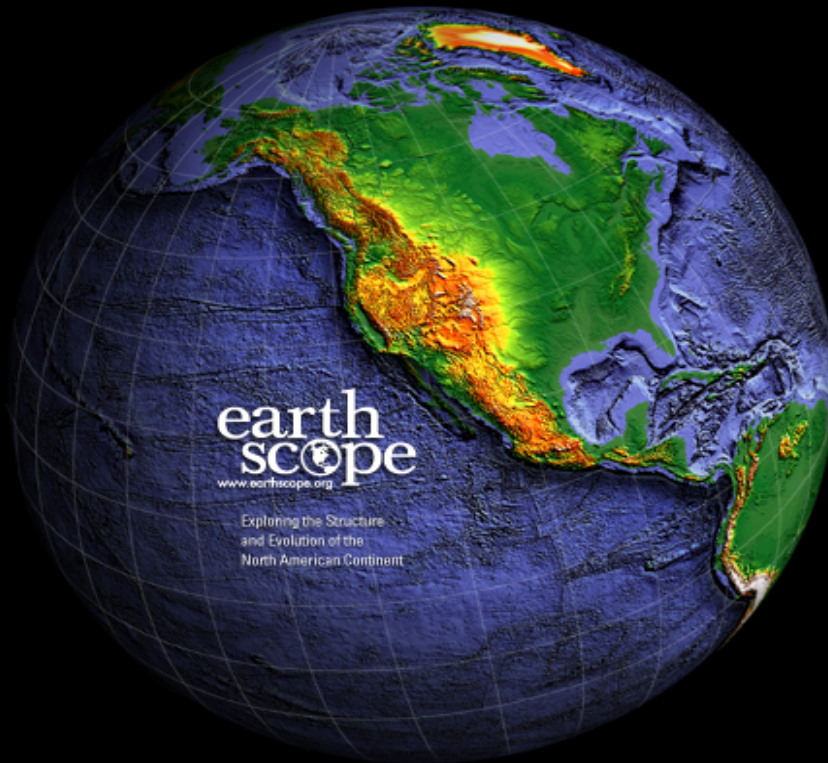


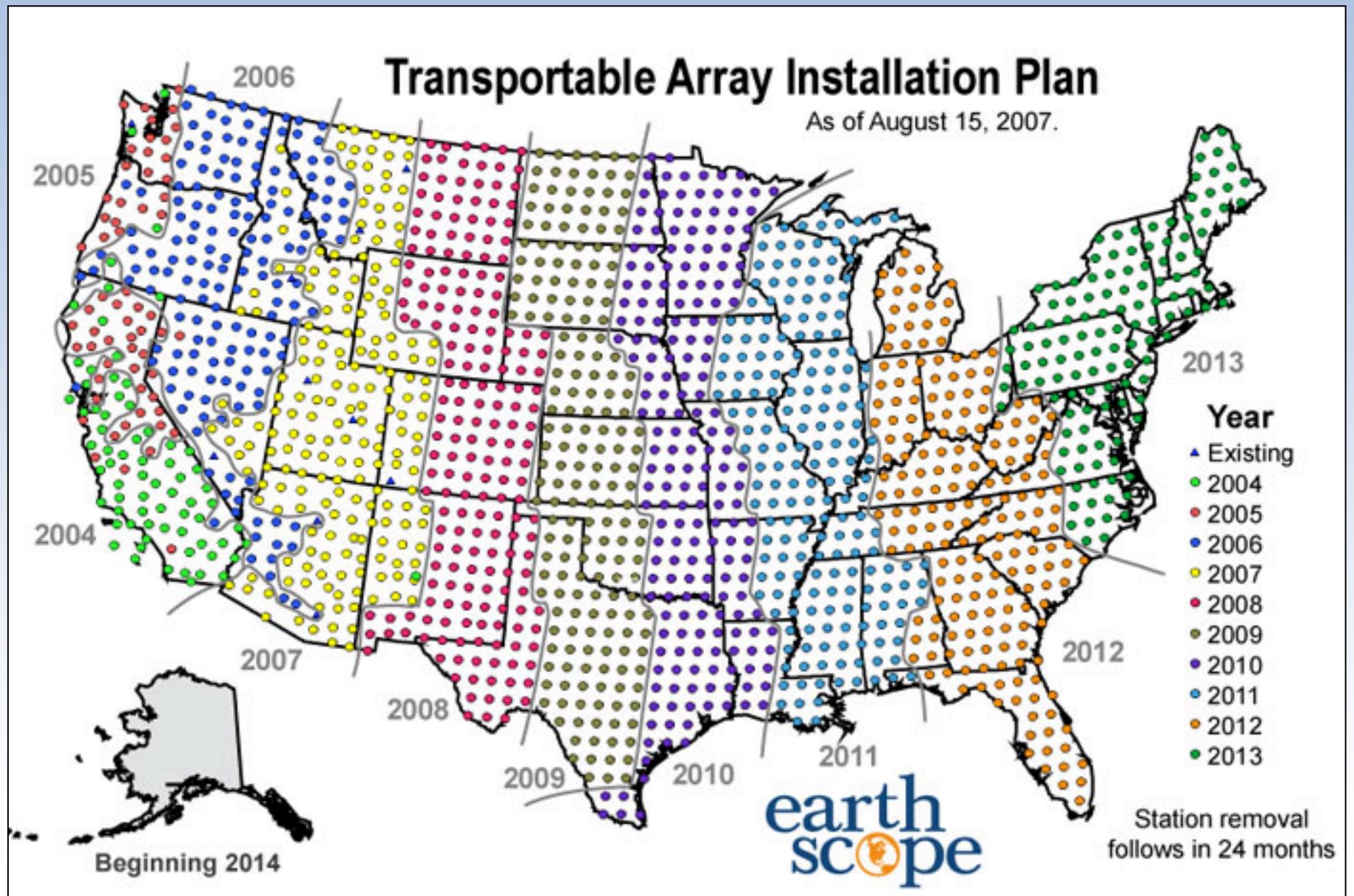
USArray Status Update

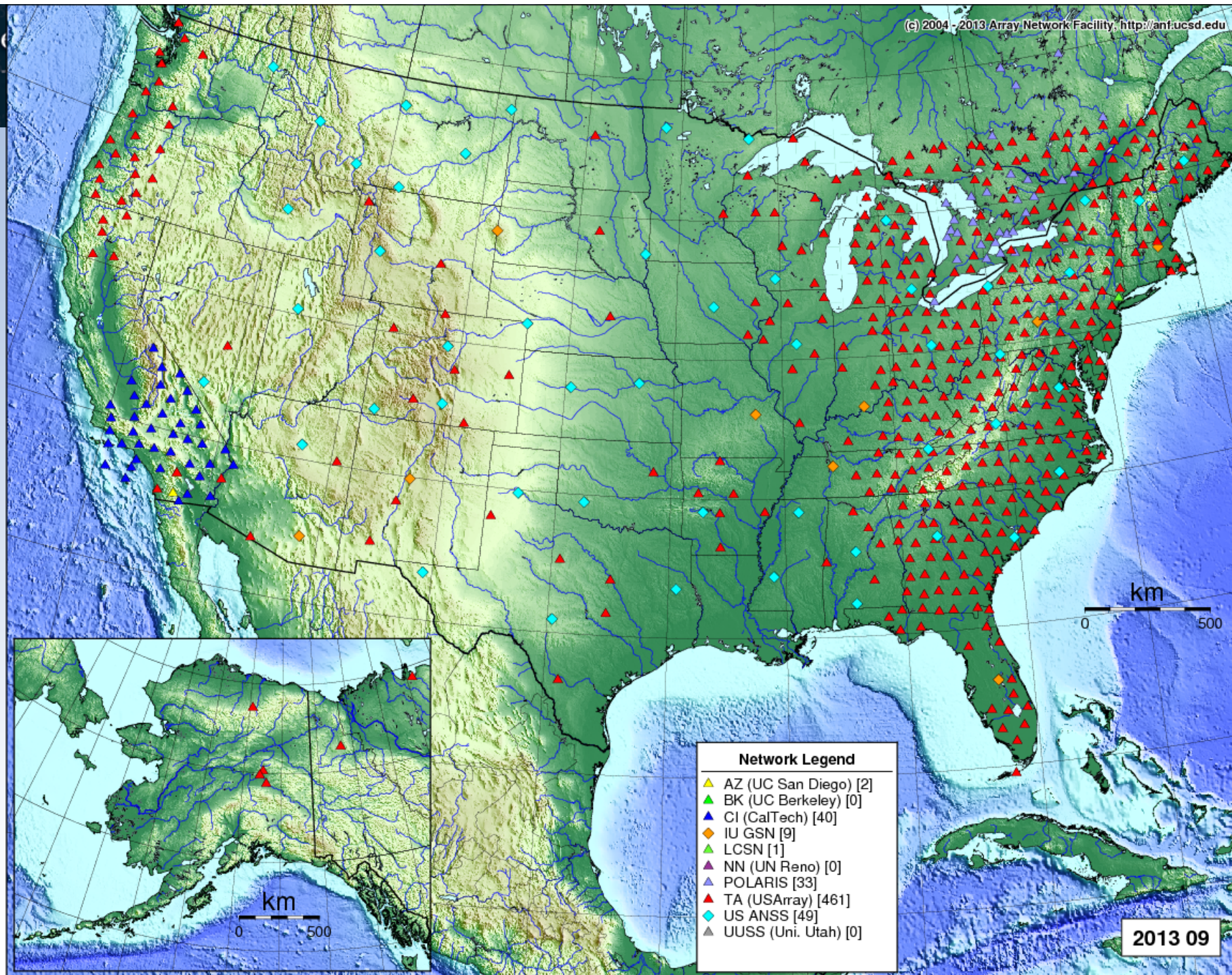


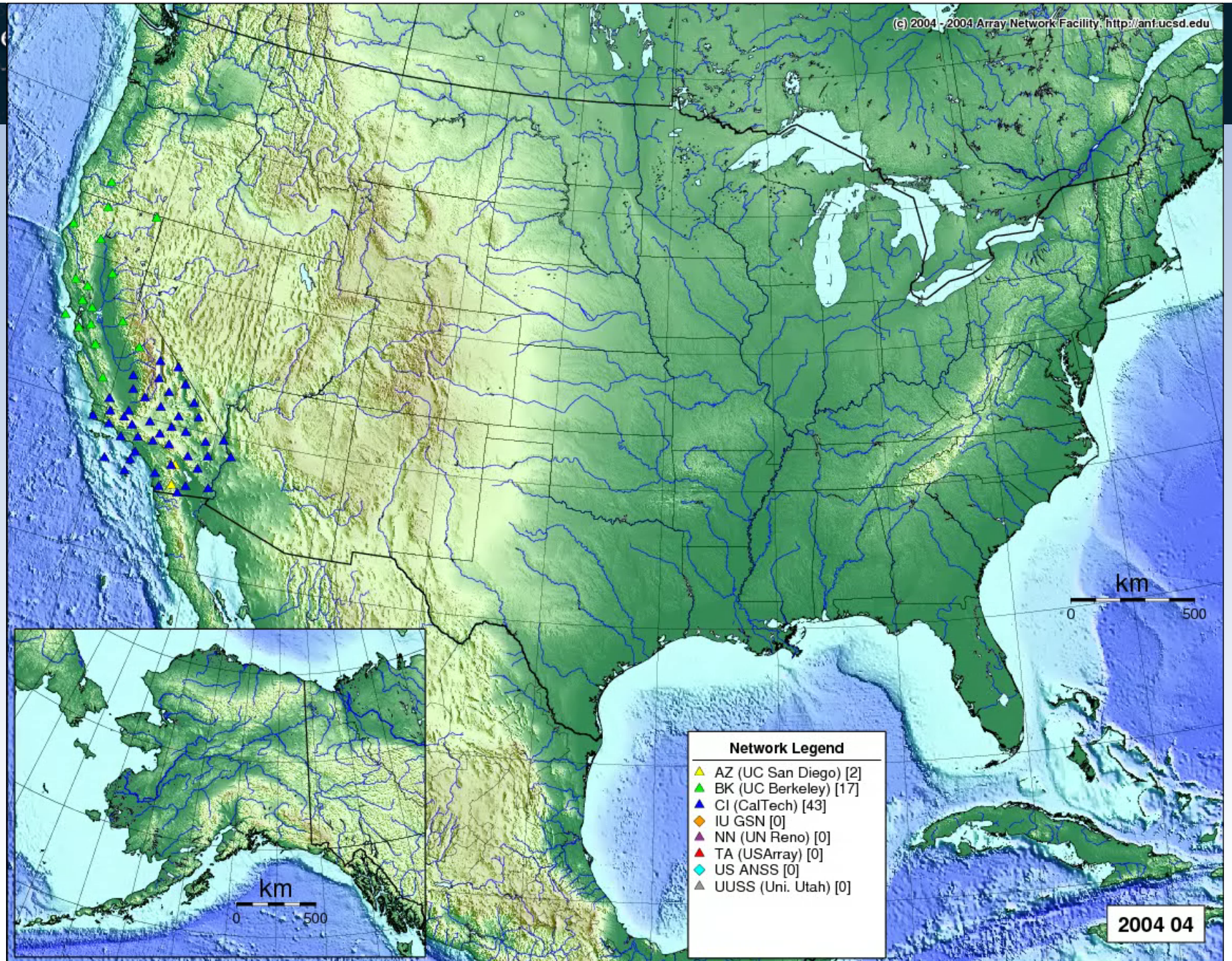
Bob Woodward & David Simpson
IRIS

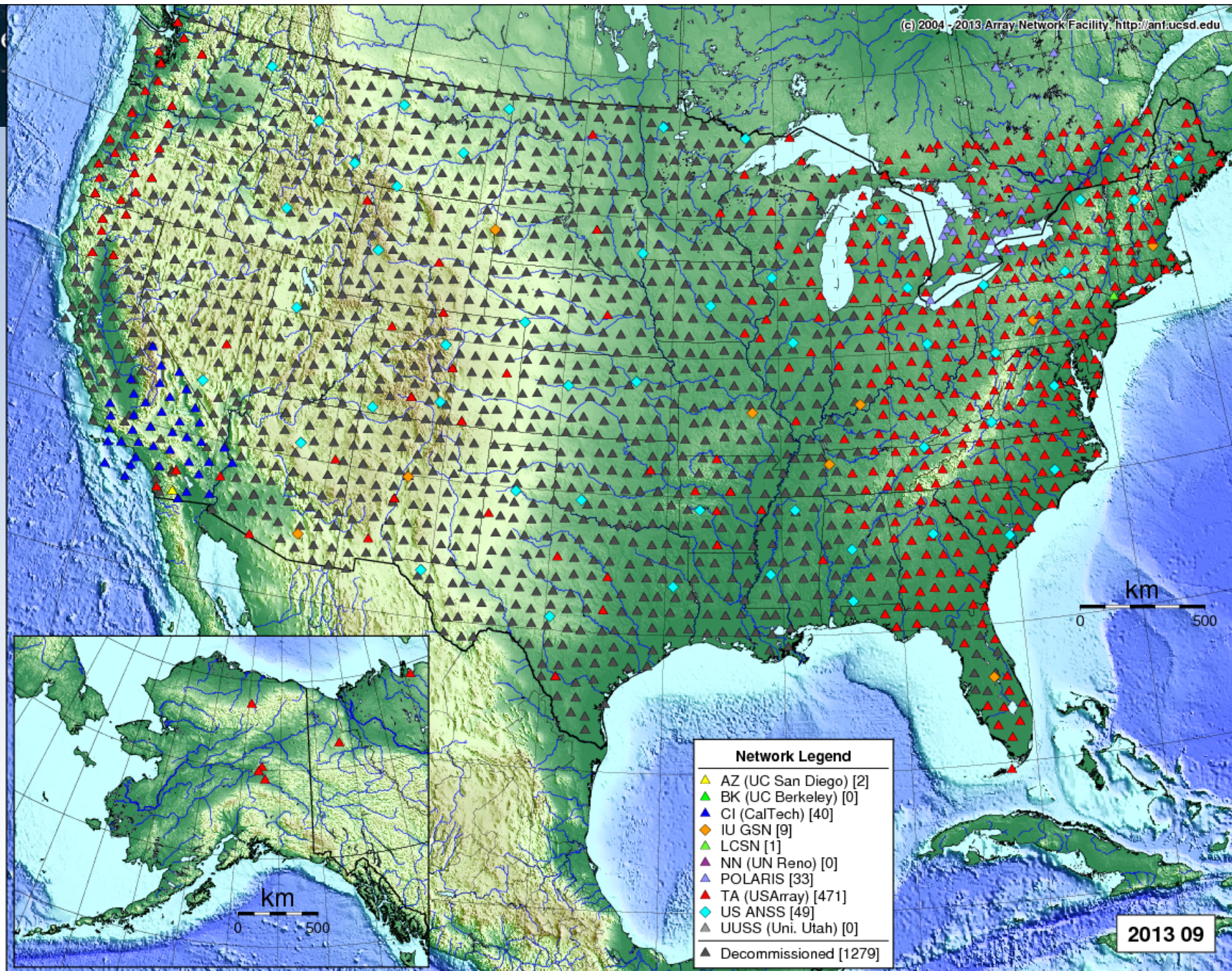
*EarthScope Steering Committee
October 8, 2013
Boulder, CO*

A Ten Year Plan









TA Science Symposium and All Hands Team Meeting

- Celebrating the completion of the TA deployment
- September 30, 2013
- Woods Hole



TA Science Symposium and All Hands Team Meeting

An afternoon of talks highlighting the science resulting from the TA

Fine-Scale Continental Tomography

Scott Burdick
Rob D. van der Hilst



USArray Transportable Array
Research Symposium
September 30, 2013

Understanding deformation of the western US: *what have we learned from USArray?*

Maureen Long
Yale University

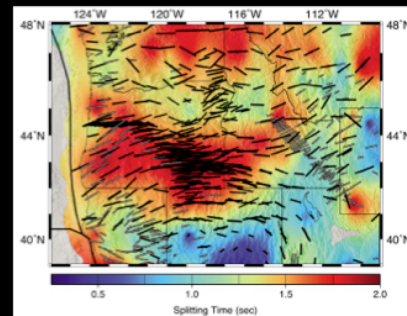
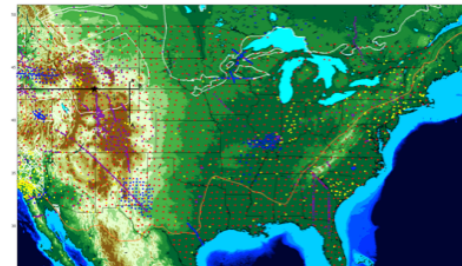


