
PNSN 2011-2012

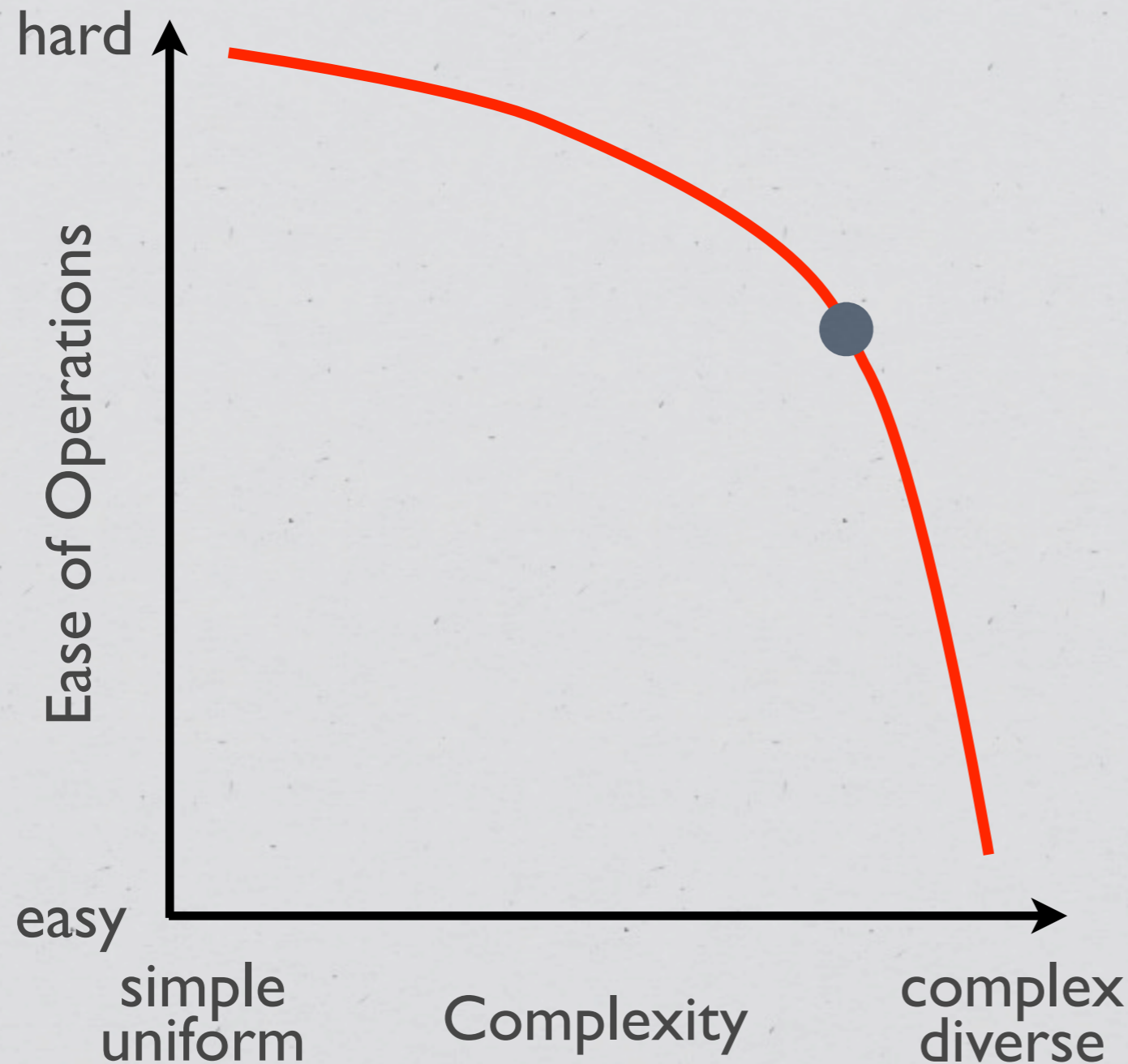
Regional Advisory Committee, 1 May, 2012



Outline

- * ARRA network improvements
- * AQMS adoption
- * www.pnsn.org update
- * Hanford developments
- * BPA telemetry changes
- * NetQuakes & NetQuakes Portland
- * Seattle Liquefaction Array

Tradeoff - Minimizing Network Risk



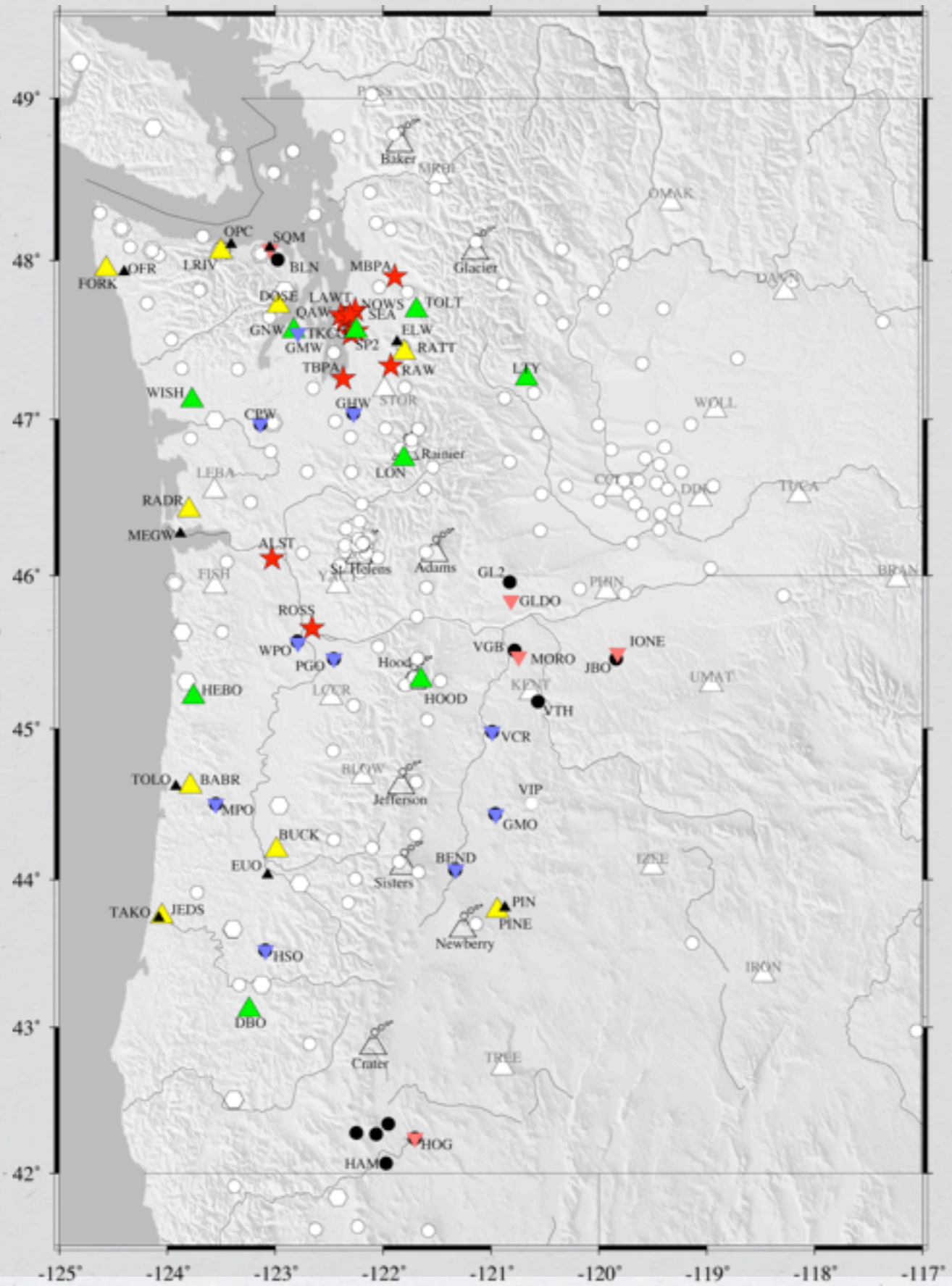
* And maximizing network robustness and usefulness....

The Rules ...

- * **Do not stop production system.**
- * **Maintain continuity.**
- * **Remain technologically current.**
- * **Prepare for the unknown.**

