Reaching Out to Scientists: A Model for Integrating Scientists' Research into Teacher Professional Development

J. Hare[1,2], L.K. Smith[2], S. Buhr[2], O.P Persson[1,2], C.W. Fairall[1], S. Lynds[2] and M. S. McCaffrey[2]

[1]NOAA Earth System Research Laboratory, Boulder, CO; [2]Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder

Introduction

The CIRES Education and Outreach Program offers a suite of programs aligned with the Essential Principals of Ocean Sciences (EPOS) and the Essential Principles of Climate Sciences (EPCS). One such program, the COSEE West – Colorado Collaborative, provides a means by which scientists can participate in ocean and climate sciences education outreach through a teacher professional development program. The purpose of the program is to bring the global oceans to inland audiences The focus of each year's program is driven by participating scientists' research interests. The Ocean and Climate Principles covered touched upon during the course include:

- **EPOS 3** The ocean is a major influence on weather and climate
- **EPOS 6** The ocean and humans are inextricably connected
- **EPCS 1** The Sun is the primary source of energy for Earth's climate system
- **EPCS 2** Climate is regulated by complex interactions among components of the Earth system
- **EPCS 5** Our understanding of the climate system is improved through observations, theoretical studies and modeling
- **EPCS 6** Human activities are impacting the climate system

Two NOAA scientists demonstrate a weather balloon launch at the NOAA facilities in Boulder. The half-day field trip included a presentations on Scientists Life at Sea, a demonstration of Science on a Sphere and a visit to a lab to learn about LIDAR.

Course Nuts and Bolts

CIRES scientist Ola Persson interacts with teachers who are exploring pressure and temperature before Ola's lecture on the *The Disappearing Sea Ice and the Role of the Atmosphere.*

The course consists of two half-day Saturday workshops and a weeklong Summer Institute. During the workshops teachers participate in lessons related to the speaker's topic that culminates the day. A variety of lab and computer activities, scientist lectures and field trips fill the Summer Institute schedule. Lecture topics included:

- Climate and the role of the sun
- Global wind patterns and ocean currents
- Air-sea interactions
- Scientists life at sea
- Colorado weather
- Climate science literacy

Reaching Rural Colorado Teachers

An important focus of this program is to reach teachers in rural Colorado school districts. Ninety percent of CO school districts are rural each of which extend hundreds of square miles with anywhere from 100 to 1000 students attending their local public schools. Because of the expansive and sparsely populated nature of the land, these districts struggle to offer rigorous STEM courses, and they often lack the highly qualified teachers that are required by No Child Left Behind.

We have tapped into the extensive network developed by the Boards of Cooperative Educational Services (BOCES). The BOCES use **videoconferencing (VC)** to help deliver services throughout their regions. We ship all teaching materials for the Saturday workshops to the teachers who meet in their local **VC** site, and they work right along side the Boulder teachers and interact with the speakers.

Incentives include: covering travel expenses to the Summer Institute and paying their tuition fees through a rural education grant from CU's Continuing Ed.

"Living in Steamboat makes it difficult to take workshops, especially in the winter. The COSEE videoconference made it easy, I felt like I was there."

Evaluation

Both a pre- and post-course surveys were administered to judge teacher's gain in content knowledge. Plus, daily evaluations were collected to gauge course satisfaction. Some of the highlights include:

- Participants very much appreciated interacting with all the scientists who were involved. The scientists were approachable and presented their topics at fairly easy-access levels.
- Scientist lectures, field trips, and in-class activities were very well integrated in the schedule.
- The content assessment showed an increase in knowledge for all participants among the topics addressed. Participant backgrounds in ocean science varied widely but all attendees found their workshop experience to be valuable.

New this year!

This year we will be collaborating with COSEE West (University of Southern California, UC Los Angeles, College of Exploration). Five teachers from each program will exchange places and learn new perspectives of how the oceans affect local weather, ecosystems and economy. Like the rural Colorado teachers, the Southern California teachers will participate in the first set of workshops via videoconferencing. We are hoping this exchange will promote cross-collaboration between teachers and their students and an understanding of each other's perspectives on climate-related topics.

Other Related CIRES Outreach Projects

The COSEE West – Colorado Collaborative is one of several CIRES projects that foster climate literacy. Other projects include ICEE, a suite of professional development offerings aligned with the EPCS, the NSDL Climate Literacy and Energy Awareness Networks (CLEAN) project and online courses and climate communication workshops. See **http://cires.colorado.edu/education/outreach/index.htmls** for more information or contact **Susan.Buhr@Colorado.edu**.

For more information about the Colorado Collaborative visit **http://cires.colorado.edu/education/outreach/cosee/COSEE2010CoursePage.html**. Deadline to apply for this year's course is **March 15th**.