Plate Boundaries Old and New: Insights from USArray

Karen M. Fischer¹, Emily Hopper¹,
Ved Lekic², Heather Ford³,
Lara Wagner⁴, Rob Hawman⁵

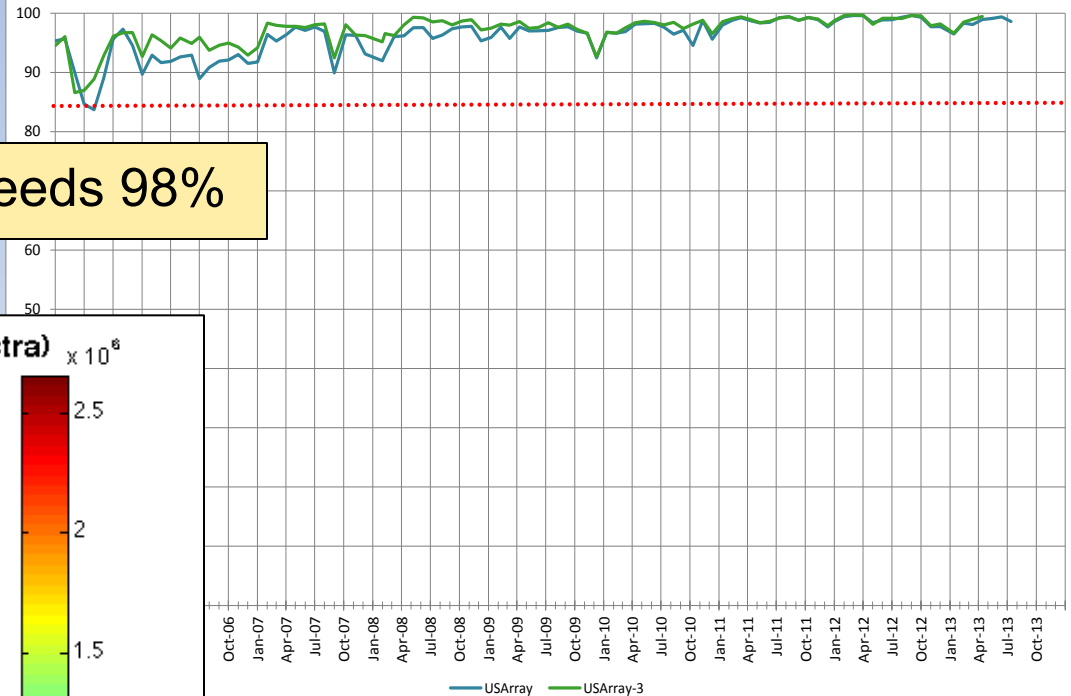
¹Brown University, ²University of Maryland, ³Yale University,
⁴UNC Chapel Hill, ⁵University of Georgia



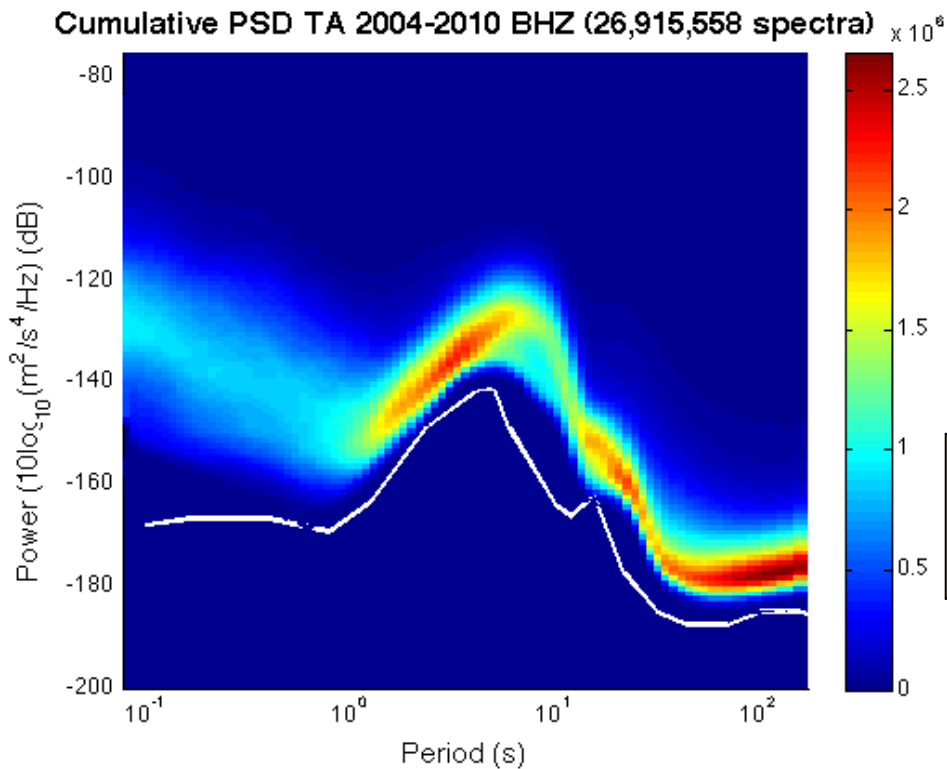
Performance & Quality

Network availability typically exceeds 98%

Composite USArray Performance



Station noise highly uniform and quite low for temporary installations

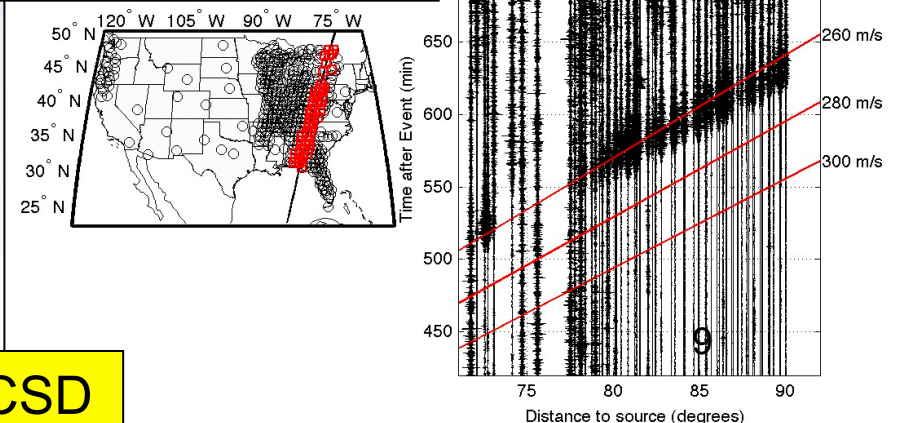
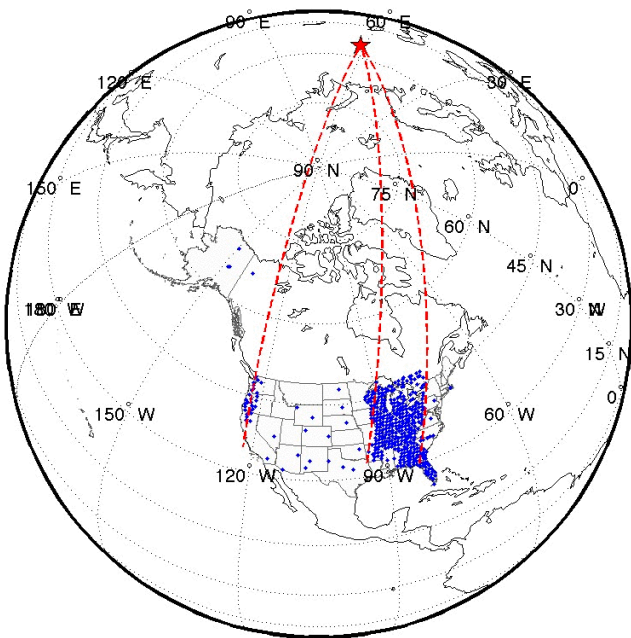
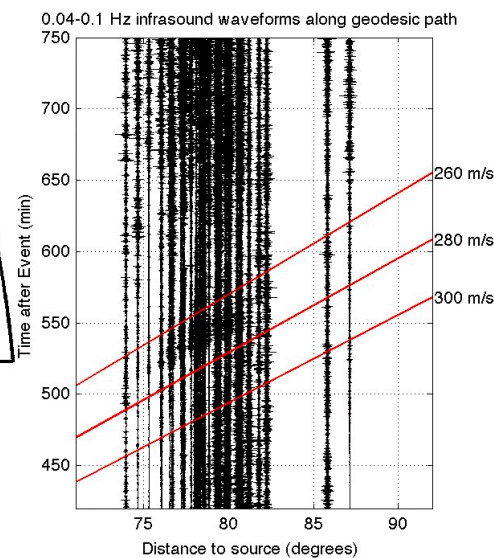
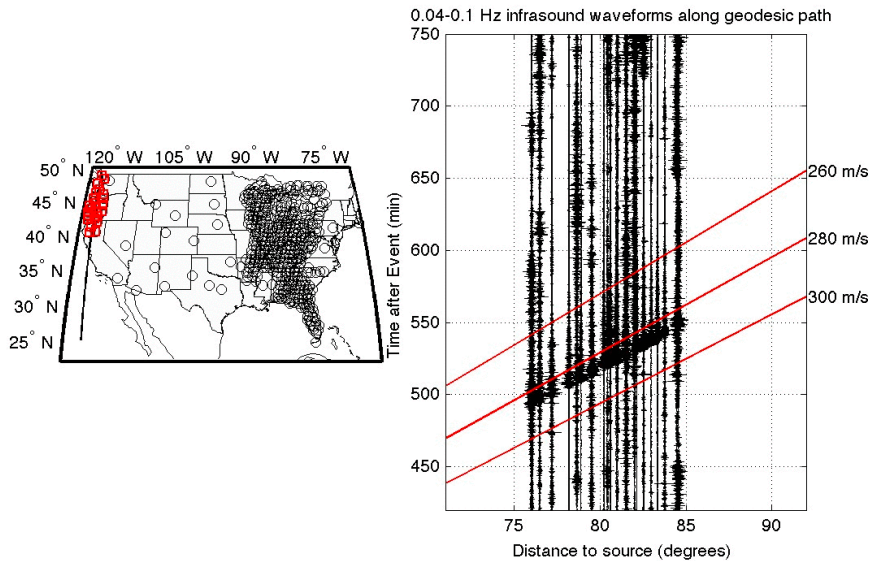


