

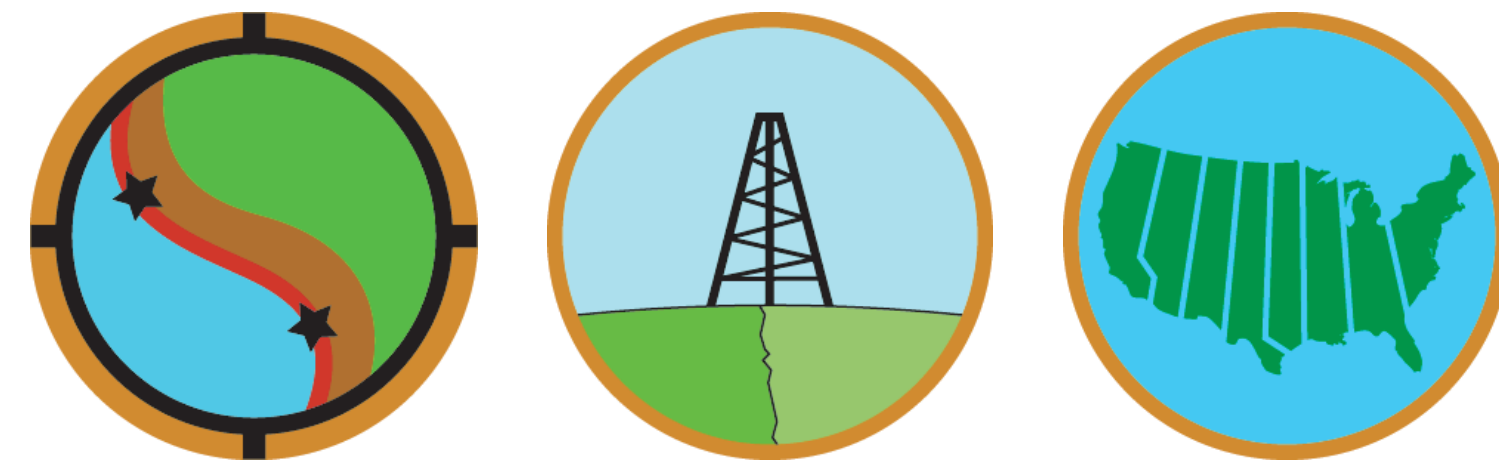


# EarthScope / Plate Boundary Observatory Frequently Asked Questions

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[http://www.unavco.org/PBO/faqs/EarthScope\\_PBO\\_FAQ.html](http://www.unavco.org/PBO/faqs/EarthScope_PBO_FAQ.html)



**Have all of the locations been determined? If not, how can I influence where and when they will be deployed?** Yes. Station locations are known to within ~ 10 km. If you have comments or suggestions on alternative locations please contact Mike Jackson ([mikej@unavco.ucar.edu](mailto:mikej@unavco.ucar.edu)) and he will make sure it is placed on the PBO Site Selection Working Groups Agenda.

**What kind of monuments will be used by PBO? Backbone, Volcano, etc.?** PBO will use deep-drill braced monuments where possible. Where logistics do not permit these types of monuments, a short drilled braced monument will be used. (Short drill braced pictured)

**Will there be radio communications? Remote computers?** There will be a matrix of data communications options from direct internet connectivity to possible manual downloads of receivers. The decision on which type of connectivity will be made based on the particular configuration of each site. We will strive to not have computers at each site.

**What is the schedule for deployment?** 2004 - 50, 2005 - 200, 2006 - 250, 2007 - 250, 2008 - 125. A more detailed deployment schedule will be available after the PBO Site Selection Working Groups have convened and set installation priorities based on scientific targets.

**What is a PBO Station?** PBO GPS stations will consist of a permanently installed GPS receiver with a high quality geodetic monument and ancillary equipment continuously tracking GPS satellites.

**Does PBO need help with reconnaissance and permitting?** Yes. Absolutely. Please see the following web site for information on how to contribute.

**How many new continuous stations will be installed?** 875

**When will the equipment decisions be made?** Fall 2003

**Will there be seismic instruments?** Yes, where there are overlapping science goals. Both PBO and USArray will work closely in the reconnaissance phase to maximize joint station locations. In addition, all strainmeter sites will house seismometers and in some cases GPS receivers. PI's are encouraged to propose using the pool of campaign receivers to occupy USArray sites and to use the portable array of seismic instruments to observe at PBO sites.

**Will they all be solar power?** There will be a matrix of power options from AC to solar/wind power. The decision on which type of power system that will be used will be made based on the particular configuration of each site.

