

# *Advancing Earth Science*

*K-12 Earth System Science Education Summit*

*Report on the Conference and Progress to Date*

February 8-11, 2010  
Helios Plaza  
Houston, TX



## Executive Summary

The American Geological Institute (AGI) hosted the first Earth System Science (ESS) Education Summit in Houston, Texas, at BP Exploration's new Helios Plaza meeting facility on February 8-11, 2010. The Summit was supported by a grant from the National Science Foundation, as well as by funding from AGI, the American Association of Petroleum Geologists and the Geological Society of America. Forty-two representatives of AGI member societies and key partners met to discuss and address key issues facing the K-12 geoscience education community. The issues included:

- Perception of high school ESS as a non-rigorous, non-laboratory course;
- Status of the preparation and continuing education of ESS teachers;
- Inclusion of ESS alongside other sciences in the new national science education standards;
- Lack of an ESS advanced placement course;
- Challenges to ESS in schools by the creationist and Intelligent Design movements; and
- Role of the International Earth Science Olympiad in raising the profile of ESS.

Summit participants aimed to establish a formal consensus about key challenges, identify initiatives and individuals to address challenges, form teams to work on specific projects, identify possible funding sources for projects, and plan for U.S. participation in the International Earth Science Olympiad. In doing so, participants endeavored to achieve an appropriate profile for ESS education, a better prepared contingent of K-12 ESS teachers, and dissemination of updated ESS standards that are integrated with national science standards and that reflect current geoscience.

The Summit was a combination of keynote presentations, break-out group discussions, and whole-group discussions. Each break-out group was led by a facilitator, who orchestrated the report-back sessions to the entire group. In addition to affirming the priority issues listed above, the meeting resulted in five chaired **Working Groups**, as well as lists of **Big Ideas** and **Action Items**.

### Big Ideas

Participants substantively agreed:

1. The geoscience community must speak with a common voice.
2. The geoscience community needs a public relations campaign for ESS education.
3. ESS education needs to be inclusive.
4. Teacher professional development for ESS must be organized nationwide.
5. There needs to be a state-level network to deal with crises in ESS education.
6. A nationwide campaign is needed to encourage institutions of higher learning to accept ESS high school courses as laboratory science courses.
7. The geoscience community must be politically savvy in ensuring ESS inclusion in national and state standards.
8. The geoscience community needs to work with guidance counselors and parents to raise the profile of ESS in schools for subject literacy and as a career option.
9. The AP Earth Science Exam can legitimize ESS in schools.
10. Look to the International Earth Science Olympiad as a public relations opportunity for ESS education and a chance to engage students at all levels in solving local geoscience problems.

### Action Items

Participants made a shared commitment to:

1. Collect baseline data on existing ESS teacher pre- and in-service programs in the U.S.
2. Collect baseline data on four-year institutions that do and do not accept a high school ESS course for admission.
3. Update AGI's Pulse of Earth Science web site to reflect states that both require a course in ESS and that accept a course in ESS for high school graduation.
4. Review the draft version of the new national science education standards and provide feedback.
5. Seek funding support for a Center for Geoscience Understanding.
6. Seek funding and explore potential partnerships for the International Earth Science Olympiad.

### **Post-Summit Progress to Date**

The **Earth Science Teacher Education Working Group**, chaired by the National Association of Geoscience Teachers' Cathy Manduca, is working with AGI to survey 800 members of the American Association of Colleges of Teacher Education on the status of their Earth science pre-service teacher education programs. To date, there have been some 250 responses to the online survey, which will remain "live" until January 31, 2011. Once the group collects and analyzes survey data, the National Association of Geoscience Teachers will post program descriptions and contacts on its web site. Ultimately, this group hopes to hold a conference so that faculty with singularly effective pre-service programs can share their ideas and practices with others.

As chair of the **Perception Working Group**, AGI's Education Department director is collecting information on what college admissions offices want to see in an "acceptable" laboratory science course. To date, 265 four-year institutions have been contacted (at least one large state university and one sizable four-year college per state). AGI also has obtained the College Board Standards for College Success recommendations for what should be criteria for acceptable high school science courses, as well as definitions of "laboratory science courses" from the American Association of Collegiate Registrars and Admissions Officers and from the University of California system. AGI will be sharing these data at the end of the data-collection process (estimated to be mid-February 2011). Once AGI has a clearer picture of the criteria admissions offices are using to define a laboratory science, it plans to launch a campaign making the case to college and university leaders that they should accept Earth science courses on a par with biology, chemistry, and physics. AGI has also updated the Pulse of Earth Science web site.

The **National Standards and AP Exam Working Group** has fed into the process of reviewing the

framework for the new national science education standards. Michael Wyssession, who presented at the Summit, leads the Earth and Space Science Design Team for the standards. Eric Pyle of NAGT is also a member of that team. Following the Summit, Cathy Manduca, executive director of the National Association of Geoscience Teachers, established a listserv for announcements and updates about the National Academies' process and other topics related to standards. The list currently has 75 members and has received 10 updates. In addition, Working Group Chair Roberta Johnson, executive director of the National Earth Science Teachers Association, has been exploring the option of establishing a workshop to help develop models for capstone Earth science courses.

David Gibson, chair of the **International Earth Science Olympiad Working Group**, has been making contacts and looking for interest from people and groups that could help secure

funding for the International Earth Science Olympiad. Many educational professional organizations are interested and ready to help, but they lack resources. The Olympiad is promoting an integrated, team-based, problem-solving (and "engineering") approach that uses digital media, connects students from remote locations, and emphasizes Earth science.

Rob Ross, chair of the **Challenges Working Group**, reports that challenges to ESS nationwide are minimal at the moment. There have been flare-ups in Florida recently (including serious talk about not accepting Earth science as a course for high school graduation), but that was more in the Perception area than in Challenges. There have been some recent challenges to evolution and climate change education in Louisiana textbook adoptions, which AGI is monitoring.