



Grand Junction Geological Society

<http://www.gjgs.org/>



This Month's Presentation

Allen Stork

**Western Colorado University
Gunnison, Colorado**

Will present a talk on

**Petrology and Geochemistry of the
Neogene Red Mountain and Flat Top
Basaltic Lava Fields, Gunnison
County, Colorado**

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

November 19, 2025

Joint meeting with the CMU Geology Students

6:30 p.m.

Saccomanno Lecture Hall (Room 141) in the Wubben
Science Building at Colorado Mesa University

Zoom Details

Andres Aslan is inviting you to a scheduled Zoom meeting.

Topic: November GJGS meeting

Time: Nov 19, 2025 06:00 PM Mountain Time (US and
Canada)

Join Zoom Meeting

<https://coloradomesa.zoom.us/j/98192324672>

Meeting ID: 981 9232 4672

As before, we will start the Zoom meeting a half-hour early to
give people time to log in before the actual meeting starts.

Important Announcements

November is the month that we select officers for the next
year. If you would like to serve as an officer for the GJGS,
please let Bill Hood or our President, Ben Haveman
(brh0052@ymail.com) know.

Also, dues are due by the end of the year. Dues are \$25 per
year and may be paid to the treasurer (Brann Johnson) in
person at the meeting, by check to our P.O. Box (Box 4045,
Grand Junction, CO 81502) or at our web site via PayPal. If
paying by PayPal please consider adding \$1.36 because that
is what PayPal is charging us per transaction.

Abstract

Petrology and Geochemistry of the Neogene Red Mountain and Flat Top Basaltic Lava Fields, Gunnison County, Colorado

Allen Stork

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Red Mountain and Flat Top, in central Gunnison County, are mesas capped by ~10 Ma basaltic lavas. These lavas were both erupted into a paleo-Gunnison River drainage that has undergone a topographic inversion. Red Mountain consists of up to fourteen stacked aa flows with an aggregate thickness of up to 66 m. The erosional remnant of this field covers ~1.0 km². Flat Top consists of interlayered thick and thin pahoehoe flows, is up to 50 m thick and currently covers ~3.7 km². Both show no evidence of significant time gaps between the flows.

Red Mountain lavas are olivine phyric shoshonites and potassic trachybasalts. Flat Top lavas are olivine-plagioclase phyric medium-K basalts and basaltic andesites. Red Mountain and Flat Top flows are chemically distinct with Red Mountain having a greater range of MgO (5.0-7.3%), and more K₂O (1.8-2.5%), TiO₂ (1.7-2.0%), and P₂O₅ (0.6-0.7%) than lavas from Flat Top at comparable MgO concentrations. Vertical variations show that at least three separate magma batches were tapped on Red Mountain. Flat Top lavas are more chemically uniform. Transitional lavas occur at the top of the Red Mountain and bottom of the Flat Top sections.

The more Mg and Ni-rich Red Mountain lavas are LREE enriched (La_n/Yb_n ~13) and show distinct Ta and Nb depletions (La/Ta ~33). The less Mg and Ni-rich Flat Top lavas have lower overall abundances of incompatible elements, slightly lower LREE enrichments (La_n/Yb_n ~8) and more distinct Ta and Nb depletions (La/Ta ~44). Variations in REE abundances can be models with varying degrees of partial melting of a LREE enriched mantle with some residual amphibole and garnet at the lower degrees of partial melting. Variations in other highly incompatible elements such as Ta and Th indicate tapping of a heterogeneous mantle. The variations encountered between Red Mountain and Flat Top span the range found in other ~10 ma lavas from central Colorado. Chemical and isotopic date are consistent with tapping a compositionally and/or mineralogically distinct mantle that have characteristics typical of subduction modification produced during the Paleoproterozoic.

Allen Stork bio

I got my B.A. in geology at Pomona College and my PhD at UC Santa Cruz where my thesis was titled "Silicic Magmatism in an Island Arc, Fiji, Southwest Pacific: Implications for Continental Growth".

I taught mineralogy, petrology, geochemistry and volcanology at Western from 1985 until 2021. My research activity includes work in the Fiji in the Southwest Pacific with two recent publications. My students and I have also been working on the post-ash flow basaltic volcanism in Central Colorado. This includes Red Mountain and Flat Top north of Gunnison, the Hinsdale age formations at Nine-Mile Hill, Carpenter Ridge and on Alpine Plateau on the north slope of the San Juan Volcanic Field, and Grand Mesa with Rex Cole.

I have also been lucky enough to be involved in mapping the Almont, Gunnison and Signal Peak quadrangles for the CGS and the McIntosh Mountain and Little Soap Park quadrangles for the NPS. Dave Marchetti and I are currently working on mapping the Flat Top quadrangle to be published by the CGS.