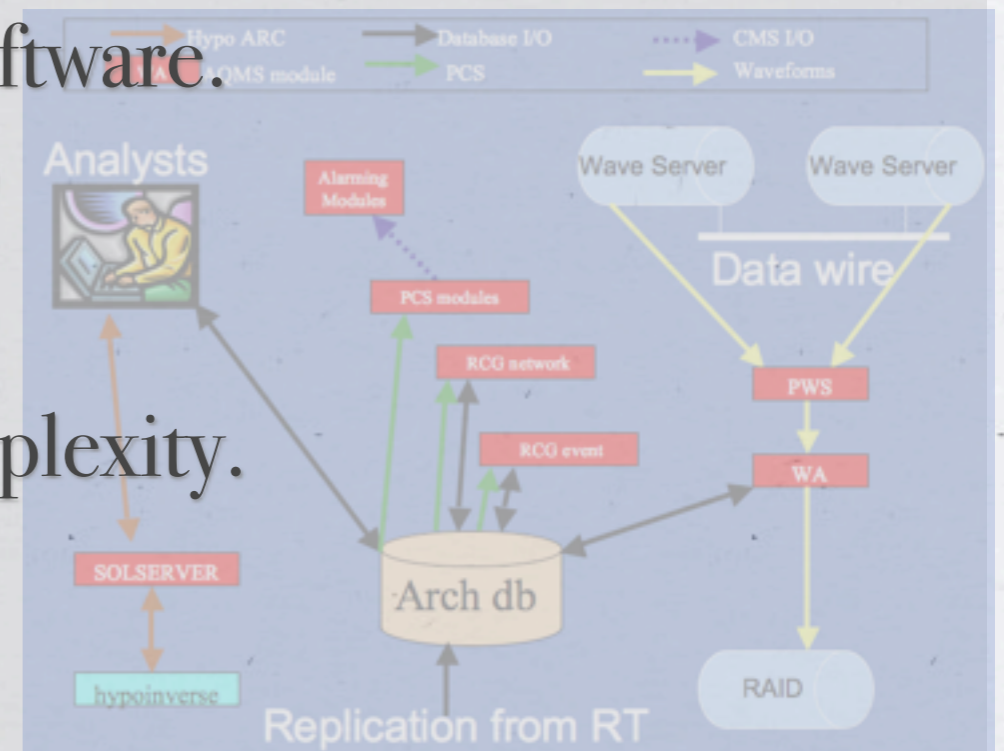
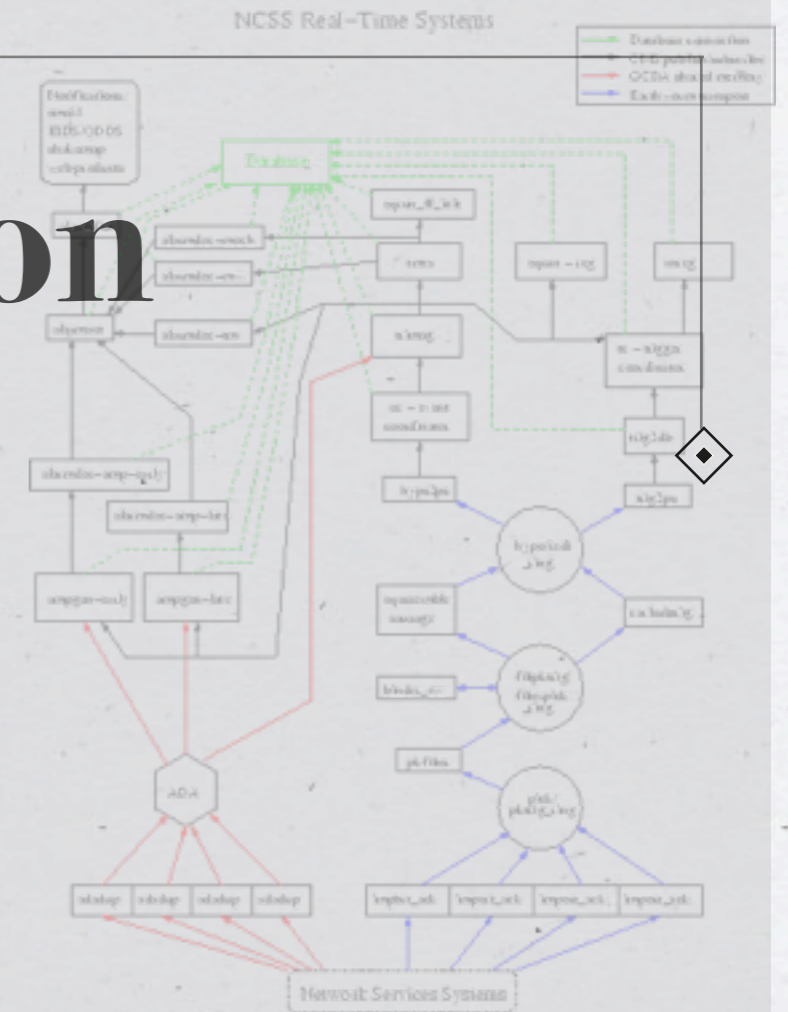
ARRA network improvements

- ◆ * Completed 30 September, 2011
- * 43 seismic upgrades
 - ❖ 18 broadband stations: 30 → 120 s + RT130; 9 new vaults
 - ❖ 10 strong motion stations: IDS → RT130SM
 - ❖ 15 analog short periods: → 4-channel “Basalt”, full digital.
(note all episensors must be replaced...)
- * 4 telemetry node upgrades. (new wiring, tower work)
- * 20 NetQuakes strong motion recorders.



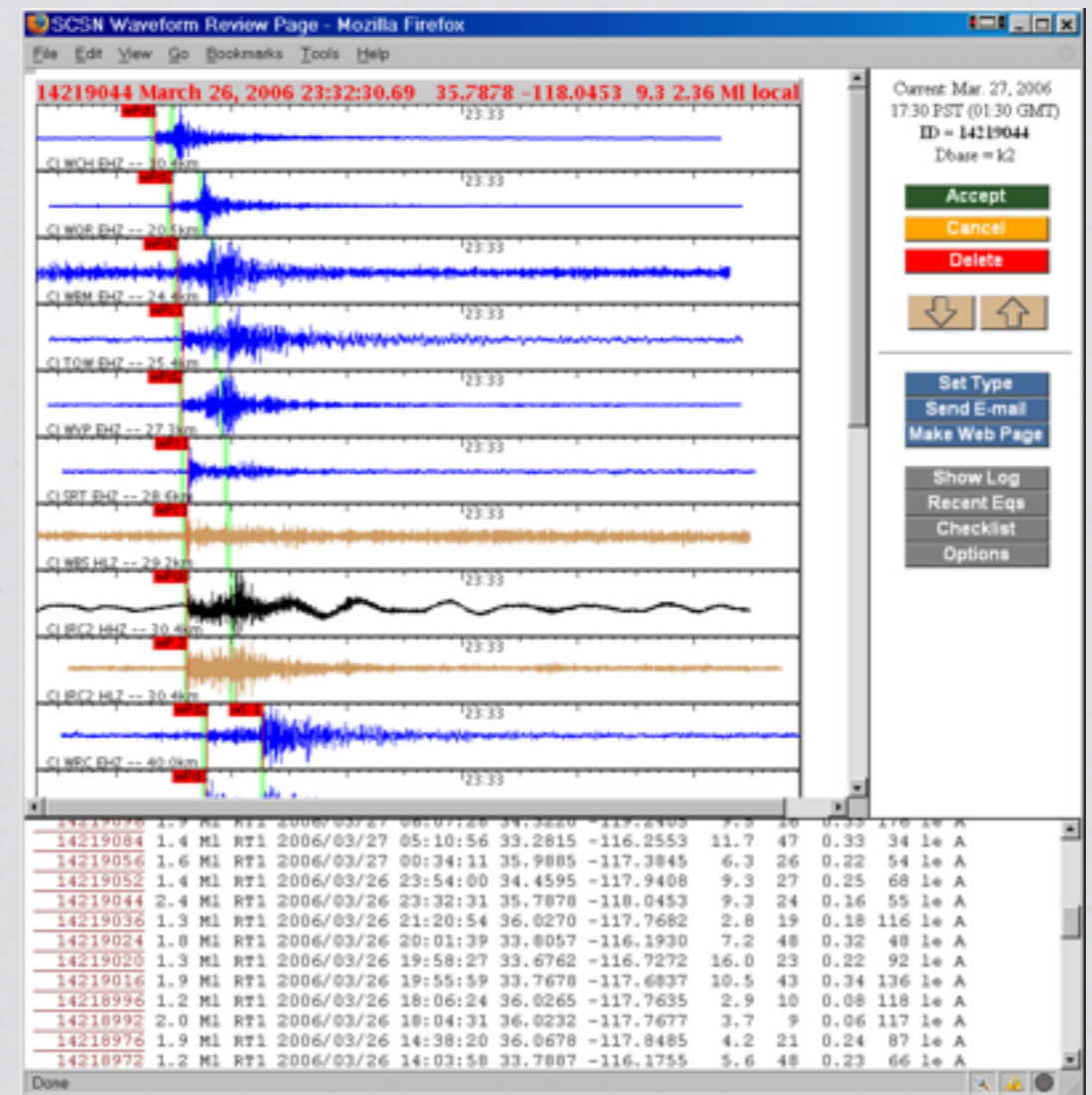
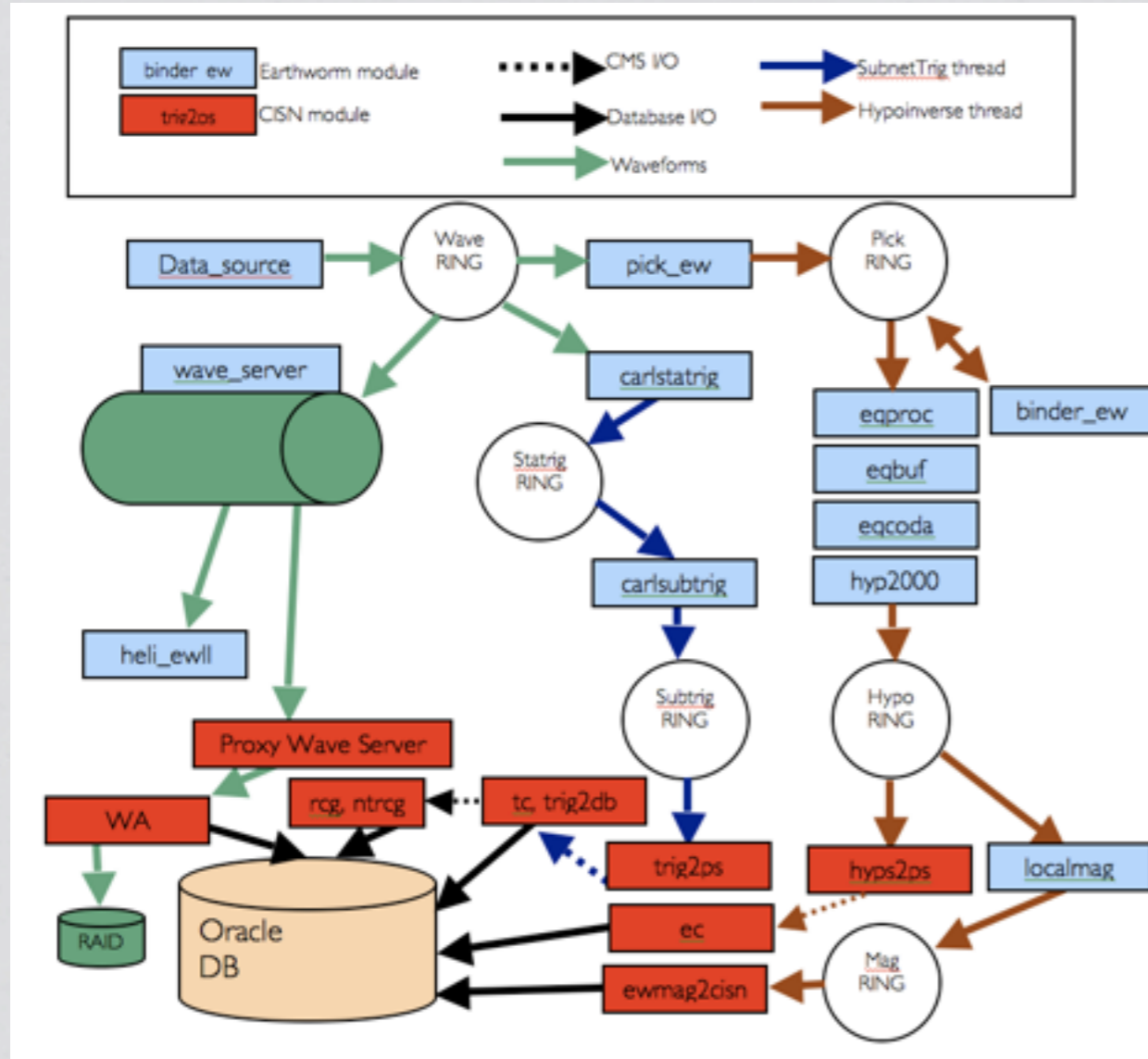
AQMS* Adoption

