



Grand Junction Geological Society

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



This Month's Presentation

Vince Matthews

**Former State Geologist of Colorado and
GJGS member**

and

Steve Cumella

Independent geologist & GJGS member

will present a Zoom talk entitled

**“Neogene Rotational Rifting of
the Colorado Plateau Microplate:
A model for the distribution of
divergent stress and strain in the
Uinta Basin and uplift of the
Uinta Mountains (and possibly
the San Juan Mountains).”**

**Note: Dr. Matthews will speak to us
via Zoom.**

Meeting Time and Location

September 18 2024

Joint meeting with the CMU Geology Students

7:30 p.m.

Sacomanno 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: Sept GJGS meeting

Time: Sep 18, 2024 07:00 PM Mountain Time (US and Canada)

Join Zoom Meeting

<https://coloradomesa.zoom.us/j/97401204943>

Meeting ID: 974 0120 4943

Note: As usual, the Zoom meeting link will be opened about a half hour before the actual meeting to give people time to log in.

Important Announcements

The 2004 Chenoweth Memorial Field Trip will be held Saturday, September 7. Requests to attend are now closed.

Abstract

Neogene Rotational Rifting of the Colorado Plateau Microplate: A model for the distribution of divergent stress and strain in the Uinta Basin and uplift of the Uinta Mountains (and possibly the San Juan Mountains)

Vince Matthews and Steve Cumella

The rotation of a Colorado Plateau microplate was proposed in the 1970s. A variety of studies and data in the ensuing decades support the concept. We define the Colorado Plateau Microplate (CPM) as a block of lithosphere that is rifting away from the North American craton in a clockwise fashion during the Neogene and Quaternary. The CPM includes the Physiographic Colorado Plateau but extends farther east and northeast. Deformation accompanying the rotational rifting is generally restricted to a 75 km “damage zone” that extends outward from the nine, linear rifts bounding the CPM. Within these damage zones, stress and strain parallel the principal rift boundaries. The damage zones extend into both the rotating CPM and the craton. Model experiments provide insights into what is observed in nature.

Borehole-image logs in numerous oil and gas wells in the Piceance and Uinta basins reveal variable patterns of the state of stress. A consistent WNW trend for Neogene faults, gilsonite dikes, and horizontal principal stress directions characterize the Piceance and eastern Uinta basins. This pattern abruptly changes to dominantly N-S with a minor E-W trend in the central Uinta basin. Left lateral displacements on the E-W features are interpreted as Neogene, rather than Laramide. The N-S pattern continues through the western Uinta basin.

Both basins fall within the 75 km damage zone for the three northern rifts bounding the CPM. The stress and strain patterns in both basins appear to reflect the kinematics of the clockwise rifting of the CPM.

The rotational rifting of the CPM generated the Neogene uplift of the Uinta mountains and speculatively the San Juan mountains.

Bio

Dr. Vince Matthews retired as State Geologist and Director of the Colorado Geological Survey in 2013.

Vince received Bachelors and Masters degrees in Geology from the University of Georgia and a Ph. D. from the University of California, Santa Cruz and holds Outstanding Alumnus Awards from both institutions. He taught at seven institutions of higher education and served as an executive in four publicly-held, natural-resource companies.

Matthews is a Senior Fellow in the Geological Society of America where he served as General Chair of the 125th Anniversary Meeting. He is the 2014 recipient of the Pioneer Award from the American Association of Petroleum Geologists.