The quality and consistency of the data have been key to the science

Atmospheric Acoustic Transportable Array

- Infrasound data provides unprecedented profiles for azimuth and distance

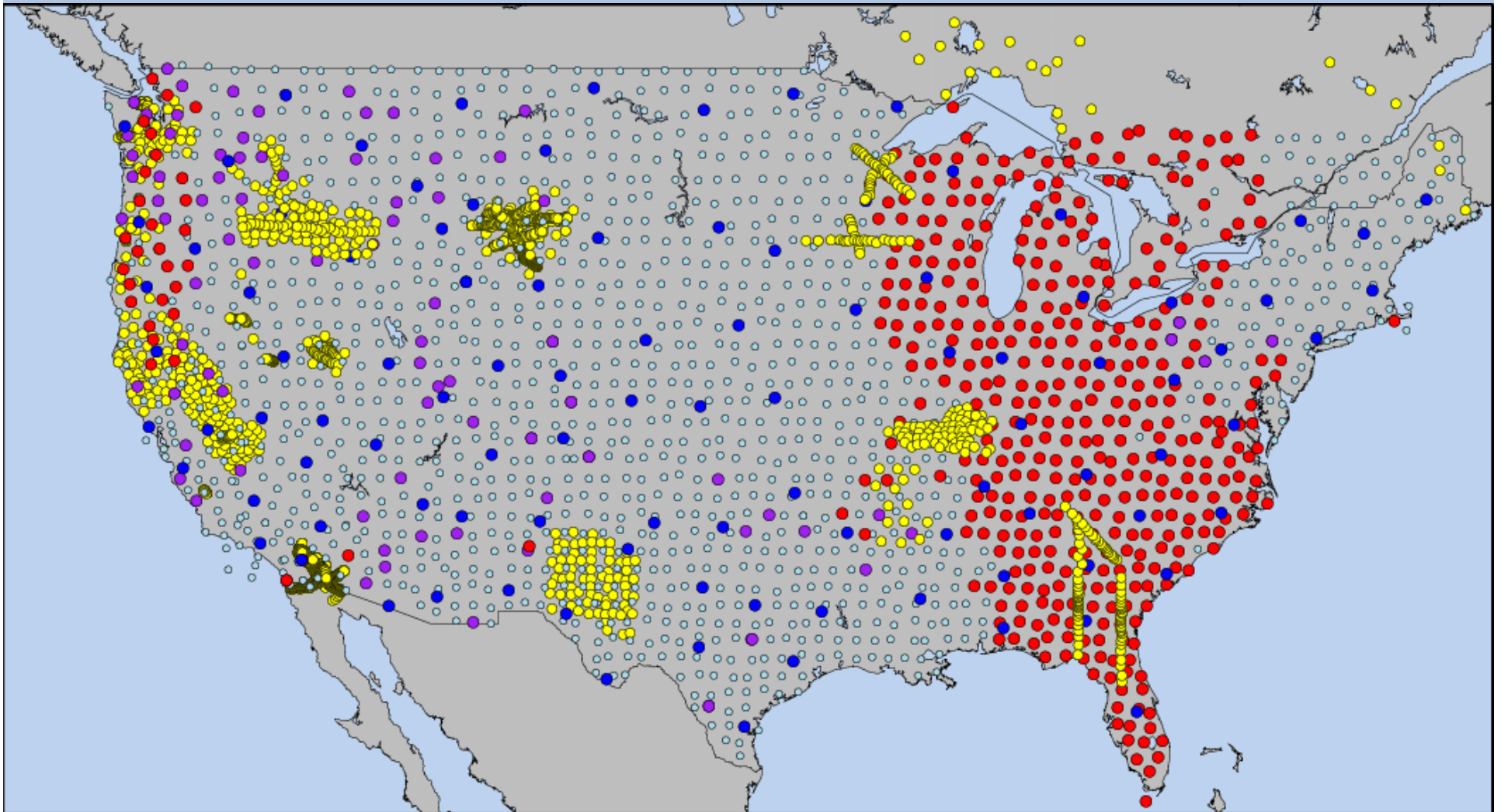
Google:
IRIS infrasound
For events and
detections



Figures from Catherine deGroot-Hedlin, UCSD

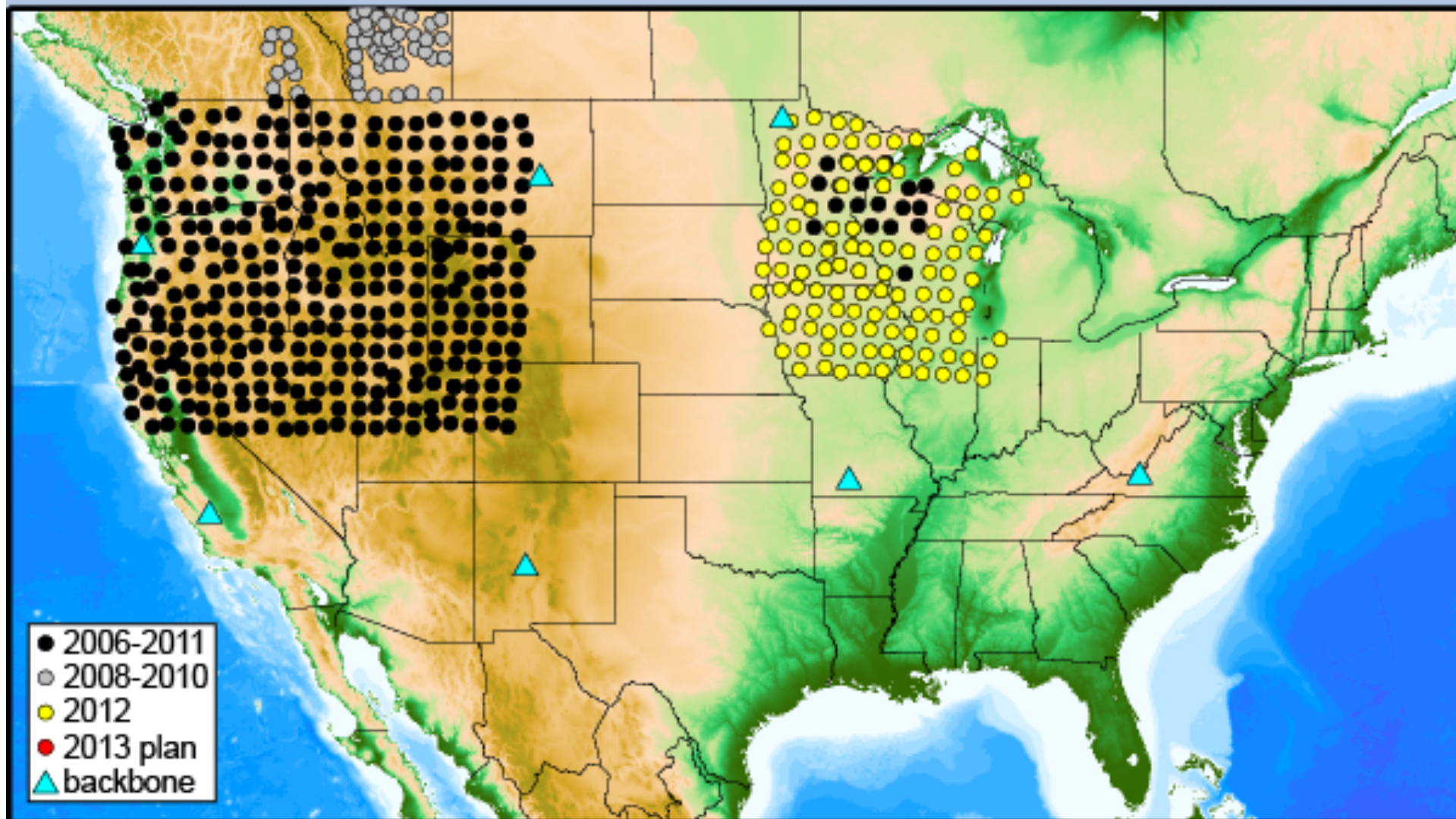


Leveraging the TA



- FA experiments have leveraged the TA and drilled down on specific targets
- TA approach has also been emulated by some FA experiments