- * In production mode on 1 January, 2012.
- ❖ 1st RSN outside of Calif. (and USGS).
- ❖ Entirely alters processing system.
- ❖ Necessitates new hardware as well as software.
- ❖ Still sweating many details.
- ❖ Presents many opportunities, adds complexity.



*ANSS Quake Management System

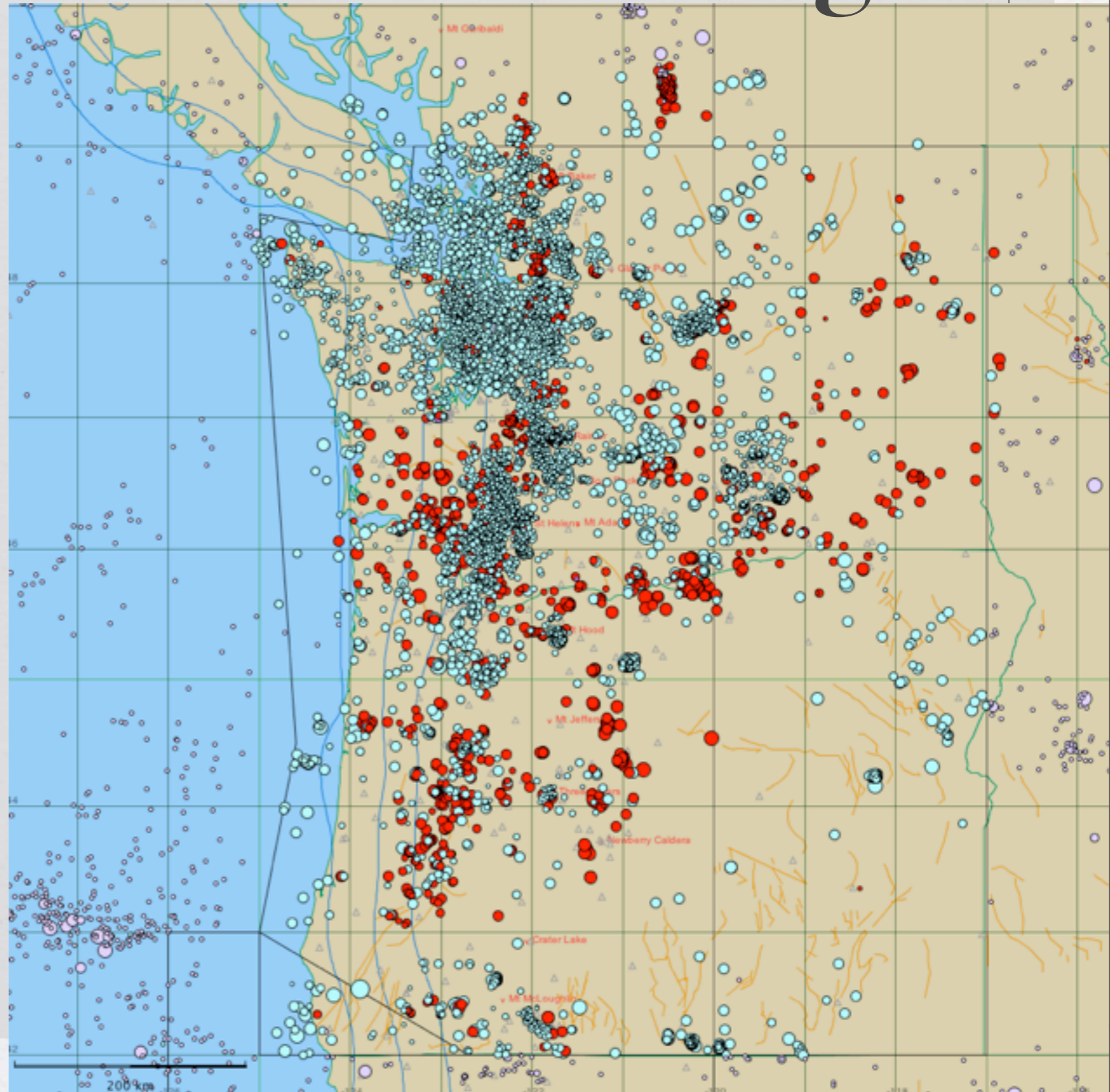
Not a Simplification



* But a much-needed modernization to “flatten” operations across ANSS

Past 5 years of PNSN catalog

- * >23,000 events
- * “Peacetime” rate



www.pnsn.org update

- * Timing linked to AQMS production schedule.
 - ❖ A “soft rollout” ...
- * Modern, “administerable” via simple CMS GUI.
- * Scalable, strong use of caching for common pages.
- * Focus on useful, engaging, accurate, information.
- * Interaction via social media.
- * Frequent updates.
- * Strong use of analytics to guide development.

Recent Earthquakes



Recent natural and manmade seismic activity. Click figure for details.

Quakes Near Volcanoes

Volcano	Last Week	Last Month	Average Month
Mount Baker	0	0	0
Glacier Peak	0	0	0
Mount Rainier	0	0	3
Mount Adams	0	0	0
Mount St. Helens	12	24	22
Mount Hood	0	0	0
Mount Jefferson	0	0	0
Three Sisters	0	0	0
Newberry	0	2	0
Crater Lake	0	0	0

The number of earthquakes located at each major Cascade volcano. The average shown is the median number at each volcano for the past 4 decades. **Bold** letters indicate more-than-average seismicity in the past month.

Seattle Sea Wall earthquake fix gets cheaper

Posted by J. Vidale, 04/24/2012

Seattle Times Improved techniques lighten latest cost estimate, cater to salmon.



Bellingham faults and paleoquakes seen more clearly

Posted by J. Vidale, 04/23/2012

News Tribune New mapping with LIDAR and trenching illuminates earthquake

Latest Seismo Blog Posts

Earthquake hazards forum at UW on April 25th, 2012 from 4:00-6:30 PM

April 17, 2012
by Bill Steele

Please attend a public forum on Advances in Pacific Northwest Earthquake Hazard Understanding and Earthquake Early Warning, sponsored by the PNSN and CREW. It will be held at the University of Washington in Johnson Hall, Room 102 on April 25th, from 4:00 to 6:30 PM.

[Read More >>](#)

Seattle City Council presented with earthquake risk update

April 7, 2012
by John Vidale

Latest results tweak estimates of seismic risk a variety of ways. New science is redistributing the risk to more specific dangers, and may raise the estimate of danger from the coastal M9. The final new maps will not take effect for several years.

[Read More >>](#)

The PNSN reduces risk within the states of Washington and Oregon by

- monitoring ground motions within the region in order to better understand earthquake and volcano hazards and their impacts on the physical, economic, political, and social environment,
- providing the most accurate information about earthquakes and volcanoes as rapidly as possible to public officials, the public, and for education, and
- advocating comprehensive and cost-effective measures for reducing the harmful effects of earthquakes and volcanoes.

