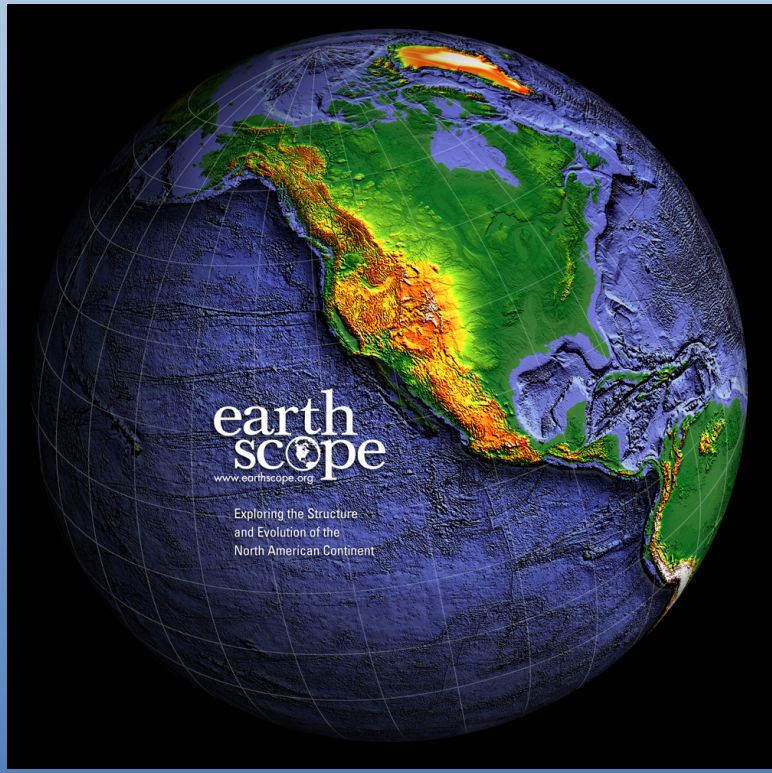
An Introduction to EarthScope: Fifteen Years of Geoscience Discovery



David Fee
EarthScope National Office
University of Alaska Fairbanks

EarthScope Symposium and Reception

1:30 - 1:45 PM | **An Introduction to EarthScope: Fifteen Years of Geoscience Discovery** by Dr. David Fee, EarthScope National Office Principal Investigator (University of Alaska Fairbanks)

1:45 - 2:00 PM | **Opening remarks** by Dr. Bill Easterling, Assistant Director of GEO (National Science Foundation)

2:00 - 2.30 PM | **EarthScope's USArray: A new window into solid Earth processes beneath North America** - Dr. Brandon Schmandt (University of New Mexico)

2:30 - 3:00 PM | **Earthquake Hazards and EarthScope** by Dr. Diego Melgar (University of Oregon)

3:00 - 3:30 PM | BREAK

3:30 - 4:00 PM | Innovating with EarthScope to Study the Water Cycle by Dr. Kristine Larson (University of Colorado)

4:00 - 4:30 PM | **How EarthScope and its Data Inspired a Generation of Geophysicists** by Dr. Suzan van der Lee (Northwestern University)

4:30 - 5:00 PM | **The Second Tectonics Revolution: a New 4D Perspective on the History of the North American Continent** by Dr. Mike Williams (University of Massachusetts)

5:00 - 5:30 PM | **Conclusion** by Dr. Jeff Freymueller, EarthScope National Office Director (Michigan State University)

