Join us for

MGS Happy Hour

When? **Wednesday, Feb 22nd 5:00PM – 8:00PM**

(talk starts at 6:15PM)

Where? **CJ's Bar & Grill** in Billings (2455 Central Ave.)

What? Drinks, Presentation, Dinner

RSVP to montanageologicalsociety@gmail.com by latest Tuesday February 21st

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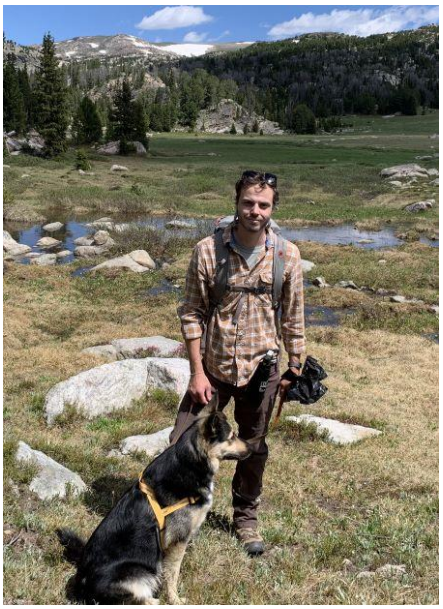
SPEAKER: DR. JACOB O. THACKER

FIXED-TERM ASSISTANT PROFESSOR, MONTANA STATE UNIVERSITY BILLINGS



Jacob Thacker joined Montana State University Billings in Fall 2022, where he teaches Geology, Earth Science, and Integrated Science courses. His research interests largely involve studying the spatiotemporal record of Cretaceous–Paleogene Rocky Mountains tectonism through geologic mapping, structural and stratigraphic analyses, and geo-/thermochronology. Jacob partly grew up in Cody, Wyoming, where he first became interested in geology. He earned his Ph.D. from the University of New Mexico conducting two disparate studies on Cretaceous and Neogene intra-plate tectonism, his M.Sc. from Montana State University analyzing the South Prairie fault in the Stillwater Complex of the Beartooth Mountains, and a B.Sc. in Geological Sciences from Cleveland State University. Prior to his position at MSUB, he worked as a Field Geologist for the New Mexico Bureau of Geology, and he has prior experience with NPS in Yellowstone, the USGS in Flagstaff, and as a Project Geologist with Childs Geoscience, Inc.

Mid-Cretaceous onset of intraforeland tectonism: A fresh look at old evidence and its implications for Laramide tectonic models

Formation of the Rocky Mountains during the Late Cretaceous–Paleogene Laramide orogeny disrupted the Cordilleran foreland basin system from Montana to New Mexico. Tectonism likely resulted from flat-slab subduction of the Farallon plate, however how the flat slab drove tectonism remains uncertain, a problem that can be addressed with rigorous constraints on timing of deformation. Compilation of previously published evidence in light of recent work suggests that strain was established across the foreland by ca. 100 Ma (or earlier), up to 40 million years before onset of latest Cretaceous to early Paleocene synorogenic deposition in central to eastern Montana. Publications since the 1960's have reported early tectonism from Montana to New Mexico that is corroborated by new work from independent researchers, while compiled

Inyan Kara Formation isopachs in western North Dakota further hint at early far field tectonism. Early signals are subtle (m- to 10's m-scale), suggesting low magnitude strain and/or the lithosphere was too strong to accumulate appreciable strain. Later easterly-directed time-transgressive (sweeping) onset of large-magnitude Laramide-style strain then occurred ca. 90–60 Ma at a rate 2–4 times slower than Farallon-North America convergence. Early phase and sweep phase intra-foreland tectonism appear to disagree with scraping of the Farallon slab beneath North America to cause the Laramide orogeny. Instead, it seems more likely that an end load force from the flat slab established far field mid-Cretaceous compression that allowed optimal crustal weaknesses to lightly fail, while later advance of the dehydrating slab progressively destabilized the craton and facilitated easterly-directed time-transgressive onset of Laramide tectonism. As such, the Laramide system would represent an accented phase of Cordilleran (Sevier-style) tectonism that evolved due to changing subduction conditions. New and ongoing work in the Beartooth Mountains and Bighorn Basin is being conducted to further verify early tectonic signals and to test this tectonic model.