Quick Links

- Recent Earthquakes
- Report an earthquake
- Notable earthquakes
- Seismograms
- Tremor Map
- Contact us
- Donate



Earthquake Report

Magnitude: 2.2
Sat April 14, 2012 09:11AM (PDT)
Event Id: 60409096

Overview	Maps	Technical Data	Waveforms
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Version #3: This report supersedes any earlier report of this event
This event has been reviewed by a seismologist

Magnitude: 2.2 MI
Time: Sat April 14, 2012 09:11AM (PDT)
Sat April 14, 2012 16:11 (GMT)
Distance From: 12.2 km (7.6 mi) S (181. azimuth) from Eatonville, WA
22.2 km (13.8 mi) N (1. azimuth) from Morton, WA
52.9 km (32.9 mi) E (85. azimuth) from Centralia, WA

Coordinates: 46.758, -122.2681667
Depth: 18.68 Km (11.39 miles)
Location Quality: Excellent
Event Id: 60409096
Horizontal Uncertainty: 0.24 Km
Depth Uncertainty: 0.74 Km
Azimuthal Gap: 57.0 deg
Number of Phases: 43
RMS Misfit: 0.12

Current Site Info ESS UW USGS ANSS Blog

Earthquake Report

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Sat April 14, 2012 09:11AM (PDT)
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Overview Maps Technical Data Waveforms

Focal Mechanism

More Information

Solution 1

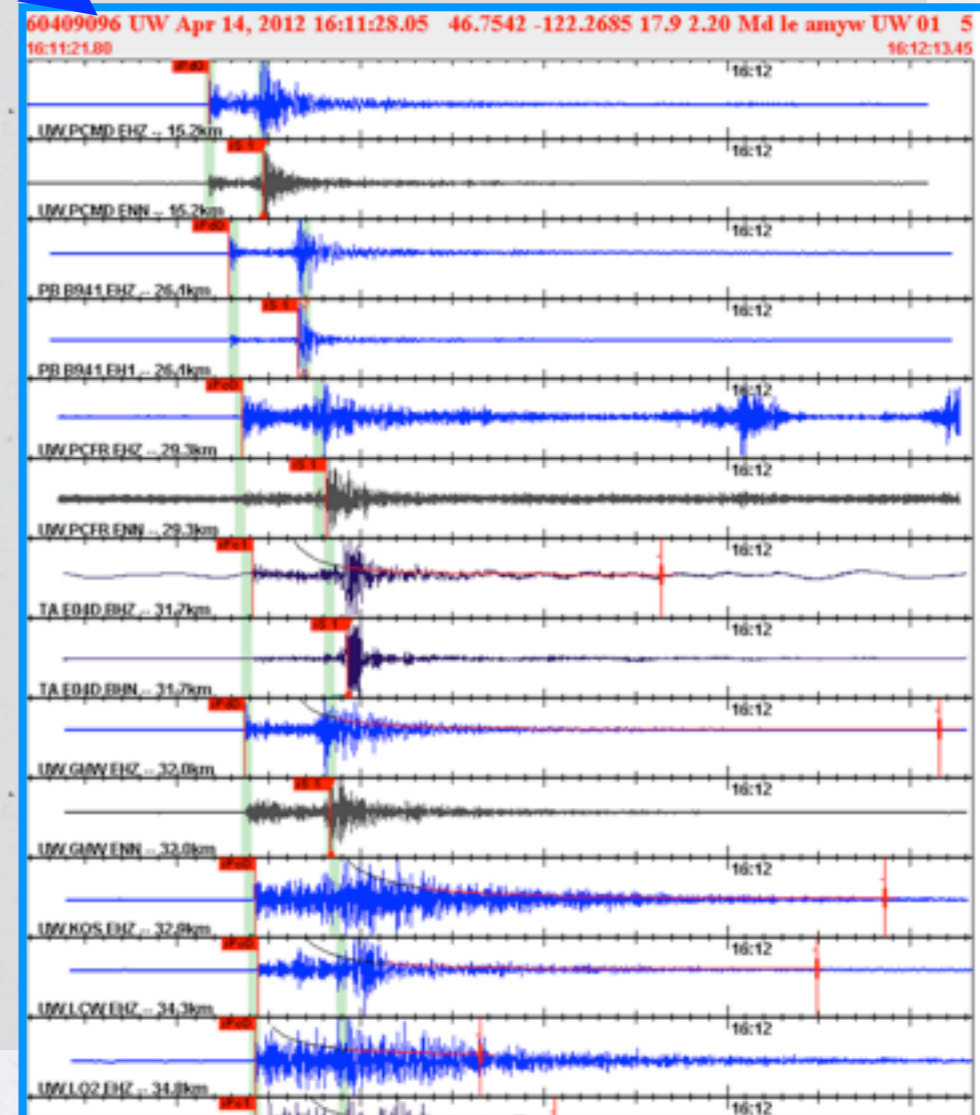
Number of P First Motions: 29
Plane A Plane B Uncertainty

Strike	80°	304°	13.0°
Dip	60°	40°	15.0°
Rate	60°	131°	30.0°

Discrepant Stations

Station	Network	Channel	Polarity	Quality
CDMR	UW	ENZ	U	0.92
STD	UW	ENZ	U	0.98
LCW	UW	ENZ	D	0.92

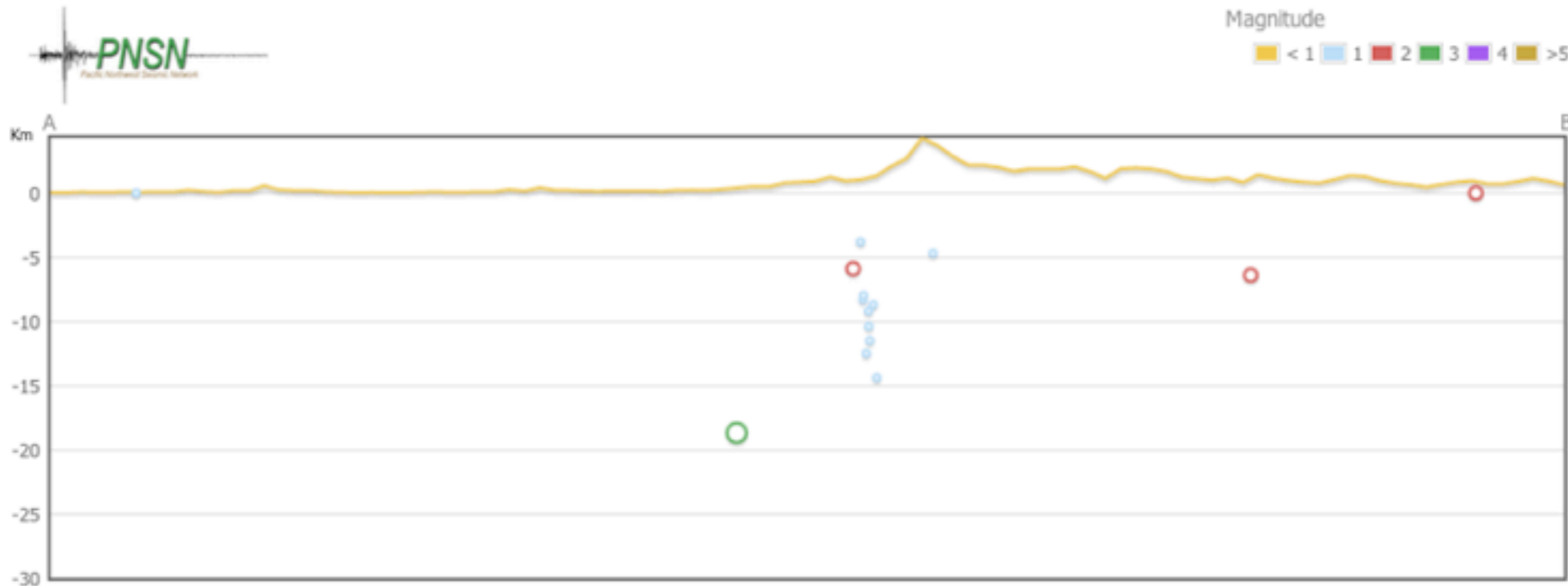
Current Site Info ESS UW USGS ANSS Blog Did you feel it?



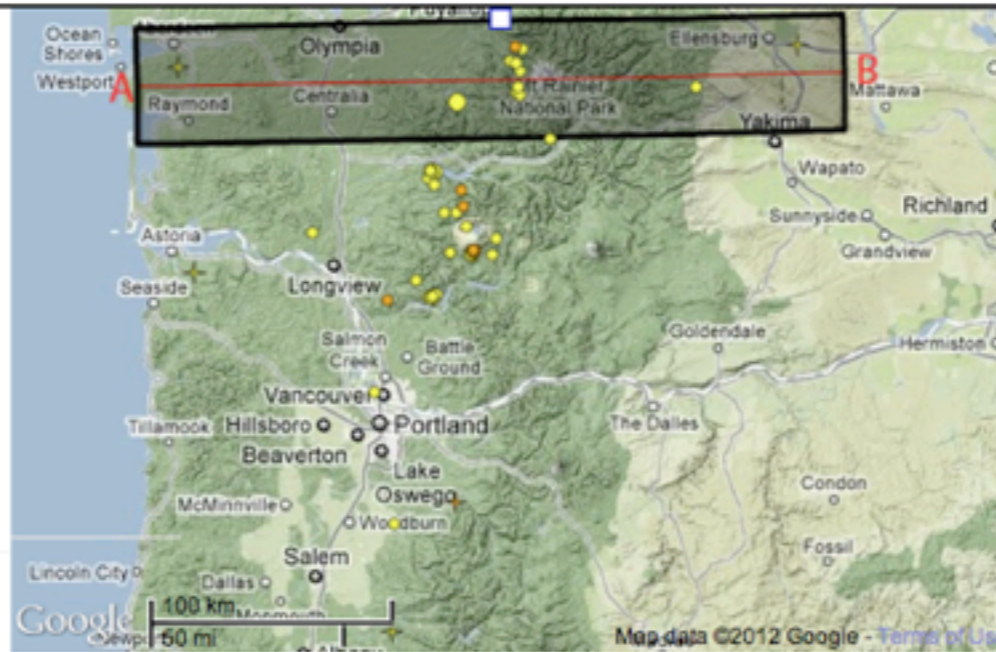
Cross Section

X

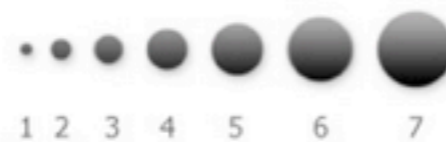
Home
Earthquake
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List
Map
Not
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US
Canada
World
PNSN
History
Trends
Volcano
Seismicity