5:30 - 8:00 PM | **Reception**

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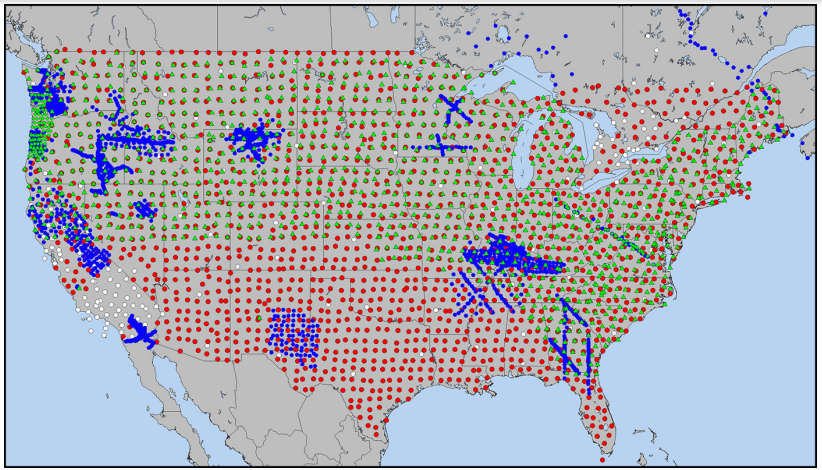
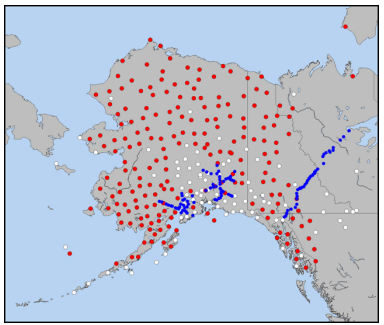
What is EarthScope?

- Largest earth science funded project in NSF history
- Goal: explore the structure and evolution of the North American continent
- Community-driven, free and open data
- Science-driven, but emphasis on education and outreach and broader impacts to society





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Partners and Acknowledgements

Many other organizations came together to make EarthScope possible!

EarthScope National Office (ESNO)

Rotating, university-based organization that facilitated scientific planning and coordinated education, outreach, and communication

- Oregon State University (2006 – 2011)
- Arizona State University (2011 – 2015)
- University of Alaska Fairbanks (2015 – 2019)

ESNO worked with numerous committees and other participants to achieve EarthScope's goals

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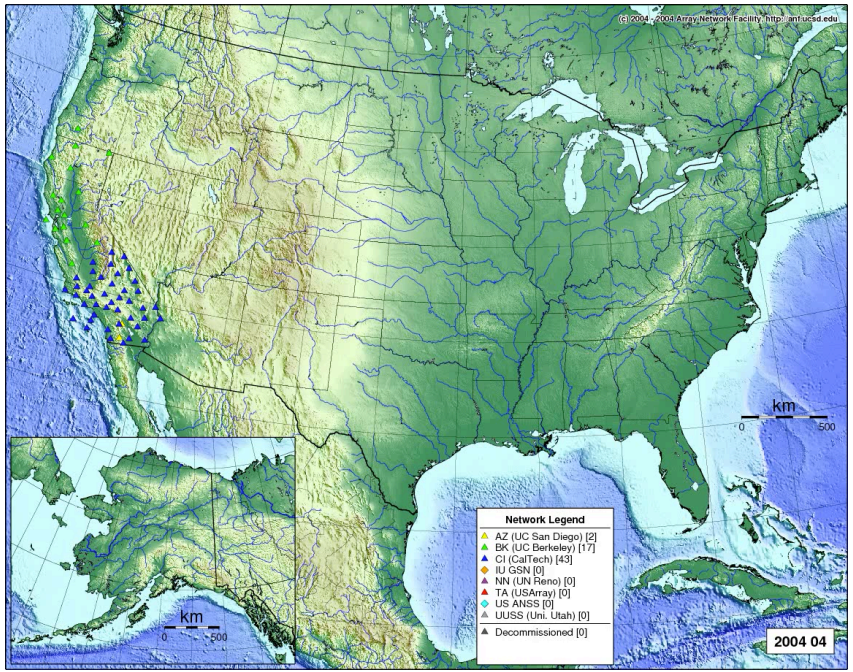
USArray

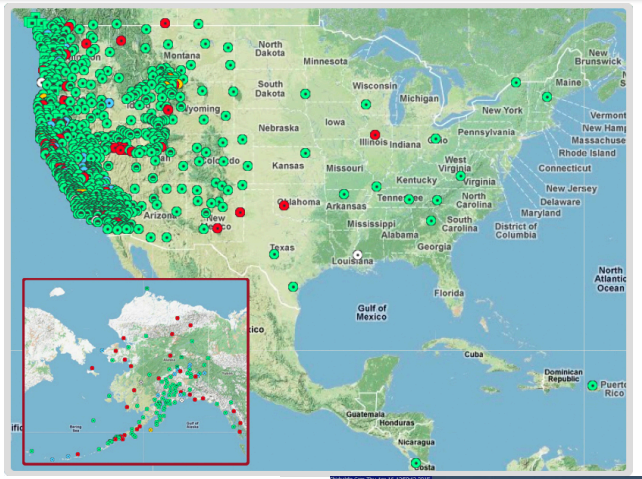
- Transportable, Flexible, and Magnetotelluric Arrays, as well as a Reference Network
- Transportable Array: “rolling” deployment of ~400 seismic and infrasound stations
- Wide variety of scientific applications, from deep earth to atmosphere
- >200 stations adopted in lower 48 and >50 in AK
- >40 TB of data produced!