**Will there be meteorological packages at any of these sites?** Yes, the backbone (grid spacing ~ 200 km) will have MET instruments.

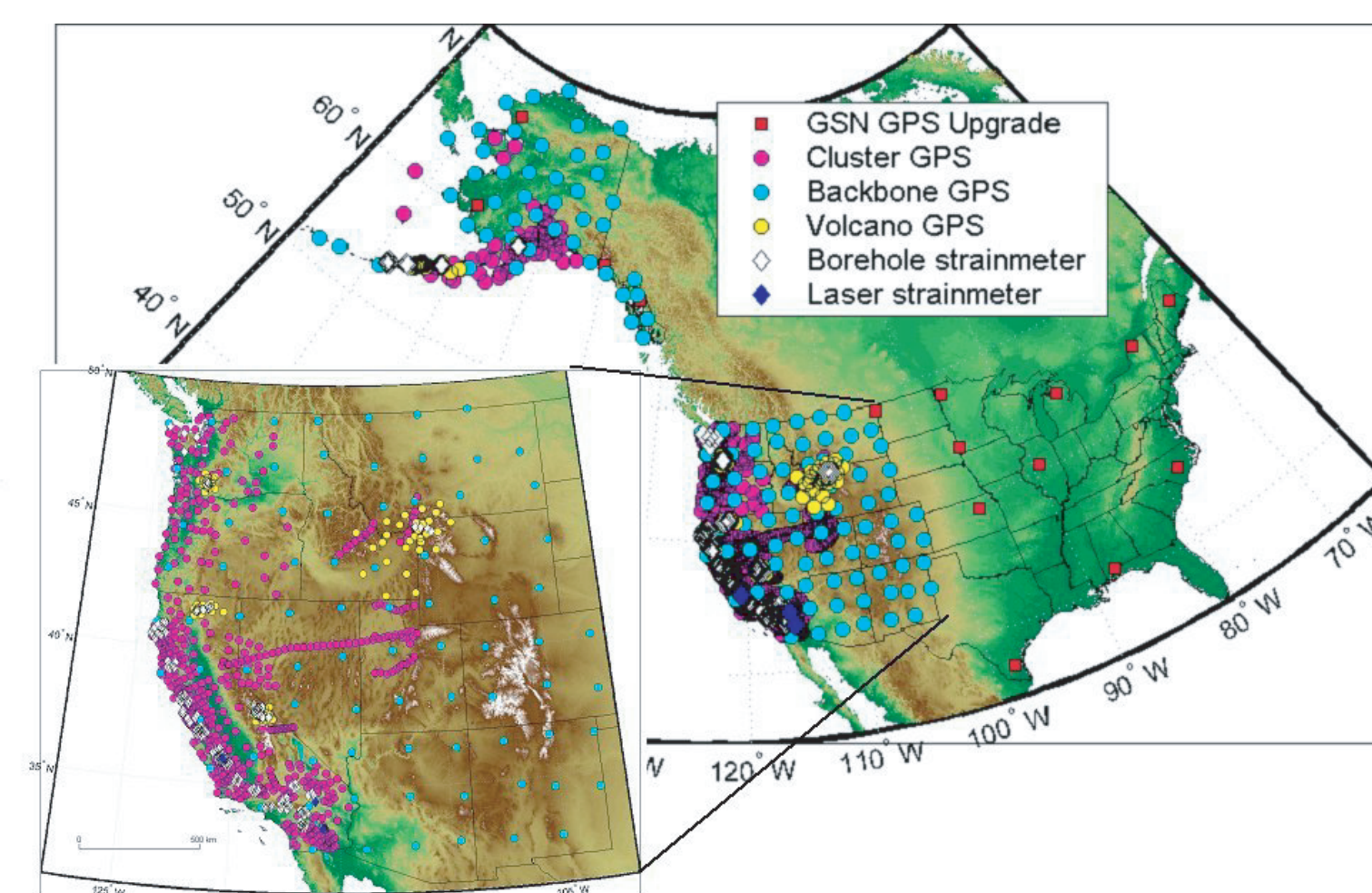
**Can I add some new sensor to a PBO site?** No. The stations are already budgeted and only in rare cases will it be possible to add sensors.

## Permanent GPS Stations

**What are the GPS receiver specifications?** The GPS receiver specifications for PBO can be found on the PBO RFP web page. Any questions regarding this RFP should be directed to Mike Jackson ([mikej@unavco.ucar.edu](mailto:mikej@unavco.ucar.edu)).