PNSN Data & Products
Network
Outreach and Discovery
News
Seismo Blog
About



Legend



- Last 2 hours
- Last 2 days
- Last 2 weeks
- Outside of the PNSN
- ★ Explosion

5) Select plot type and depth constraint if any.
6) Click "Plot"

Clear

Plot Type: X-Section Depth-Time
 Cumulative # Mag-Time

Depth Constraint:

Plot

Reset All

Recent Events

Mag	Time (Local)	Depth (Km)
1.1	2012/04/24 13:49:40 PDT	17.5
-0.6	2012/04/24 08:52:10 PDT	2.9
1.0	2012/04/24 08:25:32 PDT	2.0
0.3	2012/04/24 02:07:21 PDT	3.8
0.2	2012/04/24 01:37:19 PDT	9.4
-0.1	2012/04/23 21:45:31 PDT	10.2
0.5	2012/04/23 19:14:42 PDT	11.6

Hanford Turmoil

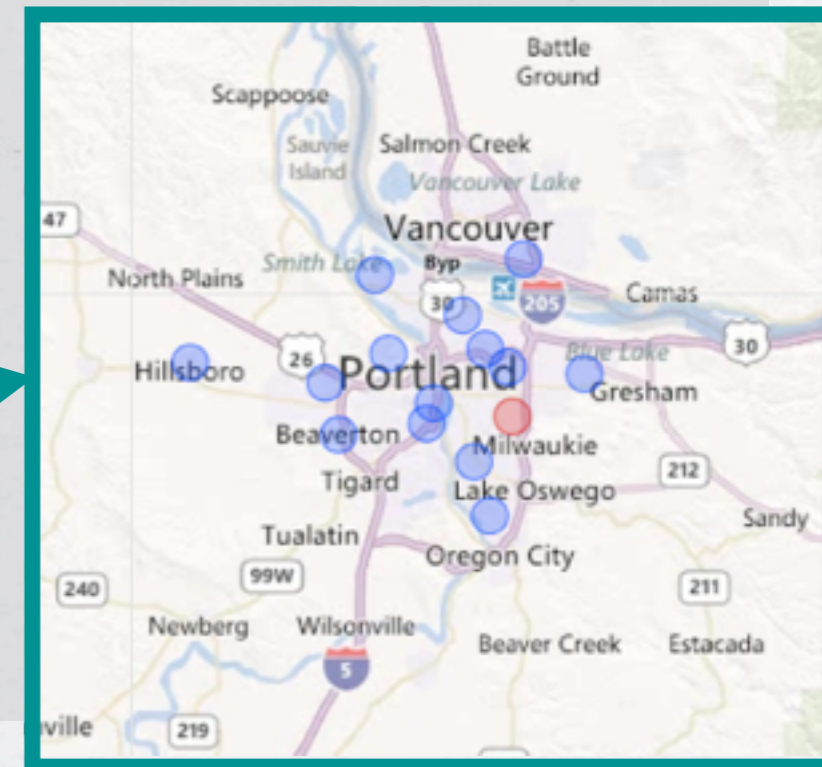
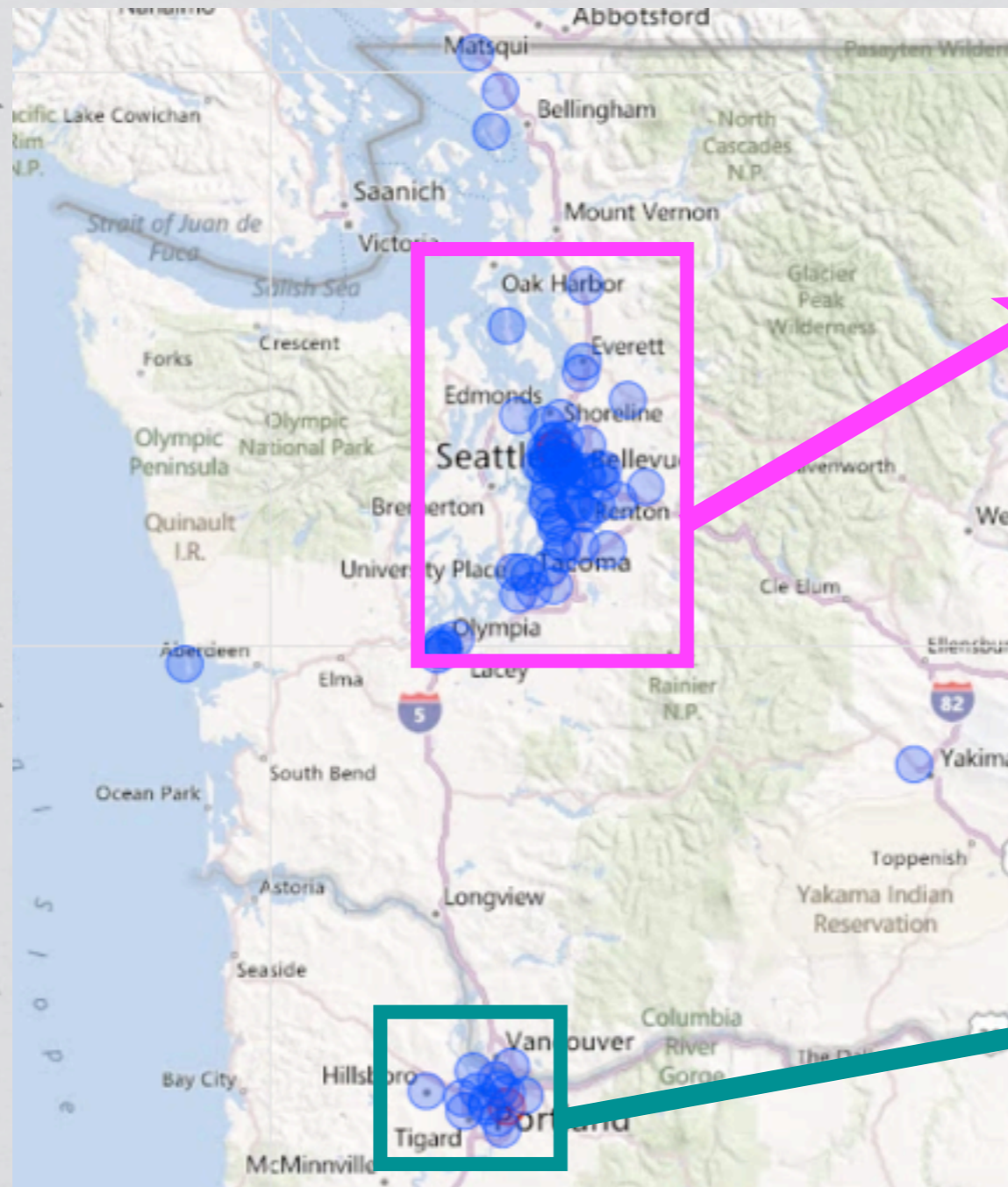
- * Contract in place, now, through Sept. 2012.
- * Initial plans for 3+ staff positions (in Richland). Scaled back probably for 2 fte (1 in Richland?) to operate.
- * MSA interested in “special products” (ShakeCast, ShakeMaps).
- * Adds much fieldwork, must coordinate with BPA work.
- * Much “Hurry up and wait” involved. Learning to operate in different cultures.

BPA Telemetry Changes

- * BPA “going digital”.
- * Will provide telemetry for us, but not increased bandwidth.
- * Expensive. But we are over a barrel.
- * Queen Anne going away. Functions switched to Covington site.
- * Changes at 17 BPA facilities. A huge effort.
- * Thanks to Tom Yelin for overseeing and Pat McChesney for technical planning.