Magnetotelluric TA

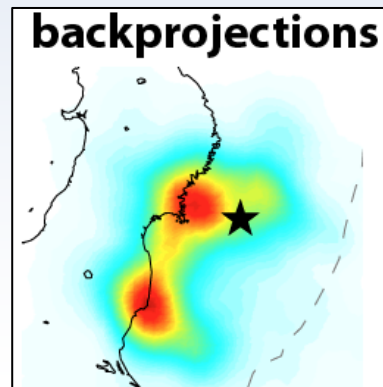
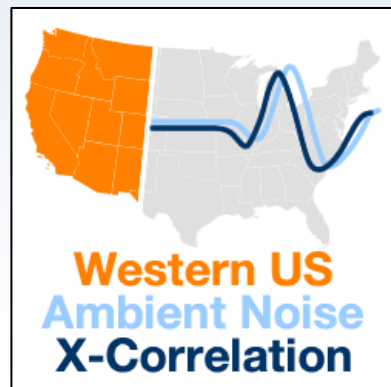
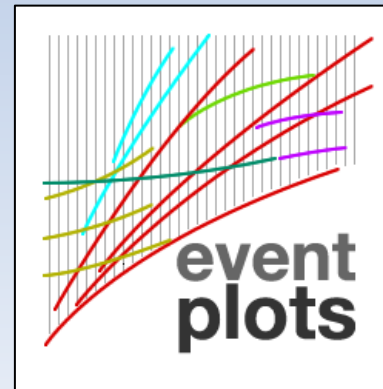
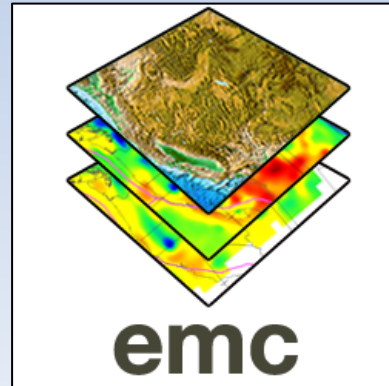
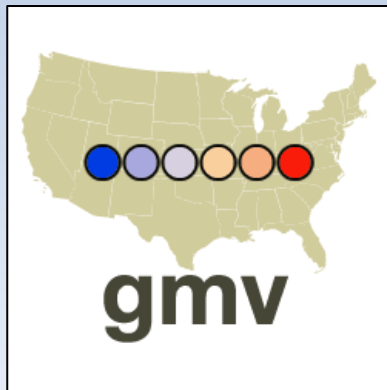




- 2013 field season well along

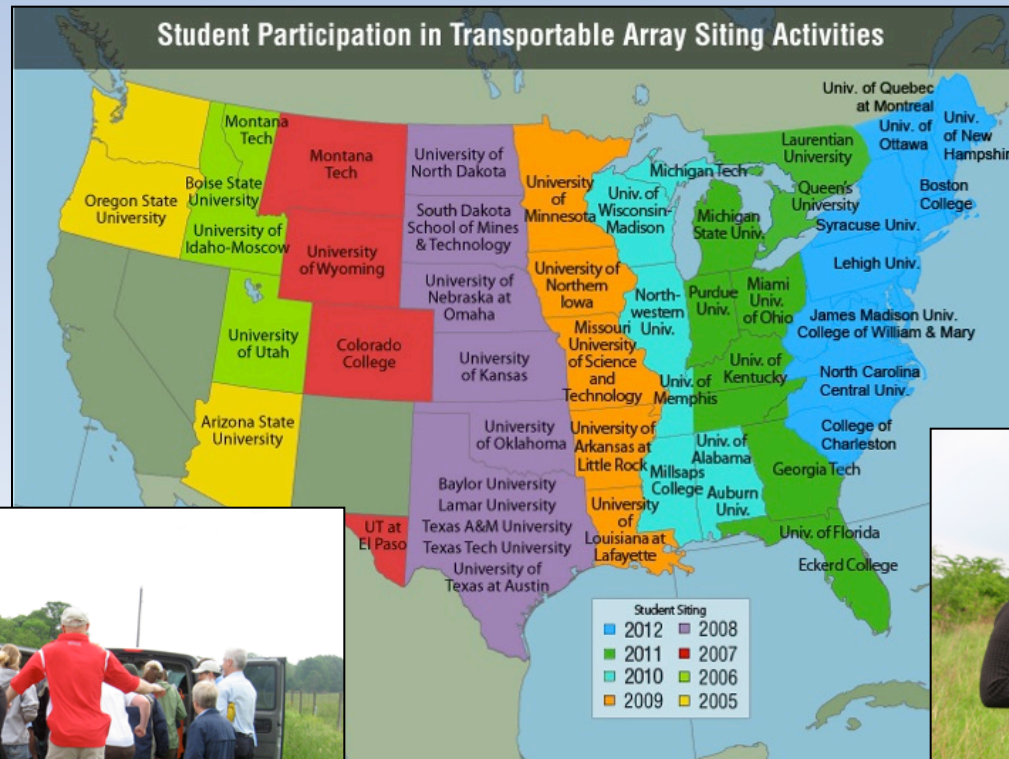
Level 0-1 Time series data

Level 2-3 Products



Engaging Students in Site Reconnaissance

- 135 students, 50+ universities





An EarthScope field engineer piles dirt on the sealed vault for Transportable Array station 128A near Midland, S.D. The station is powered by solar energy and continuously transmits its data via cellphone.

Incorporated Research Institutions for Seismology

Nationwide project lends new details on earthquakes

Updated 6/17/2010 11:31 AM | Comments 47 | Recommend 21 | E-mail | Save | Print | Reprints & Permissions | RSS

By Jeff Martin, USA TODAY



Enlarge By Incorporated Research Institutions for Seismology

When it comes to studying earthquakes, Oregon State University geology professor Bob Lillie has a simple theory: The more that is known, the better people can prepare and protect themselves.

More knowledge about faults in certain parts of the nation could lead to stricter building codes in those places so structures are less likely to topple, he says.

"If we know about the hazards, then we can put ourselves at less risk," Lillie says.

Lillie is part of a group of scientists involved in USArray, a nationwide research project that allows scientists to study earthquakes in

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A seismometer is installed on a cement floor in the EarthScope Transportable Array station H26A lower compartment. A lid is placed on the vault before it is sealed and covered with dirt to insulate it from temperature fluctuations.

QUAKE MONITORING DEVICES

Seismographs to study earthquakes are being installed across the USA in phases, says Woodward, USArray director.

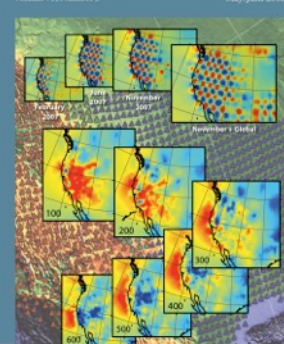
- Devices placed in 2010
- Devices to be placed in 2011



Source: USArray
By Julie Snyder, USA TODAY

SEISMOLOGICAL RESEARCH LETTERS

Volume 79, Number 3 May/June 2008



SEISMOLOGICAL SOCIETY OF AMERICA

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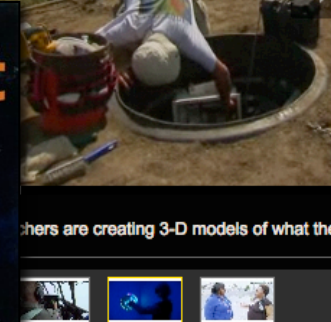
from the ader nation. n of North akes and

Newspaper, television, magazines

X-RAY EARTH

Overview Video Photos

Like 1K



others are creating 3-D models of what the

NEWSFOCUS

Scoping Out Unseen Forces Shaping North America

As it seeps across America, the USArray network of seismometers is revealing a hidden world of forces that are shaping the continent.

GEOPHYSICS

Scoping Out Unseen Forces Shaping North America

25 September 2008 10

Science

And sometimes they're pretty headlined. There are many things that are happening under the surface of the Earth, and many of them are happening in the United States. For example, the USArray network of seismometers is revealing a hidden world of forces that are shaping the continent.

What a deep focus event is, and how it can be used to study the Earth's interior.

A deep focus event is a type of earthquake that occurs at depths greater than 300 kilometers. They are rare and difficult to study, but they can provide valuable information about the Earth's interior.

The USArray network of seismometers is revealing a hidden world of forces that are shaping the continent.

THE REAL BATMAN How to see with sound

COLLAPSING UNIVERSE Is dark energy getting weaker?