**Will there be DGPS or RTK broadcast?** For most stations no. In some cases where local academic, municipal, county, state, or federal agencies sponsor a GPS site, PBO will exchange the cost of permitting for an additional radio to broadcast local DGPS corrections.

Where will the stations be located?



**What is the sensitivity and stability of the strainmeters?** Borehole strainmeters have a sensitivity of a few nanoradians at periods up to a few days. They clearly detect earth tides. At longer periods the sensitivity declines. Longbase laser strainmeters have similar short period sensitivity and better long term stability.

**What data products will be available?** Data products will include raw time series and filtered time series with and without tides removed.

**What is the latency?** Depends on the communications link. We anticipate less than 5 second latency.

**Where do I get the data?** Strainmeter data will be available from the EarthScope data portal.

**What will the sample rate be?** 10-Hz

**How many strainmeters will be installed?** Approximately 50 Borehole dilatation instruments, 125 Borehole three component instruments, and 5 Long Baseline Laser instruments.

**What software is available to help me process strain data?** PBO will have one full time strain data processing technician. If there is interest we can host data processing seminars at UNAVCO annual meetings. The software required to process strain data is freely available.

**Where will the strainmeters be located?**

**What kind of strainmeters will be installed?** There will be several types of strainmeters: Borehole instruments that measure only the dilatational component of the strain field; Borehole instruments that measure three horizontal linear components of the strain field; and, Long Baseline Laser instruments.

**How can I influence the locations / schedule?** Station locations are known to within ~ 10 km. If you have comments or suggestions on alternative locations please contact Mike Jackson ([mikej@unavco.ucar.edu](mailto:mikej@unavco.ucar.edu)) and he will make sure it is placed on the PBO Site Selection Working Groups Agenda.

**Will there be seismometers or GPS at all the strainmeter sites? If so, what sensors?** Yes, we have budgeted for a 2 Hz, 3-component borehole instrument at each site.

**What kind of site geology are you looking for?** Borehole strain locations require competent Bedrock at a depth less than 200 m. The long baseline instruments involve a much more complex installation generally. See <http://ramsdn.ucsd.edu/>

**Do you need power at these sites?** AC power is preferred. The borehole instruments can run on solar power. The long baseline instruments require AC power.

**Will there be a pool of portable strainmeters?** No. Strainmeters must be cemented into the ground and cannot be moved.

**Will the data be publicly available?** Yes. The data will be freely available on-line as soon as it can be downloaded and moved to the archive (generally within a few hours of download).

## Strainmeters

**When do I need to submit my campaign data to the PBO archive?** Campaign data will be submitted to the archive as soon as practical upon completion of the project.

**Will PBO process my campaign data? If so, will the processed results be public? What is the policy for processed results?** The processing of campaign data is the PI's responsibility. There will be no routine processing of campaign data. However, PBO will process campaign data sets on a per request basis. Results are released immediately based on PI consent otherwise available after 2 years.

**Where can I get training for campaign field work?** PBO will have engineering staff who specialize in campaign field work. They will train and assist investigators in the field, at the PI's institutions, or at the UNAVCO Facility. Online training and materials are available on the GPS Campaign section of the UNAVCO web site. <http://www.unavco.ucar.edu/campaign/campaign.html>

**Are there people available to help me plan and conduct field campaigns? Do I have to pay for them?** PBO will have engineering staff who specialize in campaign field work. They will train and assist investigators in the field. Staff salaries are covered. Travel costs must be covered by PI proposals.

**Are chokering antennas available with PBO campaign systems? If not, can I mix data with PBO permanent stations that have chokering?** No. Campaign systems will come with standard geodetic antennas. Most high quality geodetic software will allow mixing of different antennas. The receivers will be compatible with chokering antennas but these are not provided by PBO.

**What comes with a PBO campaign system? How long will they run on batteries?** Can I get solar panels? A campaign system consists of the following: GPS receiver, GPS antenna, solar panels, antenna leveling mount, cases & cables, batteries will be included and the approximate running time is 48 hours on a single battery.

**Will there be receivers set aside specifically for earthquake / volcano emergency deployments?** Yes. A pool of receivers will be housed at each of the regional offices. These receivers can be used for emergency response.

**How heavy is the campaign equipment?** Can one person carry a system? We anticipate that the entire system (not including monument) will weigh less than 40 pounds.

**Can I conduct a joint GPS / Seismic field campaign?** Yes, this would require coordination between USArray (portable array) and PBO (campaign GPS).

