PROJECT SUMMARY

Overview:

Teaching public and K-12 communities about scientific research has taken on greater importance as climate change increasingly impacts the world we live in. Science researchers and the educational community have a widening responsibility to produce and deliver curriculum and content that is timely, scientifically sound and engaging. To address this challenge, we are proposing the project for 2013-2015 in conjunction with the Joint Science Education Project (JSEP) that occurs each summer. The purpose of this project is to engage high school students via hands-on and web-based experiences in atmospheric and geoscience research in the Arctic and in local environments to enhance climate literacy and understanding of earth dynamics. There are two objectives for this project: First, to support climate literacy in high school students, specifically the concept of energy exchange between the Earth, atmosphere, and space; and second, to serve as an education and outreach mechanism for research projects that extends the ability to communicate important research to a broad audience. The project goal is to establish a robust model of education and outreach for remote science research that is scalable, accessible, and capable of engaging students, teachers, and content experts throughout the world. Over the course of the proposed three-week summer program experience, students will conduct scientific inquiry associated with place that supports a more focused science content exploration. It is approximated that 80 students per year will participate in the hybrid learning environments as part of this project at multiple locations in Greenland, Denmark and the US. Anticipated products are: a web environment for students, teachers, parents/guardians and experts to collaborate and interact; a model for education and outreach for remote scientific research; educational research on the development of science identity and agency; research on the usability and utility of the web environment for enacting AL framework principles; and assessment of student understanding of the nature of science and climate literacy.

Intellectual Merit :

Currently, one of the most important challenges in science education is achieving climate literacy for students. The challenge is largely driven by misconceptions of the fundamental science that originates primarily from three sources; misrepresentations by the media, insufficient classroom instruction, and a general disconnect between science and the public. There are three fundamental concepts that are particularly problematic; radiation, the greenhouse effect, and climate vs. weather. The proposed project provides a compelling opportunity to engage students in an inquiry-based curriculum alongside cutting-edge geophysical experiments at Summit Station and at the GIS ice edge through projects such as Integrated Characterization of Energy, Clouds, Atmospheric state, and Precipitation at Summit Station (ICECAPS), Towards Hydrologic Understanding of the Greenland Ice Sheet, and Shallow-Borehole Array for Measuring Greenland Emission of Trace Gases as an Analogue for Methane on Mars (GETGAMM). These projects measure parameters that are closely tied to those identified in student misconceptions. Thus, Arctic science research and the AL approach combine to create a learning environment that is ideal for a practical, rich, engaging, and well-prepared learning experience.

Broader Impacts :

Students participating in the project will be diverse, rural, and traditionally underrepresented. Groups include: students participating in JSEP at Kangerlussuaq, Greenland and Summit Station from Greenland, Denmark, and the US; the Women Outside With Science (WOWS) program based in McCall Idaho; the TRiO Upward Bound Math Science (UBMS) program and the Helping Orient Indian Students and Teachers (HOIST) program based in Moscow Idaho; and students from Chinook West Alternative High School in Nederland Colorado. Beyond the students this project will work with directly (80 per year), it is anticipated that a network of teachers and students will be supported (approximately 500) as capacity grows for delivering curriculum in conjunction to . This project will also develop a model for education and outreach for remote science research. The AL approach is robust and shows great potential for supporting the education and outreach needs of scientists in remote locations.