

## FLEXE Project Update

As FLEXE enters its fourth year as an integral component of the GLOBE educational experience, it is appropriate to reflect on the progress of the project to date and to extend a heartfelt ‘Thanks’ from the FLEXE team, Ms. Liz Goehring, Dr. Donna Blackman, Mr. Eric Simms, Dr. Bill Carlsen, Dr. Charles Fisher, Dr. Steve Kerlin, and Mr. Jamie Larsen, to all those involved. Thanks to the effectiveness of the GLOBE network, the FLEXE team has had the pleasure of working with GLOBE country coordinators, educators, and students in multiple countries implementing and testing new materials and on-line components for GLOBE students. It’s been an exciting journey!

During the past two years, the FLEXE team has focused on testing lessons and on-line tools associated with an instructional unit on energy transfer in an Earth systems context through the comparison of local and extreme environments. Following a successful online pilot of FLEXE materials in Fall 2007, involving students from the U.S. and Germany (reported in the February 2009 GLOBE Program Office News Brief), the FLEXE team used feedback from the participating GLOBE educators and coordinators to refine activities and on-line components for a second pilot during Spring 2009, outlined below. The 2009 pilot, which occurred during January – June, included: 1) teacher professional development based on the pilot activities, 2) the implementation of new and improved activities focused on ‘energy transfer’, 3) a new system interface running on GLOBE’s servers, and 4) a GLOBE-hosted web site and live phone call featuring a scientific research expedition exploring hydrothermal vents in the South Pacific.

The following describes some key elements of the 2009 Energy Unit pilot effort:

### 1. Teacher professional development

Training was provided for domestic and international educators who participated in the pilot effort. Teachers in the U.S. engaged in two online instructional sessions to familiarize themselves with the project content, structure and commitments. Several German educators who participated in the 2007 pilot signed up again and prepared for the pilot via phone or online communication. Educators in Thailand and Australia received similar training during visits by FLEXE team members to their respective countries for face-to-face workshop experiences. The FLEXE team would like to thank all GLOBE partners, teachers, and students taking part in the 2009 pilot of the revised Energy Unit. In particular, gratitude is extended to Drs. Mullica and Krisanadej Jaroensutasinee for helping to organize and facilitate the Thailand workshop and to Mr.



Peter Hardy for doing the same in Australia. The team also thanks GLOBE’s technical staff for all the hard work that went in to migrating the FLEXE system to the GLOBE platform.



## 2. Testing of new and revised activities

Educators and students taking part in the 2009 pilot participated in new and/or revised versions of activities and online tools. Examples of select activities include:

- “Getting to Know My Partner School”, an on-line activity that introduces partner schools to each other in the context of the FLEXE energy unit. The activity has elements that are set for adoption as part of the GLOBE Collaboratory;
- “What’s so Extreme About My Local Environment”, a new activity that was unveiled for GLOBE Partners during the DLESE workshop in August 2008, and is scheduled to be one of the activities that will support GLOBE student research efforts related to climate change;
- “Investigating the Effects of Local Extremes on Living Organisms”, a new activity designed to test online tools that allow students to submit research reports and conduct student-to-student peer reviews. This activity also is set for inclusion in the GLOBE Collaboratory;
- A number of FLEXE Forums, including “Temperature Variation in the Deep Sea Environment”, which are learning activities structured to facilitate meaningful asynchronous communication between students and research scientists.