NetQuakes & NQ Portland

- * 87 deployed
- * ~15 more to exhaust local supply



Seattle Liquefaction Array

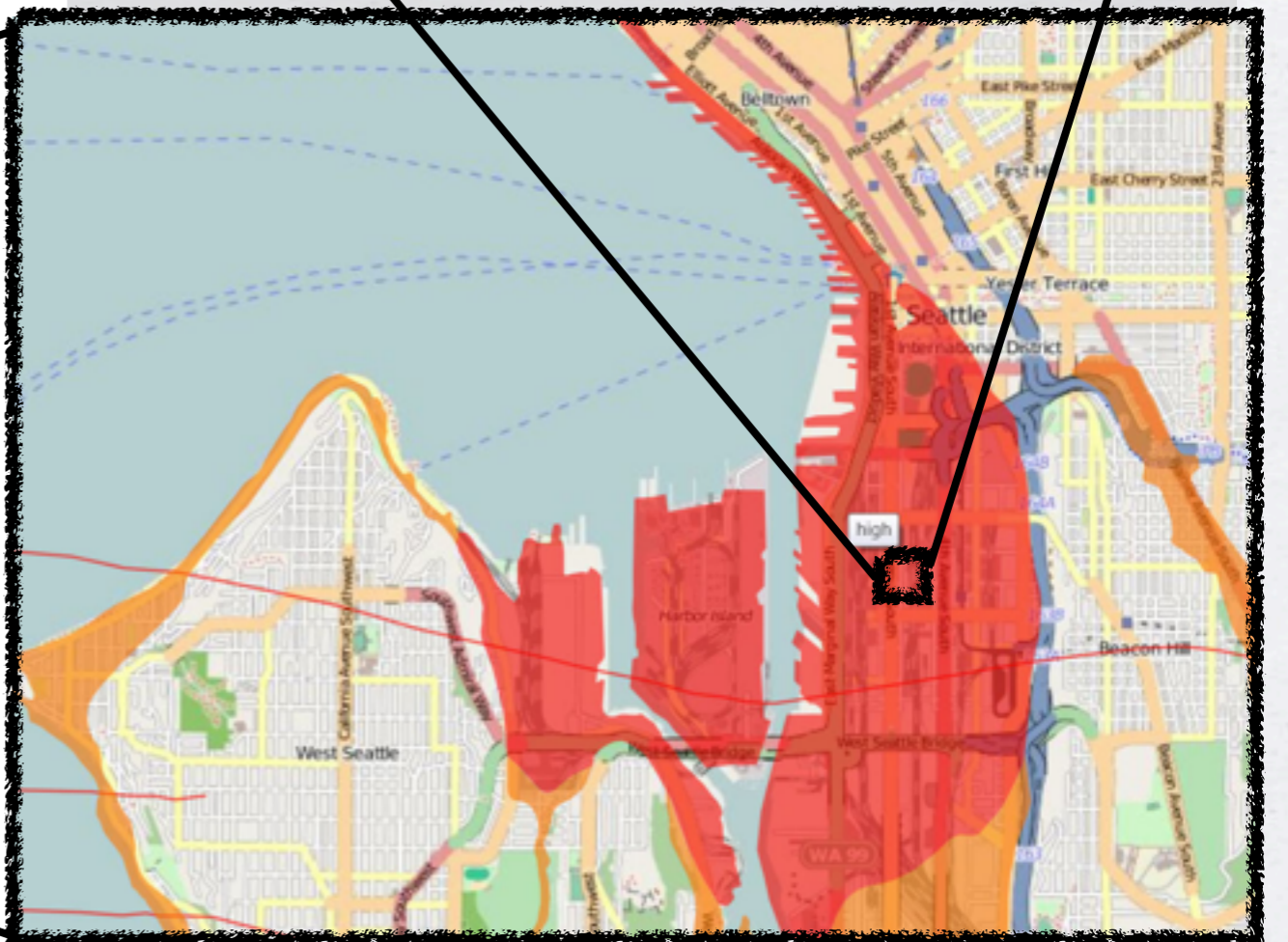
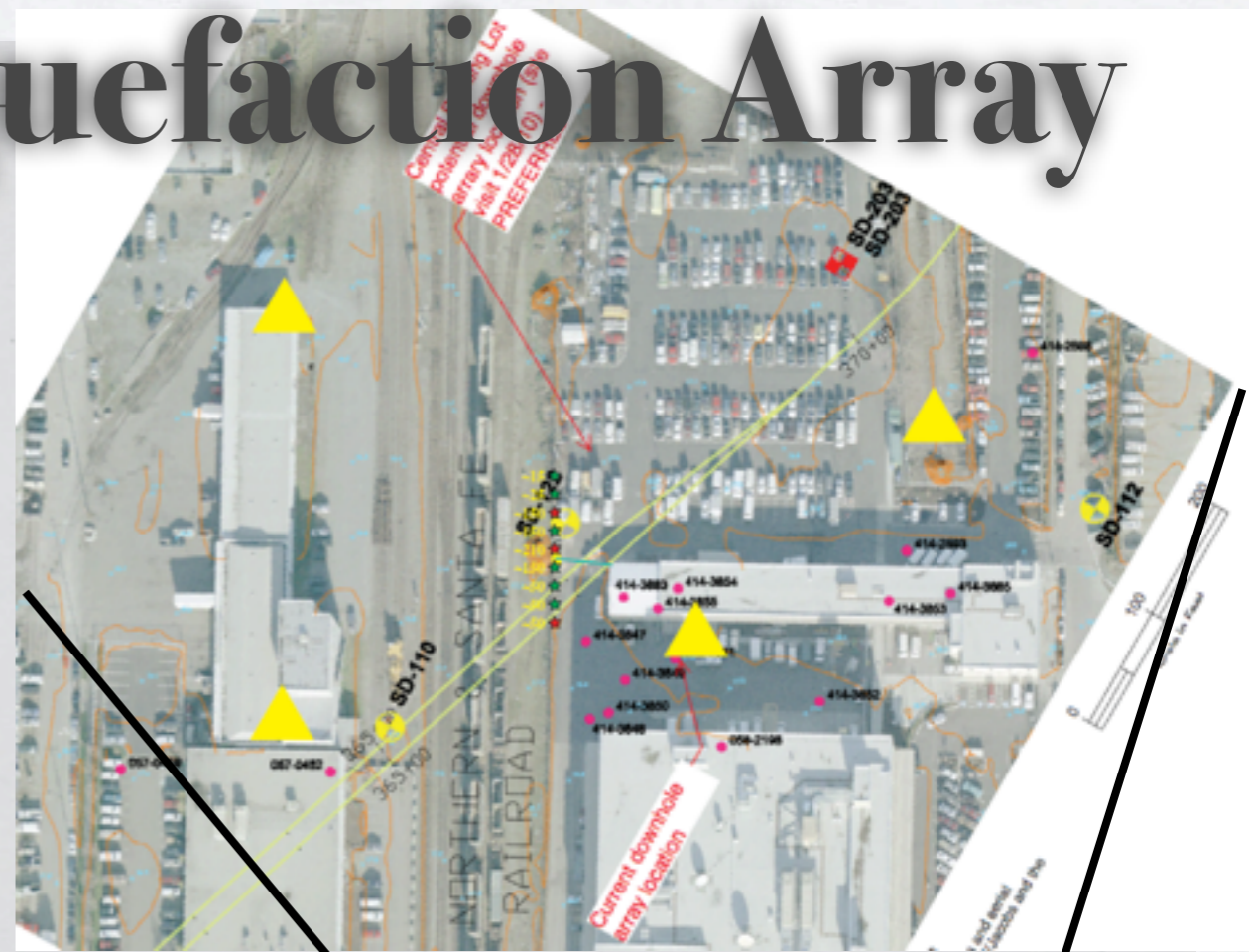
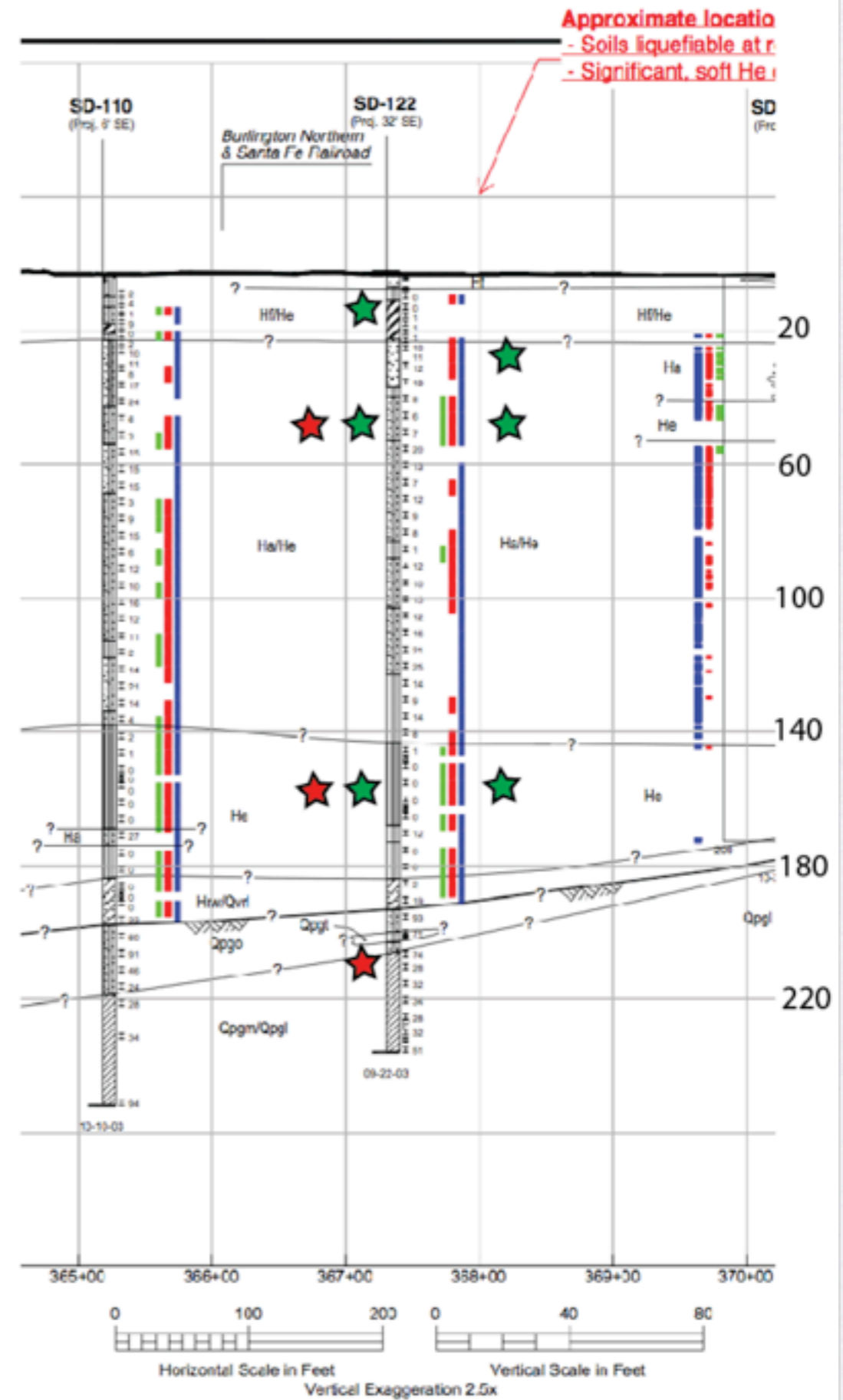