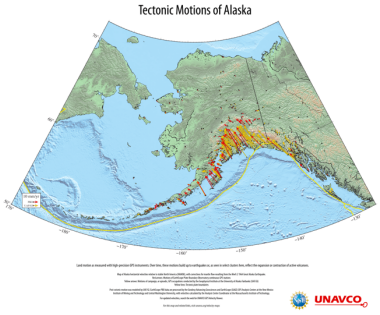


Animation courtesy ANF

Plate Boundary Observatory (PBO)

- >1200 geodetic instruments to measure ground motion along the Pacific and North American plate boundaries
- Also provides information on snow, vegetation, soil moisture, etc.
- Implications for earthquake and volcanic hazards, drought, landslides, and other earth processes





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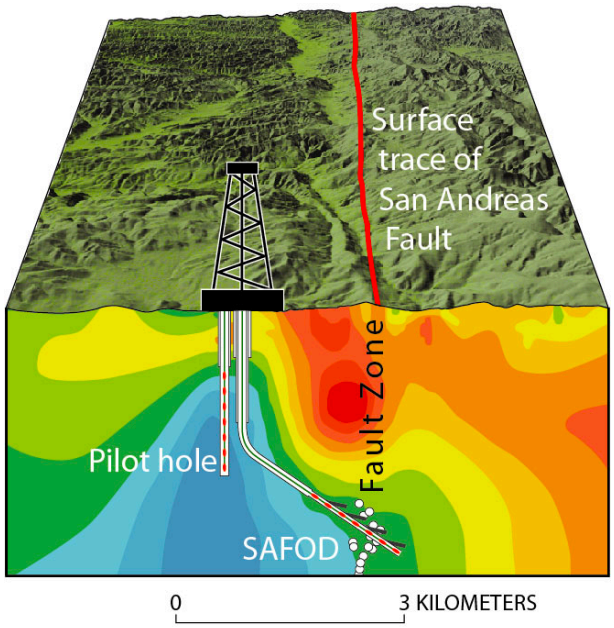
San Andreas Fault Observatory at Depth (SAFOD)

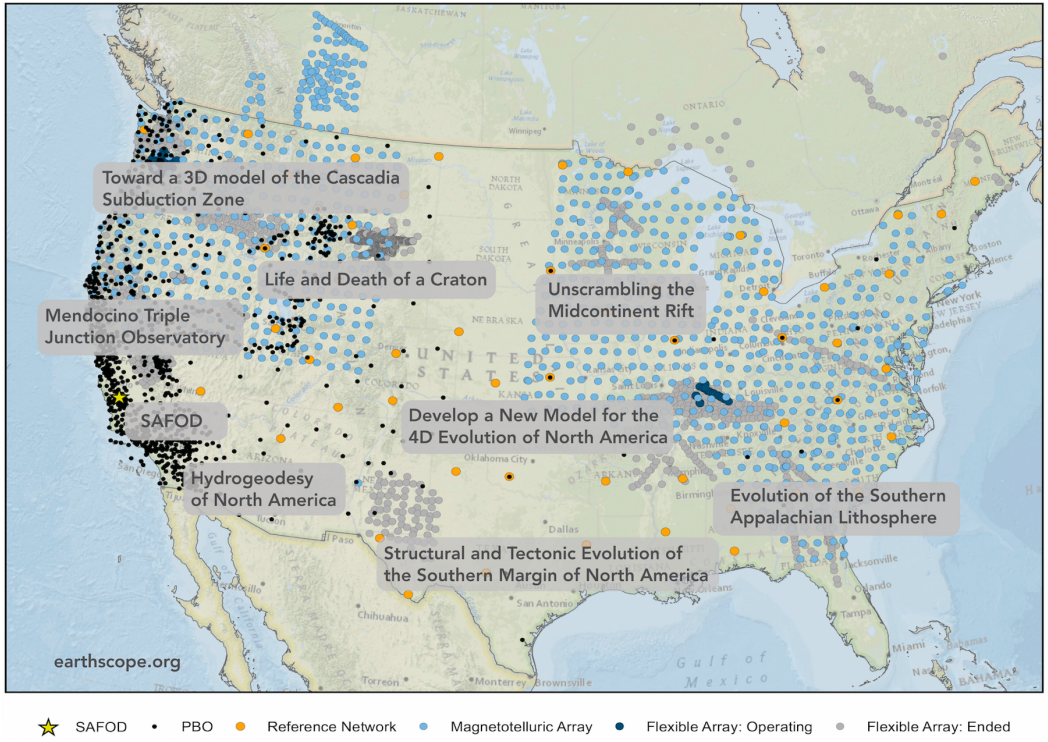
- 3 km borehole into the San Andreas fault
- Unique in-situ observations of a fault at depth
- Provides information on earthquake cycle and related processes