## 3. Scientist-Student-Research connections

Both FLEXE pilots have featured culminating on-line events that connected educators and students to live scientific research, in both cases with active research cruises. The 2009 cruise was focused on the study of the extreme environment of hydrothermal vent communities located at the Lau Back-Arc Basin, near the Kingdom of Tonga in the South Pacific, and was posted as a News Brief on the GLOBE web site prior to the cruise ([February 2009 Newsbrief](#) and [June 2009 Newsbrief](#) under Stars and Announcements). Participating teachers and students, as well as others members of the public following along, 1) learned how research is conducted in the deep sea using the remotely operated vehicle (ROV) Jason, 2) “met” (virtually) scientists and crew members on the expedition, 3) explored questions deep-sea scientists were investigating in their quest to understand factors influencing animal distributions in different communities found at vents along the East Lau Spreading Center, and 4) discovered what questions (and answers!) FLEXE students had as they joined the investigation. For this cruise experience, a group of students from Melinda Merrill’s Estes Park, CO middle school classroom served as FLEXE ambassadors, asking questions on behalf of all the participating schools and fielding answers from the scientists under the guidance of moderator Liz Goehring of the FLEXE Team. The energy and excitement of Melinda’s students continued even after the call as they talked about what they heard and their experiences taking part in the FLEXE pilot. You can hear and see the phone call as well as get more information about the research expedition, the participating schools and the 2009 pilot by visiting [FLEXE Cruise 2009](#).



## Evaluation

Evaluation of all FLEXE efforts is central to the project. As with all ESSP's, FLEXE seeks to develop materials and on-line tools that facilitate student learning and engagement in science. The team is working hard to analyze data collected from this pilot to understand the effects on student learning and attitudes towards science. Additionally, feedback from educators collected by our external evaluator is also being analyzed this year.

The FLEXE team is pioneering techniques for quantitative evaluation of student work. Data collected from educators and students in all of the classrooms participating in the 2009 pilot are now being analyzed; a summary report, when completed, will be shared with the GLOBE community. These efforts support the goal of the GLOBE Program Office to assess how effective ESSP materials and efforts are in supporting GLOBE's mission. Educators taking part in the FLEXE Pilot, as well as other ESSP pilots, serve as an essential link and resource in this process, and the data they provide help evaluators assess the effectiveness and impacts of The GLOBE Program and its various components.

FLEXE and GLOBE are committed to sharing the research findings both within and beyond the GLOBE community. FLEXE's team member Steve Kerlin presented a well-received poster and paper on [Design of an Online Global Learning Community](#) at the 8th International Conference on Computer Supported Collaborative Learning, reporting preliminary results from the 2009 pilot. The team plans to engage in similar professional outreach as more results become available. Additionally, FLEXE along with other ESSPs presented progress reports to program directors of our major funding agencies (Dr. Jill Karsten, NSF Geosciences Division; Dr. Ming-Ying Wei, NASA Educational Programs) at a recent meeting in Washington, DC.

The next FLEXE Unit – 'Extreme Ecology' – has now been drafted, and a pilot of the materials in Winter/Spring 2010 will help the FLEXE team assess the impact of student-scientist interactions through the FLEXE Forum on student learning. Results from this pilot will continue to assist the FLEXE team in creating effective and engaging educational tools to promote Earth science literacy, as well as support the GLOBE program in the development of activities and tools for the GLOBE Student Research Campaign on Climate 2011-2013.

### What GLOBE teachers have to say about the FLEXE project:

*"... the kids are loving it! They are fascinated by the life at the bottom of the ocean. And the demonstrations and designing models create heaps of discussion!"*

Stephanie Kierce, Australia

*"My class truly enjoyed participating in the FLEXE program this year. I teach physical, life, and earth science. The FLEXE project covered all of these areas. The relation to math was awesome. I emphasize charts, graphs, and diagrams in my math class every year. The ability to create them from raw data and the ability to interpret them is critical in everyday life. The connection of the temperature conversions from the temperature tower made the relationship between the two systems real for the students."*

Debbie Adams, USA

*"My classes are really enjoying the FLEXE project!"*

Kareen Borders, USA

*"This was surely worthwhile for the special needs student! The hands-on labs were better for her than a lecture would be."*

Regina Brinker, USA

*"My students enjoy very much to work on FLEXE program...."*

Sawat Chantalay, Thailand

The FLEXE team is currently seeking enthusiastic educators in the U.S. and other English-speaking classrooms around the world to pilot the new 'Extreme Ecology' Unit. This effort will include implementing the learning activities and online components with students in the classroom and providing valuable evaluation data to the FLEXE team. If you are an educator who would like to help improve the offerings of FLEXE and GLOBE please visit the [FLEXE project page](#) or look for more information being sent out in a message from the GLOBE Help Desk that includes details on how to apply.