

GLOBE: From Local to Extreme Environments (FLEXE)

Principal Investigator: Ms. Liz Goehring

Co-Investigators: Dr. Donna Blackman, Eric Simms, Dr. Bill Carlsen,
Dr. Catherine Williams, Dr. Charles Fisher

Performing Institution: Pennsylvania State University



Courtesy UW

Description: How extreme is the deep sea? What does it take to flourish along a mid-ocean spreading center 2500 meters below sea level? Characterized by crushing pressure, near freezing temperatures, and no light, the deep sea is the largest ecosystem on Earth. Scientists are currently conducting investigations to learn more about features that make this ecosystem extreme and unique. Join the scientists in the Ridge 2000 program and associated research programs by participating in GLOBE FLEXE - From Local to Extreme Environments. Through comparative protocols and online interactions with project scientists and partner schools, students will gain an understanding of local and the deep-sea environments, the interconnected Earth system, and the process of science. FLEXE students will collect data from their local environment and compare it with data from an extreme deep-sea environment. FLEXE students will compare their data with data collected by a partner school in another part of the world. Scientific reporting and a peer review process will cap the student experience.

Resources for educators will include the FLEXE educators' guide, interactive online training, and customizable web-based tools to monitor and assess student work. FLEXE will involve a steadily increasing number of scientists. To date, 43 scientists (including the leaders of four research expeditions to "extreme" sites and those involved in ocean observatory initiatives) have volunteered to be involved in a variety of roles, including web-based interactions with GLOBE students and teachers. FLEXE education specialists and an external evaluator will conduct formative and summative evaluation to gauge and improve achievement of project goals.

Science Content Focus: Deep sea as an ecosystem; mid ocean ridge spreading centers and cold seeps, geologic processes, plate tectonics, hydrologic processes, sea water chemistry, biological communities.

Intended Audience: Grade 6-12 students and their teachers.

Geographic Scope: Starting with the U.S., FLEXE will expand with time to include other countries. While we hope that many GLOBE countries will participate in FLEXE over time, initial international participants will likely include countries that are already part of InterRidge namely Australia, Austria, Canada, Denmark, France, Germany, Iceland, India, Italy, Japan, Korea, Mexico, Morocco, New Zealand, Norway, Philippines, Portugal, Russia, South Africa, Spain, Sweden, Switzerland, and the United Kingdom.

Type of Project: GLOBE students will participate in protocol-driven fieldwork/analysis; structured web-based interactions with scientists and with students in a partner school; and culminating activities (reporting on their investigations, participating in peer review and receiving wrap-up feedback from scientists).

Web Link to Existing Ridge 2000 Information: www.ridge2000.org

How to Get Involved: www.globe.gov/fsl/html/templ.cgi?flexe

FLEXE Project Leader: Ms. Liz Goehring, exg15@psu.edu

GLOBE Project Leader: Mr. Jamie Larsen, jlarsen@globe.gov



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Meet the Team



Courtesy UW



Principal Investigator: Ms. Liz Goehring at Penn State University is the Education Outreach Co-coordinator of Ridge 2000. She has a background in ecology, education, and systems and focuses on developing learning communities including students, educators and scientists. Liz will lead FLEXE project development, coordination and dissemination.



Co-Investigator: Dr. Donna Blackman is a marine geophysicist at Scripps Institution of Oceanography (SIO). She currently serves as Chair of R2K steering committee, and is the primary liaison with the research community.



Co-Investigator: Mr. Eric Simms at Scripps Institution of Oceanography is the Outreach Co-coordinator of Ridge 2000. He has a background in marine ecology and is focuses on outreach associated with with web channels and ocean observatory systems. Eric will help develop learning materials and coordinate involvement of contributing scientists.



Co-Investigator: Dr. Bill Carlsen is a Professor of Science Education at Penn State University and the Director of PSU's Center for Science and the Schools. Bill will lead development of the web-based instructional components, such as peer review and structured interactions with scientists.



Co-Investigator: Dr. Catherine Williams is a Research Associate in Biology at Penn State University and currently manages several websites including the Ridge 2000 public website, www.venturedeeocean.org. Catherine will coordinate integration of online components of FLEXE with GLOBE.

Core Science Team: Dr. Anna-Louise Reysenbach (microbiology, Portland State University), **Dr. Christopher Janzen** (chemistry, Susquehanna University), **Dr. Charles Fisher** (biology, Penn State University), and **Matt Smith** (geology, University of Florida) represent the core science team.



GLOBE Project Leader: Mr. Jamie Larsen has over 20 years experience as a science educator and curriculum developer with experience teaching and developing curriculum in grades K-12. He has taught science in both public and private schools and developed curriculum for formal and informal science programs.