Images courtesy USGS

Synthesis

- 9 multidisciplinary, thematic workshops held from 2017-2019
- Opportunity to integrate EarthScope results and reflect on lessons learned
- Generated both scientific synthesis and E&O materials



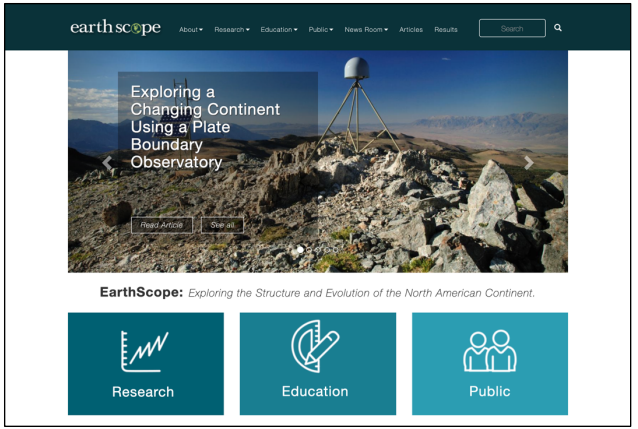
Education and Outreach

- Goal: Use EarthScope to reach a broad, diverse audience
- Multi-faceted approach: ESNO, funded projects, workshops, etc.
- University: Speakers series, newsletter, website
- K-12 students and teachers: regional workshops, online materials, etc.
- Public: website, social media, regional workshop
- Policy and scientific leaders: in-person meetings, symposiums

Yellowstone Workshop

USA Science and Engineering Festival

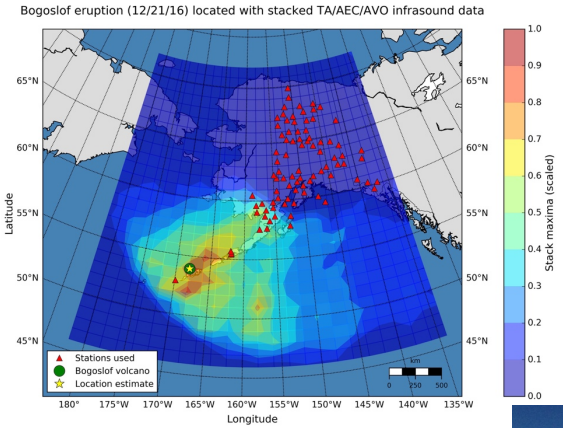
Website



Speaker Series

EarthScope: personal context

- Alaska Volcano Observatory (AVO) using EarthScope data
- Improved volcano monitoring before and during recent eruptions
- Data and resources that would otherwise not be available



UCSB, UAF, AVO

Bogoslof volcano eruption as recorded on the TA

Pavlof volcano eruption, March 2016

EarthScope: Thank you!

- Unparalleled project that would not have been possible without multi-agency collaboration and coordination
- Results, data, and resources will be of use by many for years to come
- Framework is one that should be emulated in the future
- The following presentations will detail the scientific and societal benefits

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