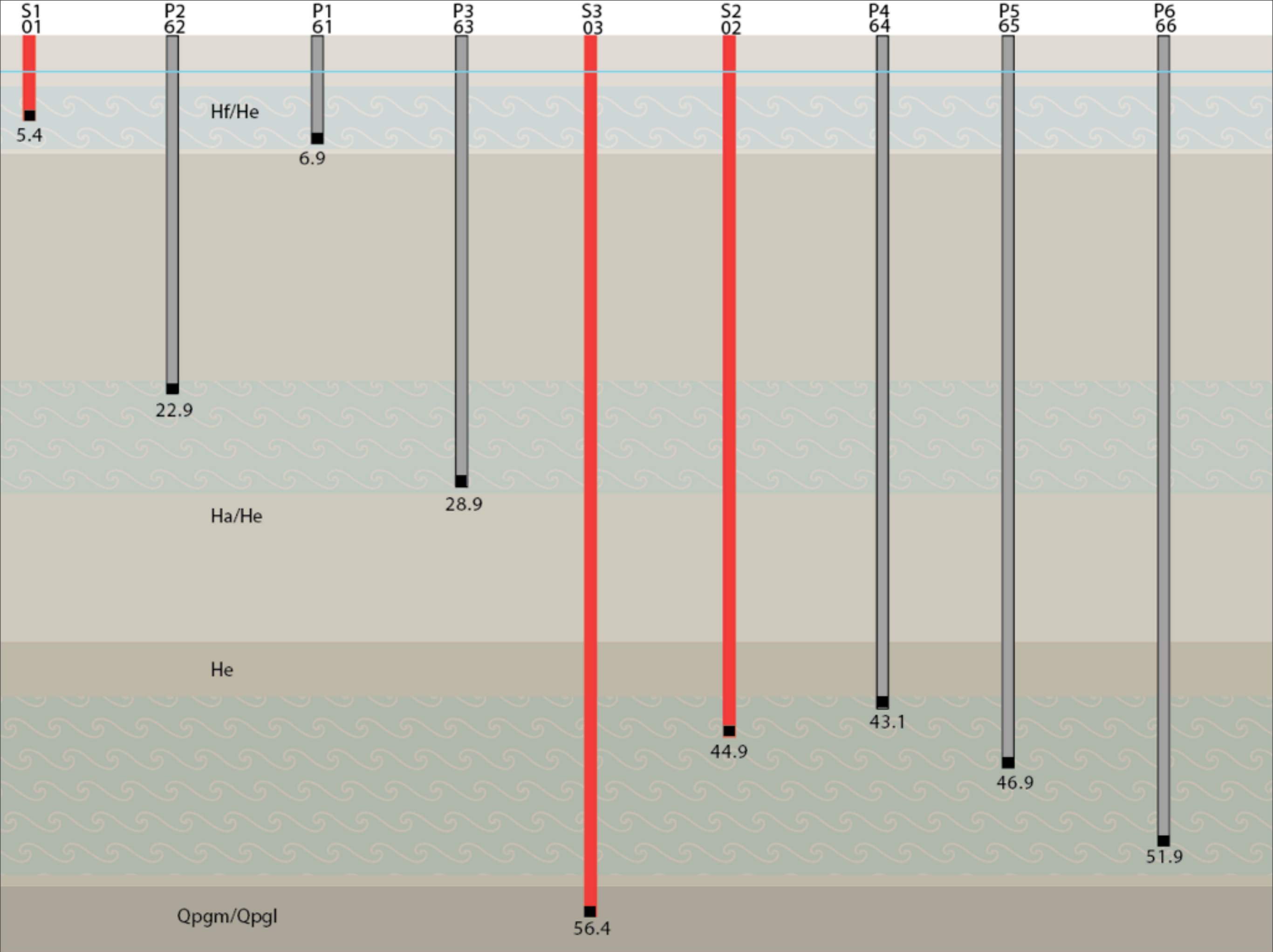
Figure 4.1-1
Geologic Hazard Areas

Instrumentation

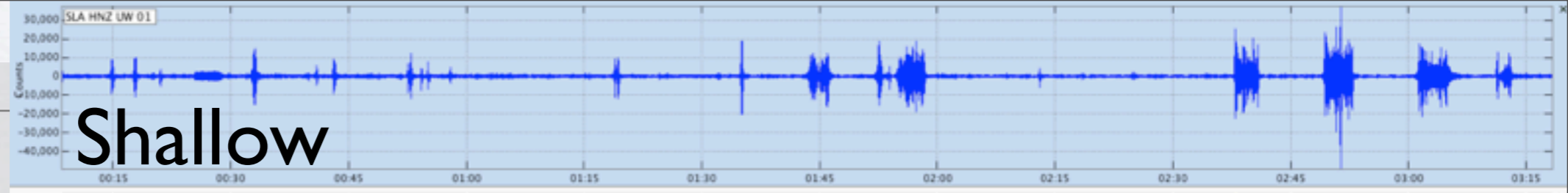
- 3 downhole accelerometers
- 6 piezometers (+ 1 barometer)
- Surface accelerometer array



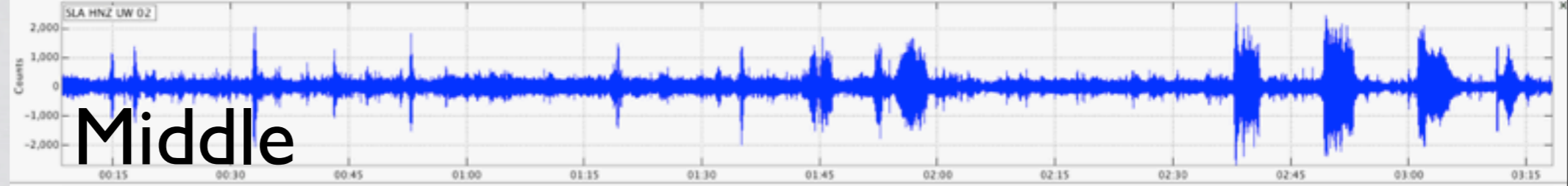
Kudos to Tom Yelin, Craig Weaver, Jamie Steidl, Rob Stellars, Bill Perkins, CB Crouse