QUANTUM LASERS Half light, half matter

NewScientist

What is down there? Earth's deep secrets revealed at last

News, ideas and innovation. www.NewScientist.com The last job in science

Student Impact: Training the Next Generation



- ~125 students over four summers
- Developing new strategies for dealing with the flood of data



The TA Comes to Washington







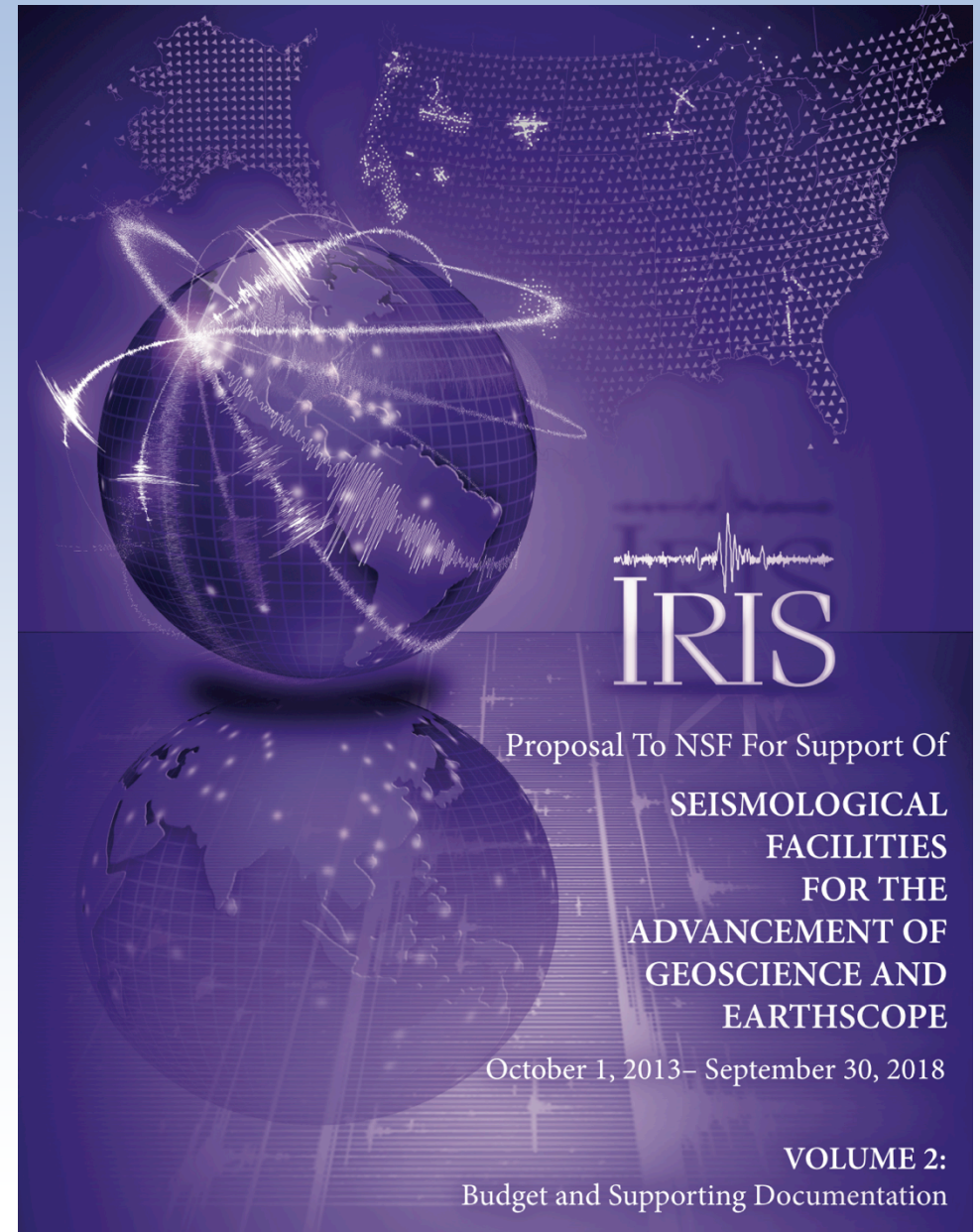
Recent Meetings

- USArray – Canada Science Opportunities
 - Feb 19-20, Sidney, BC, Canada
 - Workshop report (Freymueller, Hyndman, eds.)



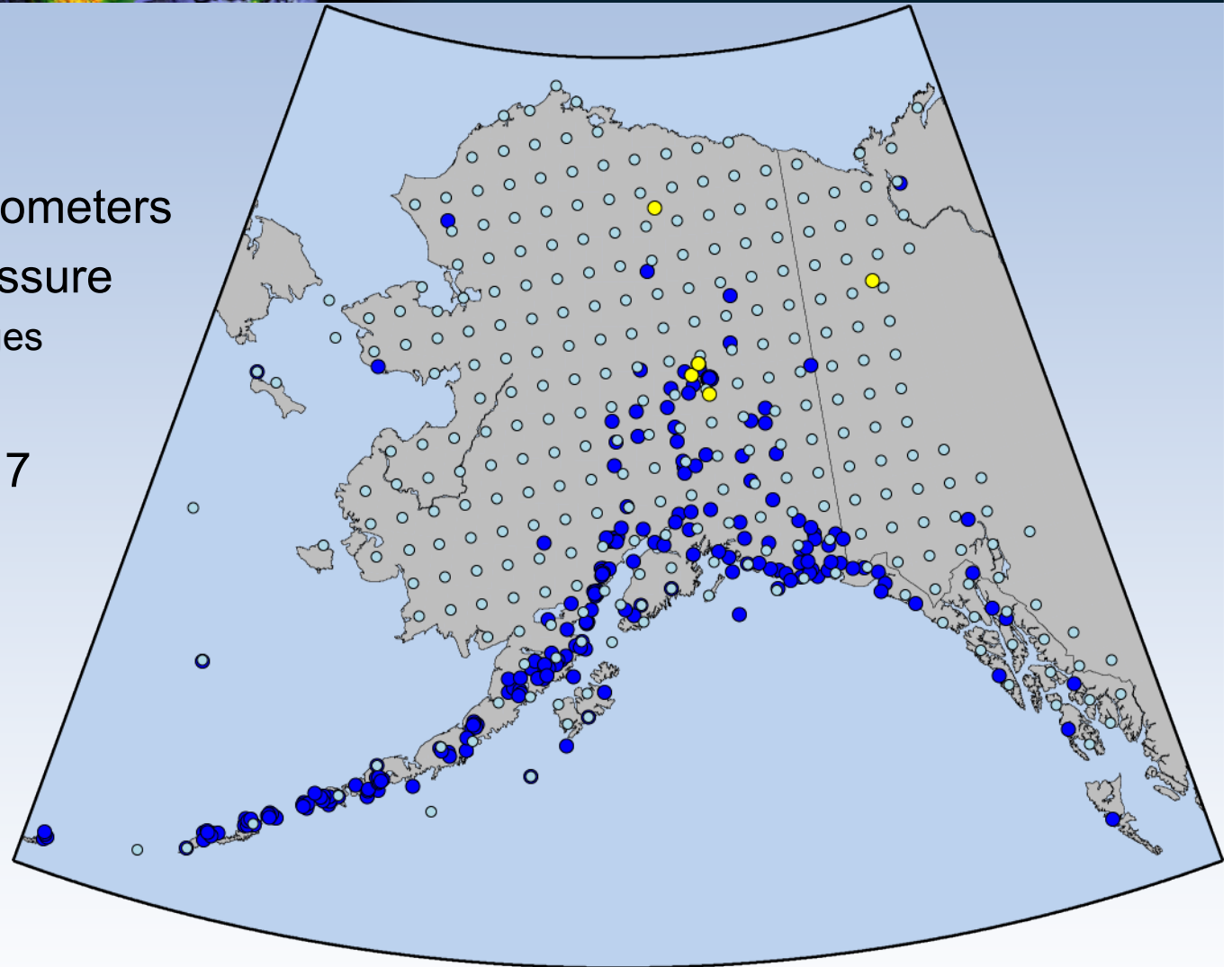
Good News: Funding!

