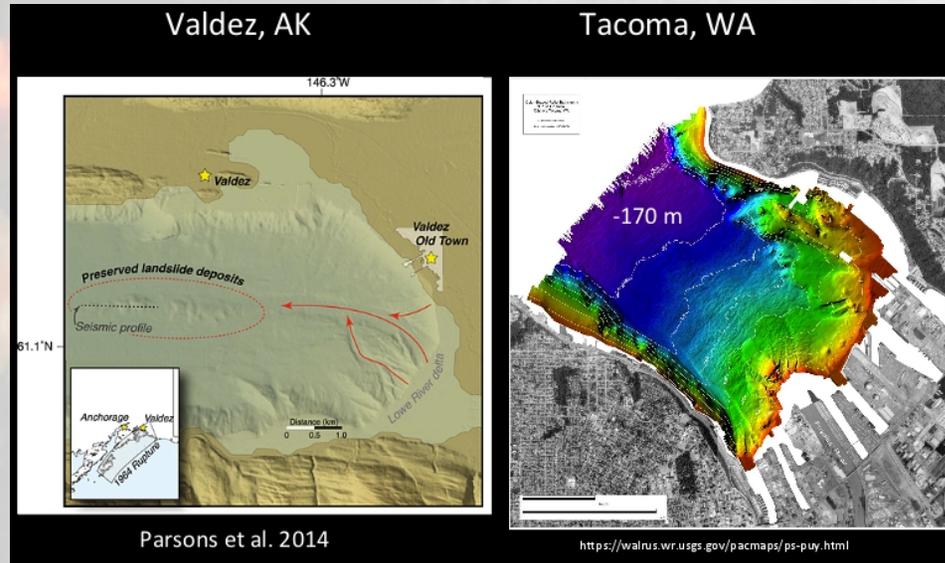
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Our Evolving Vision

State-of-the-art information products to provide stake-holder decision support tools;

Deliverables: near real-time maps of likely

- coastal, submarine and onshore landsliding,
- megathrust generated large-scale land-level changes,
- localized tsunami generation and inundation,
- volcanic slope collapses and lahar paths.



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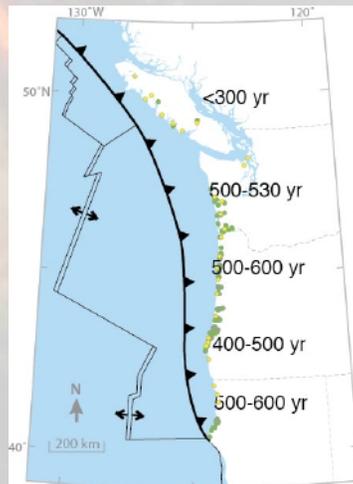
Our Evolving Vision

Where? How big? How often?

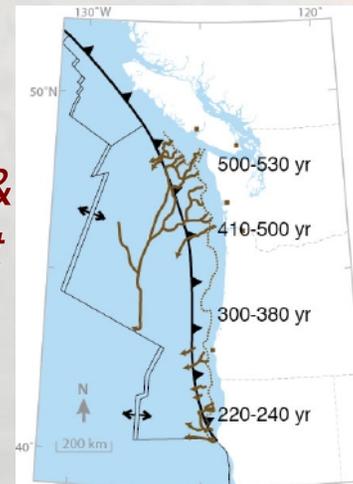
Uncertainty leads to potentially unnecessary mitigation. Resolve major uncertainties by

- reconciling onshore and offshore records of Cascadia prehistoric earthquakes,
- filling big gaps in the paleo-earthquake history along the Alaska-Aleutian arc,
- constructing eruption histories for high-threat Alaska volcanoes,
- identifying key features controlling susceptibility to deep-seated landslides,
- completing databases of active crustal faults.