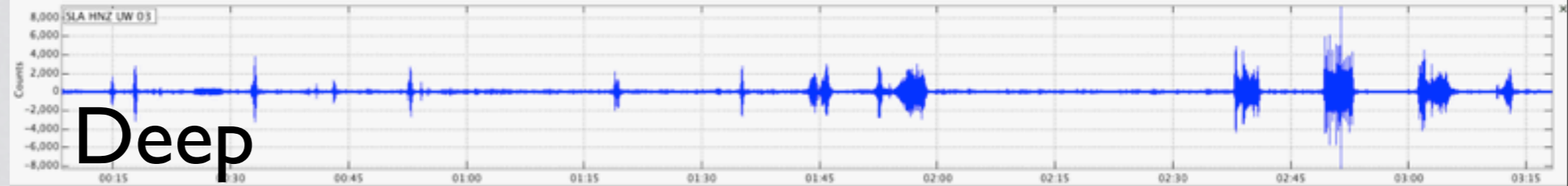
Seismic



Shallow

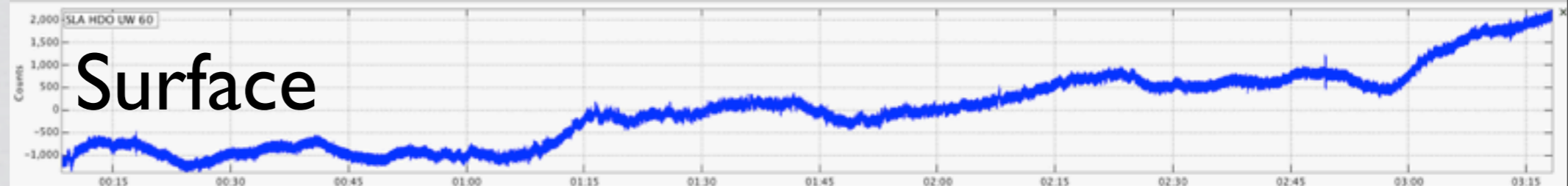


Middle

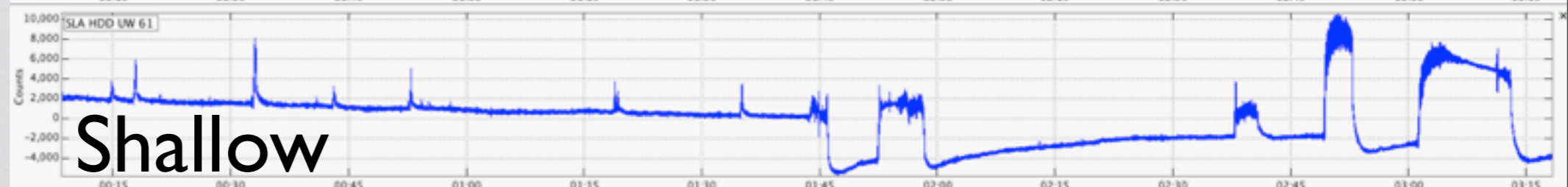


Deep

Barometer



Surface



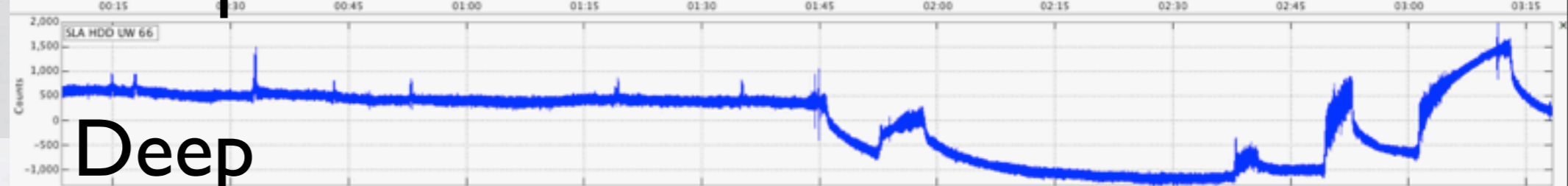
Shallow



Middle



Deep

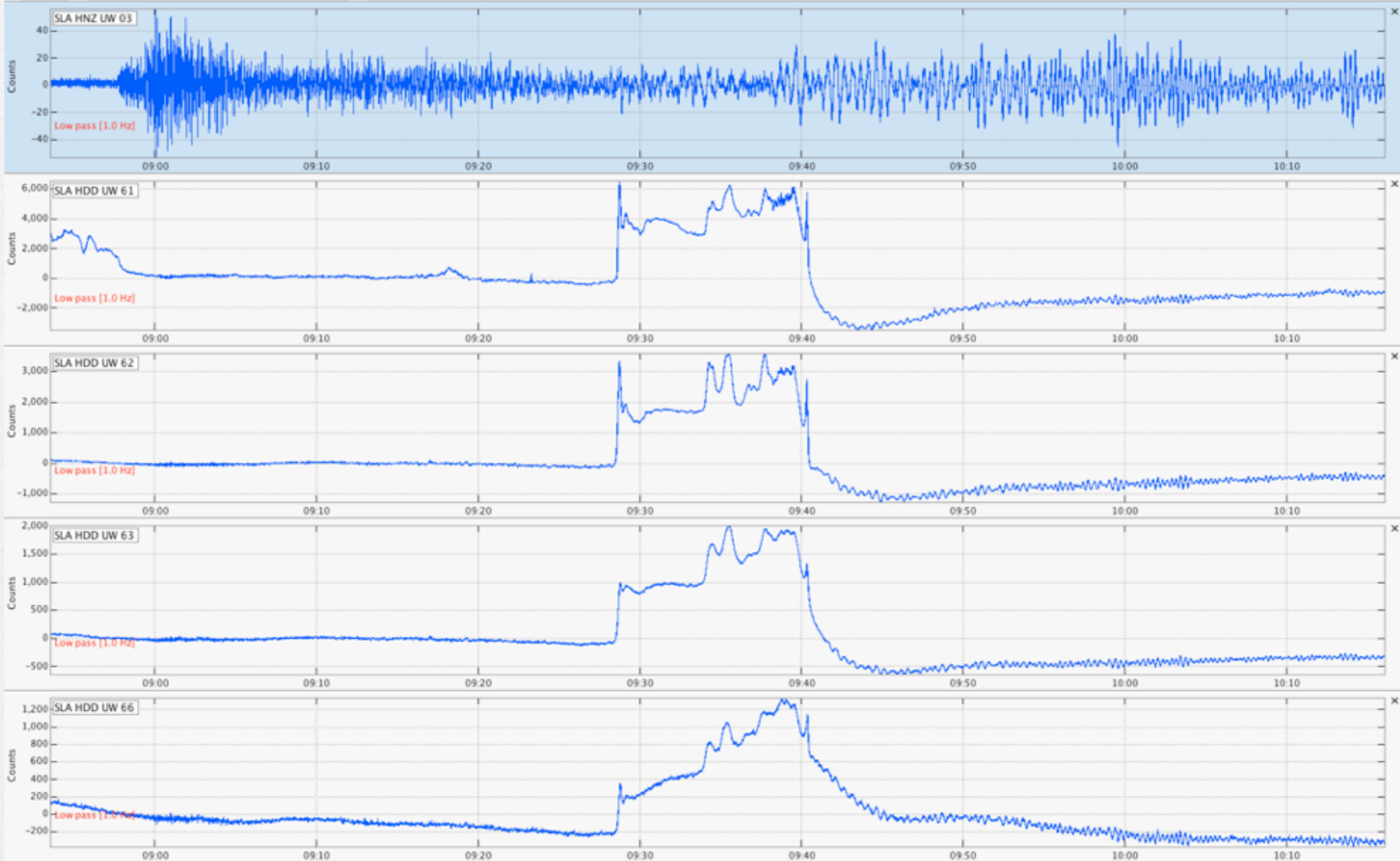


Deep

Pore

Pressure

M8.6 - Sumatra + local train



Next Up

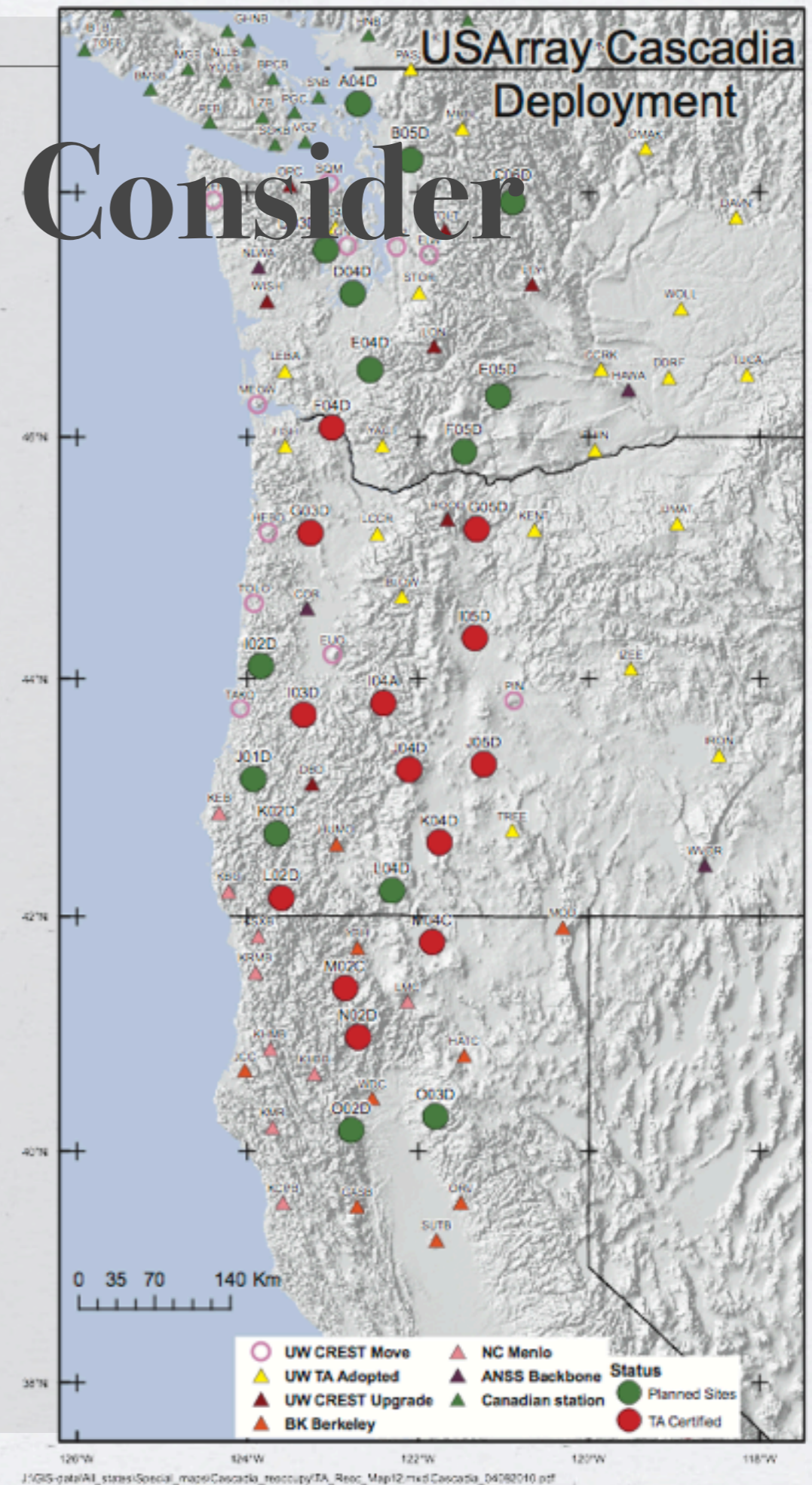
- * Deferred maintenance
 - * plus BPA work
 - * plus ARRA episensor replacements
- * RTGPS data
- * EEW stations / EEW software
- * Remaining NQ stations
- * General “tuning up” of system, back catalog
- * “Modernization” (double differences, station corrections, magnitude adjustments, moment tensors, etc.)

Some Things to Consider

- * Cascadia Initiative stations -
How to retain ?
- * Early Warning coastal station
deployment (1st 8) strategy.
- * Coordination with NEIC.

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