Grand Junction Geological Society

http://www.gjgs.org/

This Month's Presentation

Wade Aubin
Assistant Professor
Colorado Mesa University

Will Speak On

Paleomagnetic evidence for erosion and redeposition by large pyroclastic density currents

The speaker will present in person although we will also have Zoom available.

Guests Are Always Welcome

Abstract and Speaker's Bio Are on The Next Page

Meeting Time and Location

Wednesday, August 20, 2025

Joint meeting with the CMU Geology Students

6:30

Saccomanno Lecture Hall
(Room 131 in the Wubben-Science Building)

Zoom Details

Andres Aslan is inviting you to a scheduled Zoom meeting.

Topic: August GJGS meeting

Time: Aug 20, 2025 06:00 PM

Join Zoom Meeting

https://coloradomesa.zoom.us/j/98795389477

Meeting ID: **987 9538 9477**

(Zoom opens at 6:00 to allow folks time to log in).

Important Announcements

The Chenoweth Memorial Field trip this year will be on Saturday, September 13. The trip will be to Unaweep Canyon and will bring you up-to-date on new information and ideas that have been developed over the past several years.

Parking at some of the stops is **very** limited, so please plan to carpool. More information will be available at the meeting. Please contact Rex Cole rcole@coloradomesa.edu if you plan to attend.

Abstract

Paleomagnetic evidence for erosion and redeposition by large pyroclastic density currents

Wade Aubin

The caldera-forming eruption of Mt. Mazama at ~7700 BP in central Oregon, produced large-volume, fast-moving Pyroclastic Density Currents (PDCs) that blanketed the surrounding terrain with thick deposits. The PDCs were extensively erosive, stripping the slopes of the volcano of earlier fall and flow deposits for 10s of kilometers from the vent, and depositing a thick sheet of lithic breccia as proximal deposits. They traveled at high speeds, surmounting barriers as high as 200 m and depositing meter-sized lithic blocks over 15 km away. The mechanisms of erosion, flow, and sedimentation in large volume fast-moving PDCs are not well understood. To investigate this, we studied the paleomagnetism of pumice and lithic clasts (accidental rock fragments) in the PDC deposits. We collected oriented clasts in all directions from the caldera, at multiple distances from the caldera rim. Clasts were then progressively demagnetized using thermal and / or alternating field (AF) demagnetization and the remanent magnetization was measured after each demagnetizing step. Demagnetization vectors are stable, but collectively, none of them are parallel to the Mazama magnetic field. They are in fact randomly oriented in all pumice and lithic clasts. Given the pristine preservation of the PDC deposits and lack of evidence for any sort of post depositional remobilization (e.g. fluvial reworking), the deposits must have cooled, and the clasts within them acquired their remanent magnetization, and then been remobilized. The random orientations of remanent magnetization vectors is best explained by the influence of waxing and waning of the Mazama eruption on the PDCs. During waning periods PDCs were hotter and left deposits closer to the vent. During periods of waxing activity, erupted ash and gases were significantly cooled in tall turbulent eruption columns. Collapse of these tall columns produced relatively cooler, fast moving, erosive flows that stripped and entrained material from earlier flows and transported that material farther from the vent, leaving only the densest material near the vent. Thus, the final deposit represents an accumulation of pyroclastic material that had previously cooled and was then remobilized and transported to its final place of deposition. The thick sheets of lithic breccia that comprise the proximal PDC deposits are the result of intensely scouring PDCs.

Bio

Wade Aubin is an Assistant Professor of Geosciences at Colorado Mesa University. Wade was raised in the Redwood forests and coastal fog of NW California. Growing up, Wade spent a lot of time along the Pacific NW coast and mountains. His parents took him and his sister on long summer driving marathons to all the National Parks in the western U.S. These experiences instilled a love and appreciation of the natural world and the Earth. After high school, Wade spent four years in the Army, then returned to complete a BS in Geology at Humboldt State University, and then an MS in Geology at Washington State University (WSU). Wade began a Ph.D. program at WSU, but soon after 9/11 his National Guard unit was mobilized, and he and his unit soon spent a year patrolling the streets of Baghdad, Iraq. Wade elected to serve full-time with the military after this, finally retiring from the Army in Texas in 2019. He re-entered academia and completed a Ph.D. in Geosciences at The University of Texas at Austin. Wade studies explosive volcanic eruptive processes and igneous petrology. He and his family are enjoying their new life in western Colorado.