

# Geo2YC Field Studies Position Paper

## **Field-based education should be an integral part of geoscience curriculum at two-year colleges**

Introductory geoscience curriculum at two-year colleges must include robust field-based experiences/education to (1) promote persistence in college/geoscience (create and sustain a pipeline to 4YC geoscience programs), (2) promote cognitive development of students, (3) promote key organizational, personal and interpersonal skills, (4) support a broader view of the Nature of Science (that includes observational, historical, experimental, and theoretical approaches), and (5) help develop a scientifically literate community that maintains an interest in Earth.

According to the American Geosciences Institute the number of U.S. college students graduating each year with a degree in the geosciences has stagnated, while industry and government job opportunities in this field have risen rapidly in recent years (Wilson 2014). As greater numbers matriculate through the two-year college system prior to pursuing a Bachelor's degree, industry and national government are now looking to community colleges to broaden the pool of future geoscience graduates. Field experiences are an essential venue for attracting and training our future geoscientists, therefore it is imperative that field experiences remain supported and embedded within the curriculum. Research shows that field experiences significantly increase interest in geology (Wilson, 2012), and are critical for developing and producing geology majors (LaDue & Pacheco, 2013). Limiting authentic fieldwork at the community college would severely impact the production of geology majors at universities.

Field experiences represent a positive and irreplaceable learning experience for all students, including students with disabilities. Research shows that they promote particular cognitive aspects, such as an appreciation of scale (e.g. micro to macro), intellectual application, an appreciation of complexity and uncertainty, and the ability to synthesize and evaluate information, and a deeper understanding of geologic concepts (Tretinjak & Riggs, 2008). This is essential to building the foundation for geological study. They also build community and increase student persistence in college (Tinto, 1993), and improve student attitudes about their academic work, student confidence about working with others and coping with challenges, and their understanding of the significance to their work (Boyle et. al, 2007; Mogk & Goodwin, 2012).

Field experiences also aid dramatically in the overall development of our globally literate citizen. The positive outcomes align with curriculum reform efforts such as the Next Generation Science Standards and Earth Science Literacy Principles that challenge educators to teach how science is done rather than stressing the memorization of science facts. They also promote key organizational, personal, and interpersonal skills, as well as opportunities to acquire a variety of procedural skills and work effectively in a team (Quinn, 2009; Moore, 2001; Thompson, 1982).

Field experiences are also shown to impact long-term memory due to the memorable nature of the fieldwork setting and the development of a sense of place (Rickinson et al., 2004; Semken and Freeman, 2008), which is noteworthy for the continued success of geoscience related initiatives in the general populace.

Field experiences lay the foundation for a scientifically literate citizen who can critically evaluate complex challenges facing modern society and better prepare a highly needed workforce population. As logistical and economic concerns limit authentic field instruction there are calls for dissolution of programs or replacement with digital or virtual environments. As a community dedicated to the advocacy

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of two-year college geoscience education, the National Association of Geoscience Teachers Two-Year College division maintains that the benefits far outweigh the concerns and that authentic field experiences are important, irreplaceable experiences at two-year institutions.