Impacts and Feedbacks in a Warming Arctic: Engaging Diverse Learners in Earth Science Education and Research

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PROJECT NEED

- To build the capacity to navigate the challenges associated with a changing climate, learning in Arctic communities must not only increase knowledge, but also generate new knowledge as the rapid changes occur.
- Citizen science, the process whereby citizens (including K-12 students) are involved in science as researchers, presents a possible mechanism to meet this need.
- However, hypothesis-driven models of citizen science have been criticized for a disconnect between scientific agendas and the priorities and needs of diverse communities.
- The new geoscience education and research program at the University of Alaska Fairbanks, entitled Arctic and Earth SINGs (STEM integrating GLOBE and NASA), provides new opportunities for K-12 students, pre- and in-service teachers and lifelong learners from diverse communities to engage in citizen science learning.

OVERVIEW & OBJECTIVES

Arctic and Earth SINGs offers participants citizen science learning experiences that address the climate change challenges arising within their unique community, and is supported by culturally responsive curriculum and research collaboration with scientists.

Objective 1: Develop a high quality climate change education program that includes NASA assets (resources and experts), citizen science, and mobile technology for formal and informal science education settings.

Objective 2: Engage pre- and in-service teachers in authentic science and engineering learning experiences to model best practice for teaching K-12 Earth Science

Objective 3: Engage citizen scientists and youth in informal, authentic science and engineering education experiences where they produce and apply new information on the impacts of a changing global climate.

METHODS

- This STEM (Science, Technology, Engineering and Mathematics) program trains teachers and community members on climate change concepts and measurement protocols in face-to-face or online workshops.
- More focused learning on the core climate change issues in the participant’s community continues through modules that include: GLOBE protocols that best fit the issue, Local ecological knowledge, Historical and current NASA data, Direct contact with NASA subject matter experts, Collaboration with a team of arctic scientists and other partners such as the Association of Interior Native Educators and the 4-H program.
- Students and communities apply the in-depth learning and data they collected to stewardship projects related to the core climate change issue of the community.
- Scientists also use the data collected through the project to address larger scale climate change or remote sensing questions. (Examples: Do native and invasive species respond differently to a changing climate? How well does the SMAP satellite predict the soil moisture observations made by GLOBE citizen scientists?)

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PROJECT TEAM – Other Members and Institutions

Tuning Collaborators: Associate Professor of Nature Education, Northern District; Claire_decorski, Chief of Education, Alaska Wildlife Conservation Society; Melissa Murray, NASA Langley Research Center; Office of Education; Christian Mello, NASA Institute of Arctic Biology; University of Alaska Fairbanks; Natural Resources and Environment, 515 UAF Cooperative Extension, UAF College of Natural Science and Mathematics; Alaska Agricultural and Forestry Extension, University of Alaska, Fairbanks; Behavioral Sciences, University of Alaska Fairbanks; Department of Science, University of Alaska Fairbanks; Curriculum Development, University of Alaska Fairbanks; Curriculum Development, University of Alaska Fairbanks; Curriculum Development, University of Alaska Fairbanks.

GLOBE Data & Visualization Consultant: David Verbyla

GLOBE School: Lang Arena Elementary School, Juneau, Alaska; Co-led by Students of teacher Terri Jackson.