- EarthScope funded in 5 year increments
- We just completed Year 10
 - As of midnight last night
- The August 2012 proposal was recommended for funding by the National Science Board
 - High marks
 - Numerous reviews, questions, and meetings
 - A new five year agreement



TA in Alaska / Yukon

- ~300 sites
- 85 km spacing
- Broadband Seismometers
 - Infrasond, pressure
 - Some met packages
- Communications
- fully deployed 2017

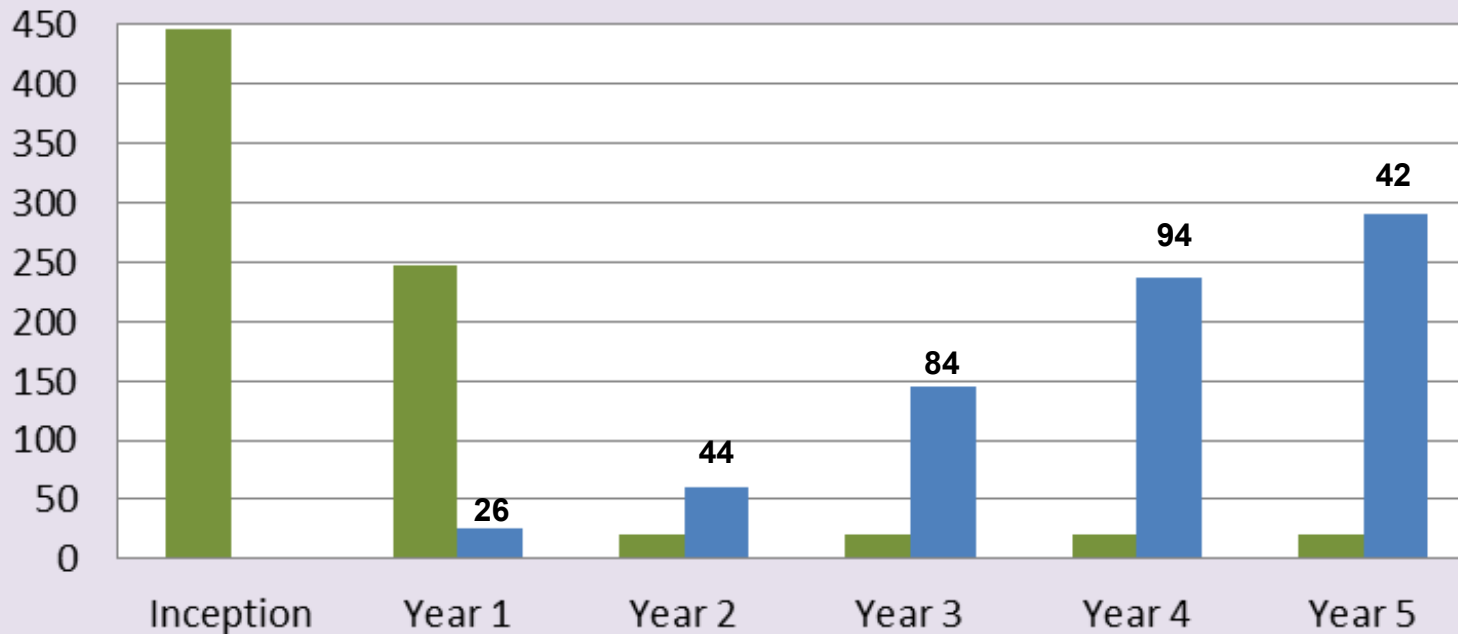


www.usarray.org/alaska

Project Schedule

Number of Stations Deployed

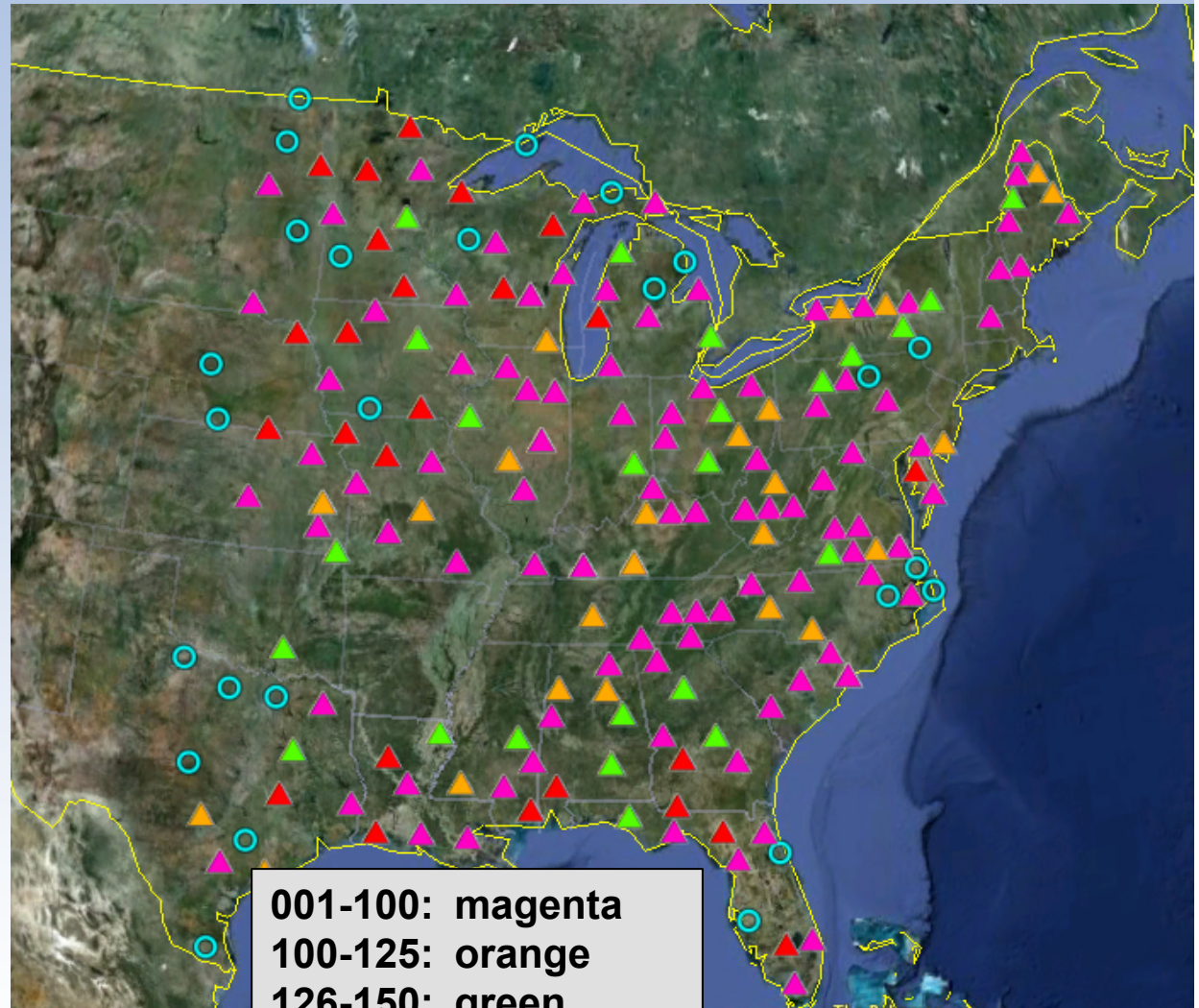
■ Lower 48 ■ Alaska



- Schedule balances roll-up in east with roll-out in Alaska
- Schedule provides longer operational window in AK
- Alaska field schedule is seasonally driven
 - Late spring – early fall
- Additional time for Alaska organizations to assemble plans to make selected stations permanent or collaborative science.

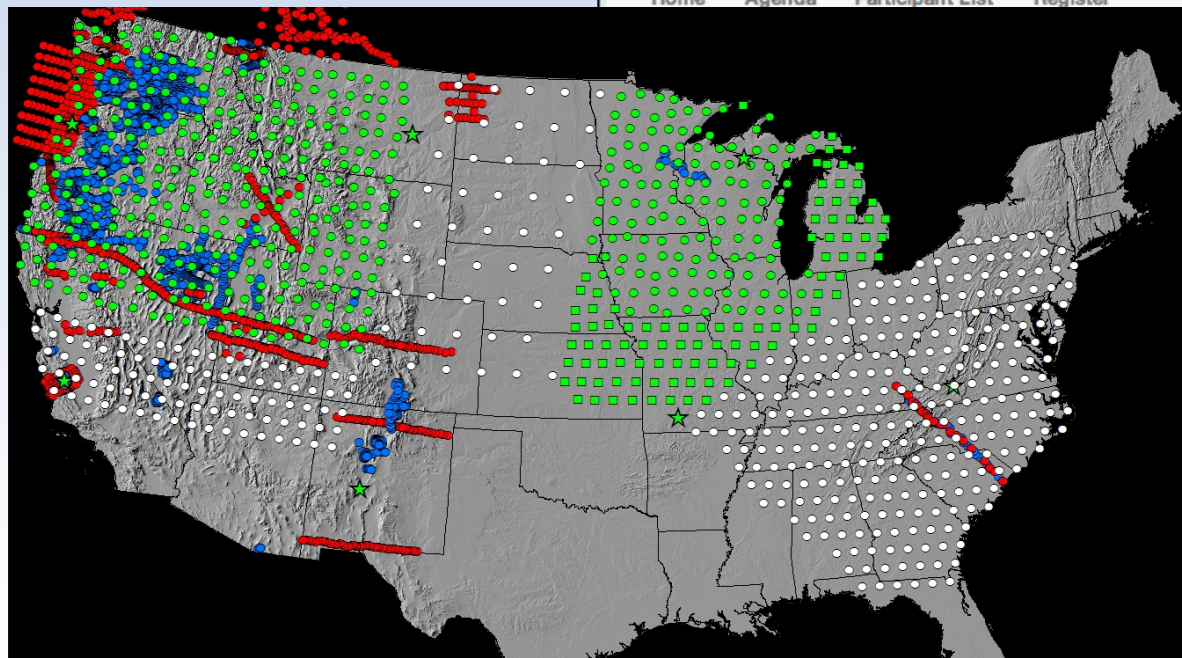
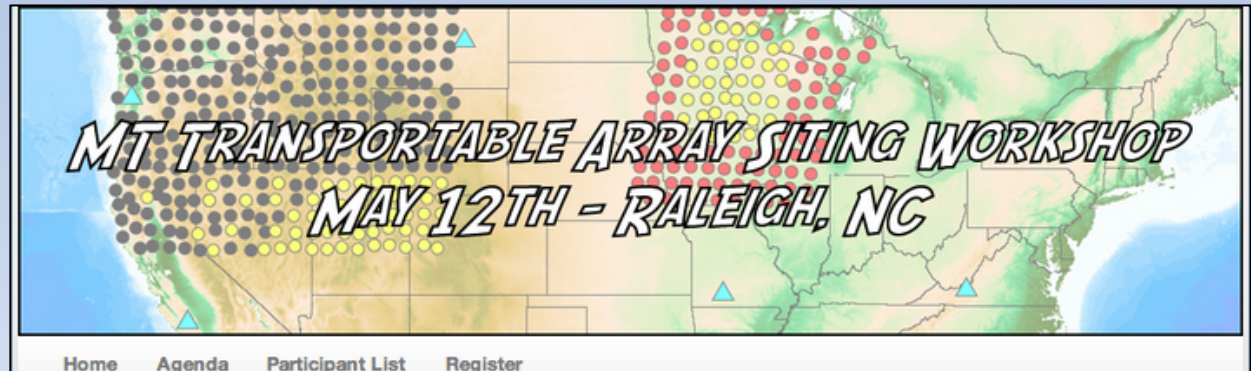
Central and Eastern US Network

