

# PBO Nucleus Education Program: Project Update and a Call to the Geodetic Community



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## What is the Plate Boundary Observatory (PBO) Nucleus?

- Built by U. Alaska, Berkeley, Caltech, Central Washington, U. Utah, USC, others
- Project funded 3/05: operate, maintain, upgrade, integrate 209 stations into PBO
- Co-administered by UNAVCO and member institutions listed above
- Strong education component to disseminate nucleus data and discoveries

## PBO Nucleus Education Program Goals and Objectives

Goals	How goals will be accomplished
Increase public understanding and appreciation of geodynamics, Earth deformation processes, and their societal relevance	Produce educational modules for: -secondary Earth science courses (middle/high school) -introductory/general education college geoscience courses -upper level college geophysics courses
Broaden use of UNAVCO data and products by wide audience of educational and research users	Testing/professional development workshops for instructors; interactive website; posters and brochures
Build sustainable community of UNAVCO scientists and educators engaged in education and outreach	Involve scientists, educators, and UNAVCO staff in design process; interactive website
Collaborate with other organizations to provide systemic impact on geoscience education	Partner with "others" to incorporate UNAVCO educational products and professional development into existing networks

## Educational Modules for Secondary and College Classrooms

Key Issue	Example of Strategy to Address Issue
Identifying user needs: college faculty (research I, comprehensive universities, liberal arts, community college, tribal colleges, historically black colleges and universities)	Conducted telephone interviews with ~12 faculty: • All agreed that incorporating societal relevance is essential • Most would prefer lab and homework exercises • Exclusively pencil and paper-based or combination pencil/paper and computer-based activities would be best • Mostly qualitative material, but some quantitative concepts appropriate (precision vs. accuracy, strain, averaging, plotting vectors graphically) • Best study areas: Cascadia/Cascade volcanoes, San Andreas
Identifying user needs: middle and high school teachers	Conduct focus groups with teachers to find out about how they currently teach plate tectonics, most suitable types of materials, level of material appropriate for their students, and type(s) of support they need to implement modules.
Fostering collaboration between scientists, educators, and UNAVCO staff	Master teacher and faculty-in-residence programs. Two secondary teachers and one college faculty member will work together at UNAVCO headquarters to develop modules in June.
Using real GPS data in modules	Data sets available for episodic tremor and slip in Cascadia.

## Professional Development for Instructors

We hold professional development workshops for secondary teachers and college faculty in which participants learn about high-precision GPS, complete data-rich activities, and discuss how to incorporate the activities and related concepts into their teaching. Audiences are strategically chosen based on existing networks of educators, and in addition to UNAVCO-sponsored workshops, we actively seek opportunities to convene joint workshops with other organizations.

•1/06: UNAVCO participated in IRIS-sponsored teacher workshop, Yuma, AZ, for ~25 middle/high school teachers. Participants completed a Jules Verne Voyager map tool activity, *Visualizing relationships between earthquakes, volcanoes, and plate boundaries in the western United States*.

•2/06: UNAVCO proposal for college faculty half-day workshop accepted by GSA. Title: *Using GPS data to study crustal deformation, earthquakes, and volcanism*.

•2/06: UNAVCO worked with 6 middle/high school Earth science teachers in Portland, OR in conjunction with Teachers on the Leading Edge (TOTLE), a field-based professional development program for Oregon teachers. In addition to the Voyager map tool activity (see above), participants contributed ideas for the middle/high school Earth science module during a focus group. Discussions about collaboration between UNAVCO and TOTLE were also initiated.

•2/06: UNAVCO and IRIS submitted proposal for a joint K-12 teacher workshop at 2006 SACNAS national meeting. Title: *Using data-rich activities to teach about plate tectonics, Earth structure, and earthquakes*.

## Education and Outreach on the Web

- 11/05: new E&O website planning initiated
- Significant restructuring for easier navigation
- Resources organized according to target audience (secondary teachers; college faculty; researchers; students; the public)
- Selected features: (additional content coming soon)
  - Teacher resources
  - UNAVCO highlights, announcements, and press
  - Professional development calendar of events
  - Archived documents, presentations, funded proposals
  - PLONE (shared project workspace) allows UNAVCO staff and collaborators to actively contribute to content
  - Access to members' and partner organizations' resources



Top: new E&O homepage.  
Bottom: Nucleus PLONE.

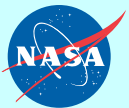
## Program Evaluation

We have worked with an external evaluator to develop a nucleus education program assessment plan. Demographic information will be collected from secondary teachers and college faculty who use our materials about their academic background, institution, and student population. We distribute surveys during workshops and short courses for feedback on our materials and professional development offerings. Interviews with teacher and faculty users will be conducted to assess the efficacy of nucleus educational materials, and we will collect examples of student work to evaluate learning outcomes.

## Upcoming Activities and How You Can Contribute

Project	Spring 2006	Summer 2006	Fall 2006
Local teacher workshops and focus groups with target teacher networks: TX, CO, CA	X		
Contribute to K-12 teacher workshop: GSA Cordilleran section meeting, Anchorage	X		
Informal brainstorming and work session to begin developing introductory/general education college module with faculty: spring AGU, Baltimore	X		
Master teacher and faculty-in-residence programs: Boulder		X	
Further revision of modules		X	
Introductory/general education college module undergoes pilot testing in selected classrooms			X
Joint IRIS-UNAVCO workshop for K-12 teachers: SACNAS national meeting, Tampa			X
UNAVCO workshop for college faculty: GSA national meeting, Philadelphia			X

- ✓ Contribute scientific content, ideas, and GPS resources that you use in your teaching.
- ✓ Work with us at spring AGU to develop the college module.
- ✓ Volunteer to pilot test the module in your course this fall.
- ✓ Let your colleagues know about the PBO Nucleus education program.



Our partners:



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