

The structural influence of Proterozoic tectonics on Eocene orogenesis; a case study of the Snowy shear zone in southwestern Montana

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Purpose

The purpose of this study is focused on the tectonic and structural history of the Snowy shear zone located in southwestern Montana. Specifically, my collaborators and I are interested in deciphering Archean and Proterozoic deformation fabrics from Cenozoic structures that pattern the modern topography of the Paradise Valley and surrounding area. This valley, pictured below, is characterized by a low grade (greenschist) mylonite zone that bounds the impressive Absaroka mountain range and parallels the Deep Creek normal fault. Although the fault clearly cuts quaternary alluvial fans and glacial deposits, its relationship to the relatively low grade Snowy shear zone remains poorly understood. Ultimately, we are interested in understanding if the Deep Creek fault is solely responsible for the Eocene, and younger, development of the valley by reactivating a Precambrian Snowy shear zone, or if the range bounding mylonite zone records a deeper exhumation during the Cenozoic.



Departmental funding

The benefits of departmental funding are clearly illustrated in this project. Funding I received enabled numerous field days this past summer with collaborators from Rocky Mountain College in Billings Montana, and Montana State University in Bozeman Montana. Furthermore, I am currently co-advising an undergraduate student from Rocky Mountain College, who is focused on a small component of this greater endeavor. The funding provided by the University of Massachusetts Amherst, Department of Geosciences, has been applied to the production of thin sections and probe time to better characterize the relationships between microstructural fabrics and metamorphic assemblages.

This past year I attended the combined Rocky Mountain and Cordillera section GSA annual meeting in Bozeman Montana where I gave a talk focused specifically on this research. The abstract and slides can be found here: <https://gsa.confex.com/gsa/2014RM/webprogram/Paper238502.html>. I am currently synthesizing my data into a manuscript, which I hope to submit to *Rocky Mountain Geology* by next Spring.