*onshore
tsunami &
coastal
uplift/
subsidence
record*



*offshore
turbidite &
sediment
record*



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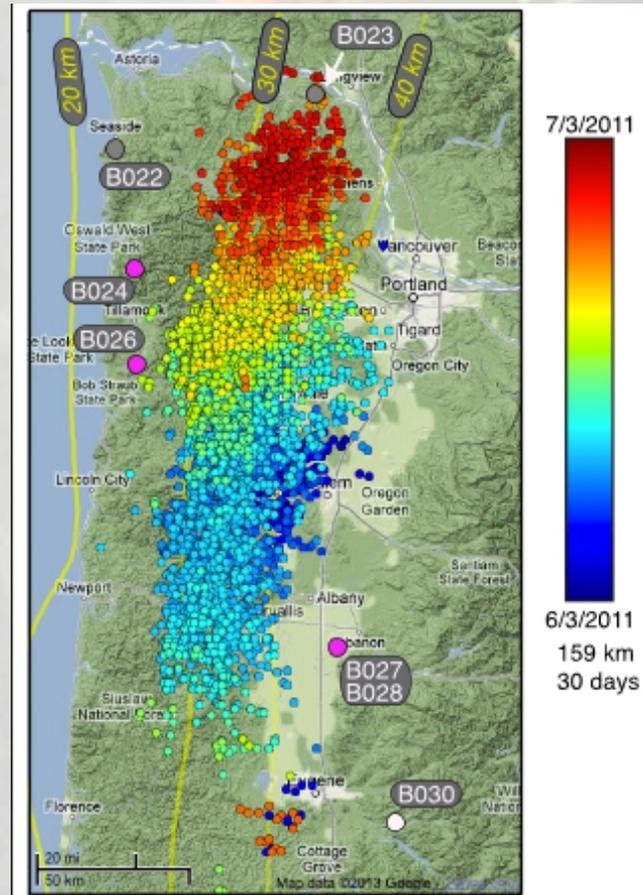
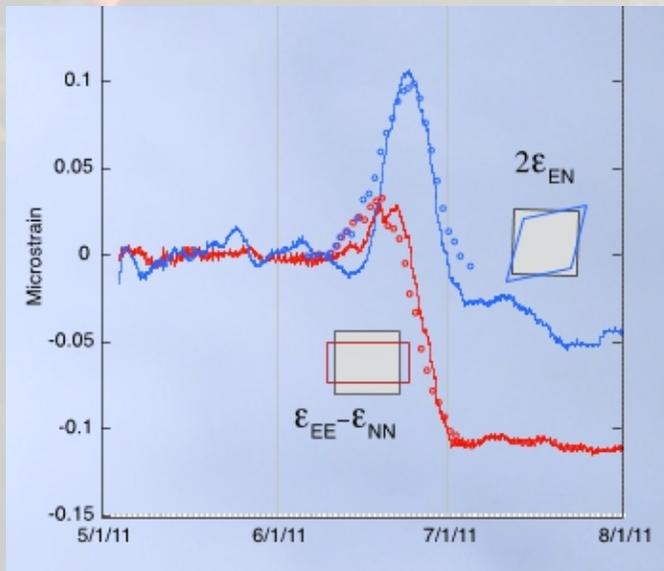
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Our Evolving Vision

Monitoring data

- prototype real-time monitoring equipment on the seafloor,
- operationalize characterization of non-traditional seismic sources,
- operationalize aseismic slip detection,
- integrating them into existing monitoring.



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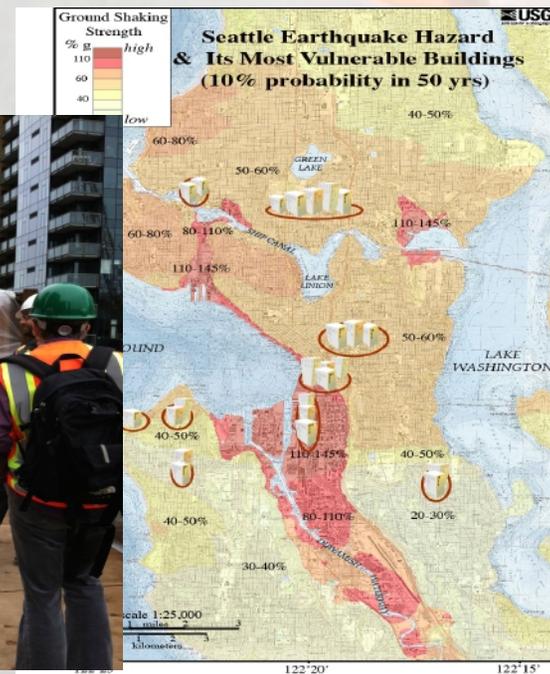
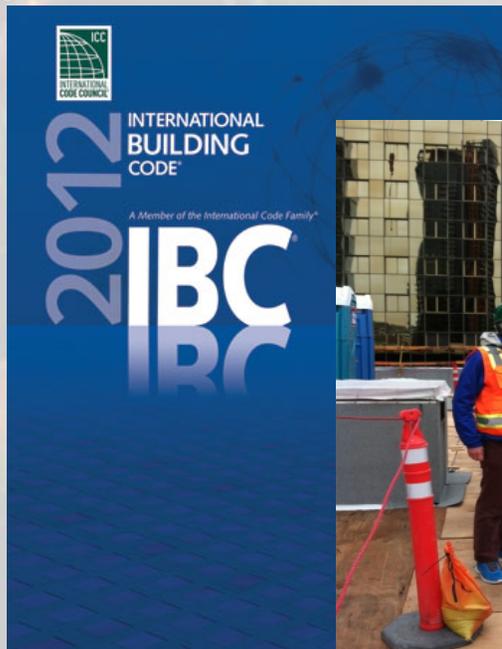
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Our Evolving Vision

Turning science into policies and actions, by engaging

- social science expertise to ensure scientist-user dialogue,
- engineers to move from hazard to risk.



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Questions?



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