**What are the options for tripods, temporary monuments?** PBO has budgeted for tripods and tribrach. A new campaign monument is under development

**Can these systems be transported by helicopter?** Yes

## Campaign Projects

**Can I use monuments that have previously been surveyed or do I need to install new ones?** PBO has budgeted for tripods and tribrach which are compatible with most previously surveyed campaign monuments.

**Can I take campaign receivers out of the PBO region? What about out of the US?** How about Canada and Mexico? Receivers can be used anywhere in the continental US, Alaska, Canada, and Mexico.

**How many receivers are available for campaign work? Now, next year, mid EarthScope time frames?** 2004 - 28 systems 2005 - 100 systems

**Will the campaign data be freely available?** Yes. The data will be immediately available.

**Does my proposal have to include costs for shipping, insurance, engineer travel, salary?** Yes, except for salary.

**Do the permanent stations have to be in place before I conduct my experiment?** No.

**How long can I keep the borrowed systems?** Systems will be scheduled based on the length of the experiment with adequate time provided at the front and end of the experiment for cleaning, packaging, and shipping equipment.

**What software is available to help me process GPS data?** There are a number of free and commercially available software packages available for processing high precision geodetic solutions. Information can be found on the following web site: <http://www.unavco.ucar.edu/processing/processing.html>. PBO will provide and support commercial software for centimeter level applications and for field checking data.

**Will PBO conduct my campaign for me?** PBO will provide planning and moderate levels of field support, but the bulk of the measurement process falls to the PI. The UNAVCO Facility has additional staff and equipment resources to support campaign projects. To request support from the UNAVCO Facility click on the "Request Support" link from the front page of the Facilities web site: <http://www.unavco.ucar.edu>

**Will PBO permit and install campaign monuments for me?** PBO will provide planning and moderate levels of field support, but the bulk of the installation responsibility falls to the PI. The UNAVCO Facility has additional staff and equipment resources to support campaign projects. To request support from the UNAVCO Facility click on the "Request Support" link from the front page of the Facilities web site: <http://www.unavco.ucar.edu>

**Will I get help to archive the data? To convert my files to RINEX?** Yes. Instructions and procedures for collecting and submitting field logs, meta data, and raw data will be available on the web. PBO data centers will archive the data and make raw and RINEX data available.

**Will PBO have monumentation installation equipment available for my use?** Yes.

## Proposal Preparation

**Can you help me estimate a budget for my proposal?** Yes, you can make an online request for budget development and technical feasibility by clicking on the "Request Support" link located on the front of the UNAVCO web site: <http://www.unavco.ucar.edu/>

**Can UNAVCO or PBO provide me a letter of support? How do I indicate to reviewers that my proposal is technically feasible and that equipment will be available?** UNAVCO or PBO will informally answer any questions you have about the technical feasibility of particular ideas and about the equipment that will be available. UNAVCO can not provide a written evaluation of the technical feasibility of a particular proposal. There will be technical representatives of all the EarthScope components present in a non-voting status at the EarthScope panel review. These technical representatives will respond to Panel questions about technical issues with individual proposals.

## EarthScope Geology

**What is EarthScope Geology?** EarthScope Geology (formerly called Geo-PBO) is a geological component of the PBO facility. It has been relabeled EarthScope Geology in recognition of the need for a broader focus to the effort.

**What is going on with EarthScope Geology?** There is identified funding for EarthScope Geology within the total EarthScope Observatory budget. However, current plans are that no funds will be spent during the first year. It is anticipated that there will be a process for identifying activities to be conducted under EarthScope Geology.

## Continuous Data

**What raw data and derived products will be available?** Raw data products include binex and RINEX data files (24 hour 15-second) and streamed binex (1 sec). Derived products include daily position estimates and time series.

**What will the sample rate be?** 15 seconds

**Will the continuous GPS data be freely available?** Yes. The data will be freely available on-line as soon as it can be downloaded and moved to the archive (generally less than 24 hours for most sites, within an hour of UTC midnight for stations that are on the Internet).

**Where will the data centers be?** There will be a data center at SOPAC and UNAVCO. The data will be available through the GPS Seamless Archive Center

**Where will the data processing centers be?** There will be two data processing centers running different GPS processing software. The PBO solutions coordinator will provide a combined solution. These processing centers will be competitively selected.

**Will there be real-time streaming data?** Where available there will be a real time 1 second stream.

**What is the frequency of downloading (hourly, daily, etc.)?** 1 data file every 24 hours