- A five year plan to leave behind ~200 TA seismic stations for:
 - Research
 - Hazards assessment
 - Critical facilities
- Multi-agency collaboration
 - NSF
 - USGS
 - US NRC
 - DOE
- Funded in FY13
- “Good government”
 - Recognition of a unique opportunity to address multiple missions / needs



Recent Meetings

- MT Siting workshop in Raleigh, NC



Workshop

The Array (TA) will have 2018 should result in workshop is to set priority. We seek participation in geology, seismology, and which will further our understanding of the mantle beneath North

Registration on Sunday May 12th will be open until April 29th.

Registration fee: \$100. Take the

http://www.iris.edu/hq/mt_planning_workshop

EarthScope Symposium & Reception

- 009, Washington D.C.
- Community sponsored
 - IRIS, UNAVCO, SSA, NMT, Stanford, AGI, GSA, AGU
- Attendance
 - Congressional, NSF, agencies, etc.



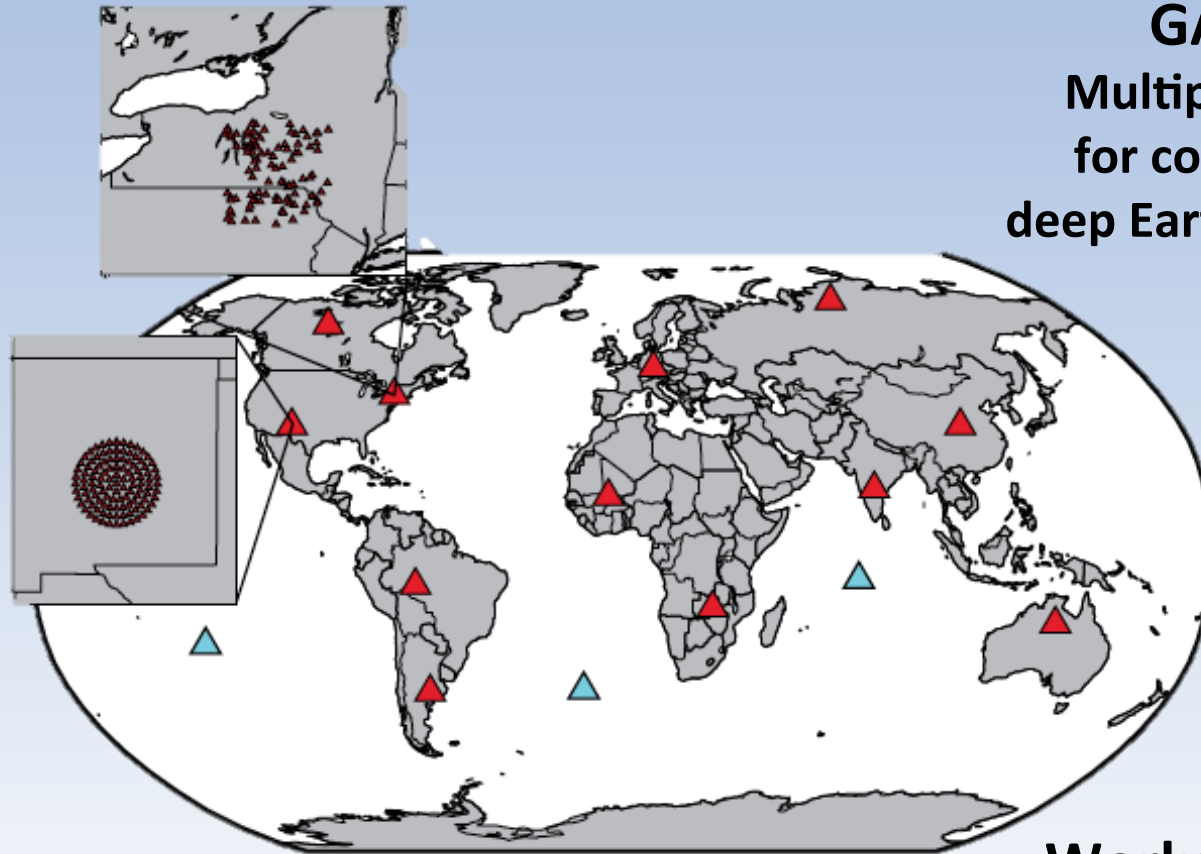
Propose similar event for 2014



Global Array of Broadband Arrays

GABBA Concept

Multiple broadband arrays
for coordinated studies of
deep Earth structure and source



Workshop held in May 2013
Significant discussion of
capabilities, results, and
possibilities

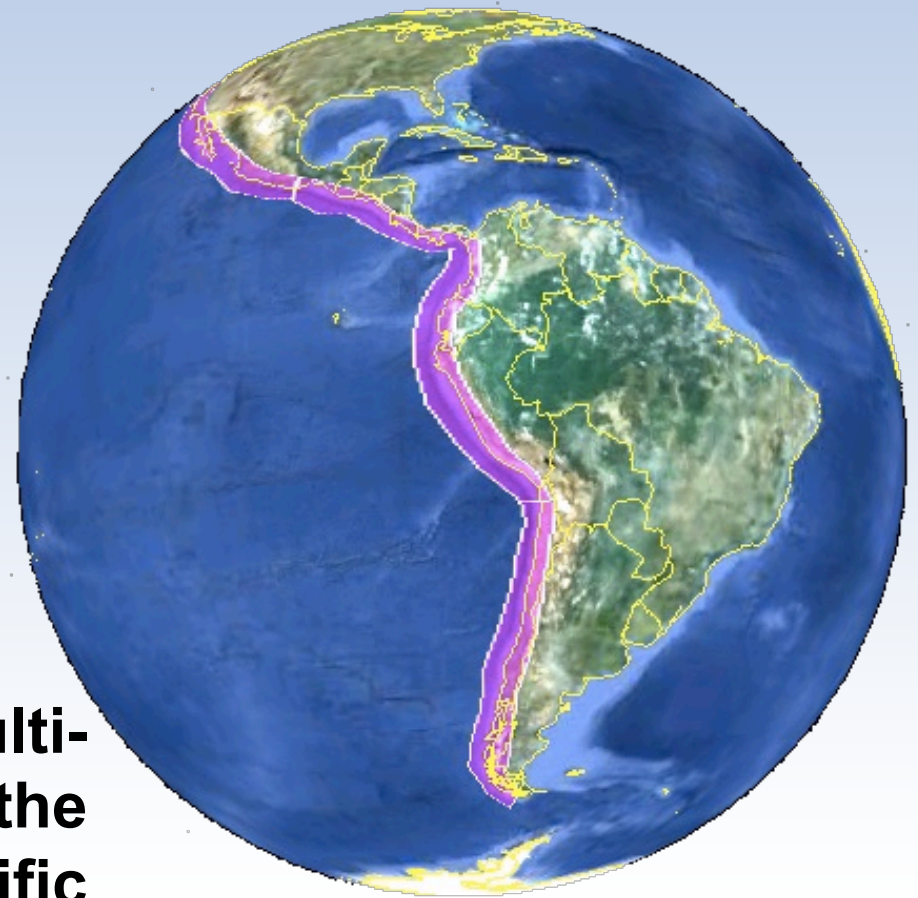
http://www.iris.edu/hq/arrays_workshop

The Big Idea: A Subduction Zone Observatory

Discussion group at ESNM in Raleigh
Follow-up meeting at AGU



**A coherent, structured, multi-
disciplinary observatory along the
length of the eastern Pacific**



Summary

- The TA has already, and will continue, to enable breakthrough science
- The Transportable Array has changed the way our field thinks about “big science” projects
- The TA has reset the bar for what is possible in large seismic network operations
- The TA has been and continues to be a transformative project



earth
scope



People Make it Happen



On the Web

- EarthScope
www.earthscope.org
- USArray
www.iris.edu/usarray
- National Science Foundation
www.nsf.gov

woodward@iris.edu

EarthScope is funded by the National Science Foundation.



EarthScope is being constructed, operated, and maintained as a collaborative effort with UNAVCO, and IRIS, with contributions from the US Geological Survey, NASA and several other national and international organizations.