The EarthScope USAArray in Eastern North America

Oct 28, 2011
Lehigh University
Science Results

Plumes: Zhdanov et al.

Modeling mantle rheology: Ito & Simons

Lithospheric foundering: Levander et al., Frassetto et al.

150+ papers in 2010-2011

TA (Magnetotellurics)

TA (Array Processing)

Visualizing earthquakes: IRIS DMC

TA, FA, & PASSCAL (Body Wave Tomography)

Mantle convection: Schmandt & Humphreys

PBO (GPS)

Modeling mantle rheology: Ito & Simons

Crustal anisotropy: Moschetti et al.

FA & TA (Receiver Functions)

TA (Array Processing)

TA (Ambient Noise)

Lithospheric foundering: Levander et al., Frassetto et al.
Transportable Array

- ~1250 stations so far; ~450 to go
- ~800 stations removed

http://arcserver1.iagt.org/TacoKMZ
Approximate Final Footprint – September 2013

23 POLARIS stations
58 TA Stations
Alaska 2013-2018

Potential TA Sites in Alaska

272 sites

85 km grid
Flexible Array

- ~16 experiments
- 326 broadband
- 120 short period
- 1700 active source
• Over 300 stations during 2006-2011

• 2012 and 2013 will focus on the mid-continent rift

• Data available at IRIS DMC
Events detection / location:

USGS QED  62
CERI      2
USArray ANF 614

Catalog produced by USArray ANF from TA waveforms to-date
60,139 events
4,488,465 arrivals

See WWW.IRIS.DMC/SPUD
As of August 2011
45 Complete Stations Adopted
29 Vaults Adopted

~$40K to adopt a station
~$6K/yr to operate
Opportunities for Broader Impacts

- Active Earth Kiosks - simple free-standing displays designed for visitor centers, small museum
- Transportable Array and the New Madrid bicentennial
- Student participation in TA site reconnaissance
EarthScope is funded by the National Science Foundation.

EarthScope is 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.

Summary

• Opportunities:
  • Data, data products, instruments
  • Station Adoption
  • Outreach and broader Impacts

• Opportunities for input
  • IRIS membership meeting and reception - Monday evening @ AGU
  • UNAVCO membership meeting and reception - Tuesday evening @ AGU
  • UNAVCO Workshop 2/28 – 3/1, 2012
  • IRIS Workshop, 6/13 – 6/15, 2012

On the Web

• EarthScope
  www.earthscope.org
• USArray
  www.usarray.org
• PBO
  pboweb.unavco.org
• National Science Foundation
  www.nsf.gov

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• 400 broadband seismic stations
  • ~70 km spacing
  • ~2 year deployments at each site
  • 10 years and 1623 sites to roll across the country

• Progress to-date
  • ~1,250 installations
  • ~800 removals

• All data are collected in realtime
  • 24x7 data collection
  • Mostly via cell modems
  • Data are openly distributed via IRIS Data Management Center
Installation