# Paleocurrent Analysis and Sedimentology of the Maroon Formation, Gunnison, Pitkin, **Pisel, J.R.**<sup>1</sup>*jesse.pisel@western.edu,* **Fillmore, R.P.**<sup>1</sup> <sup>1</sup>Department of Natural and Environmental Sciences, Western State College of Colorado, Gunnison, Colorado and Summit Counties, Colorado, USA

## Abstract

Maroon Formation is a 7,000 to 8,000 foot thick bedded red sandstone, conglomerate, siltstone and shale, with onformably overlies the Pennsylvanian Minturn Formation to othic Formation to the west, and is unconformably overlain by n the Fountain Formation in the Denver Basin, and the Sangre De Cristo Formation in the San Luis Basin. The Maroon Formation has been interpreted as a fluvial deposit draining two major highlands into the Central olorado Trough. The Central Colorado Trough has been interpreted an asymmetrical basin bounded on the east and west by the Ancestral Rocky Mountains. The Ancestral Rocky Mountains were composed of several uplifts, primarily the Front Range uplift to the east and the Uncompander uplift to the west. Several smaller uplifts have been hypothesized, identified and mapped, including the Apishpa, Ute Pass, and Sawatch uplifts. Measured sections of outcrops of the Maroon Formation in Gunnison, Pitkin, and Summit counties were made during the course of this study to evaluate lithofacies and their distribution throughout the Central Colorado Trough during the late Pennsylvanian and early Permian time. Paleocurrent indicators such as clast imbrication, cross stratification, trough cross stratification, and scour and fill structures were measured in beds throughout the measured sections to evaluate the presence of an ancestral Sawatch uplift in the center of the Central Colorado Trough. Circular statistics of the acquired paleocurrent data enabled creation of rose diagrams of paleocurrent directions for each measured section throughout the study area.

# Introduction

approximately the same orientation of todays Rocky Mountain

- The Ancestral Rocky Mountains provided source terrane and flexural accomodation for deposition of 8,000 feet of sediment
- The Ancestral Sawatch uplift has been hypothesized because there is an apparent thinning of the Maroon Formation towards

ocurrent indicators are formed during deposition of sedimentary rocks and indicate the direction of flow of rivers, tides, deltas, and turbidity currents and can be used to approximate areas of high relief. The Maroon Formation is composed of conglomerates and sandstones with abundant paleocurrent indicators that can be

used to evaluate the direction of sediment transport from source areas allowing evaluation of an Ancestral Sawatch uplift -The Maroon Formation has been interpreted as a distributive fluvial system with areas of small eolian dunes.

### **Depositional Environment**



### Location



Outcrops of Maroon Formation Shaded Blue



## Methods

- A total of 9 stratigraphic sections were measured throughout the study area totaling over 1,000 meters by either tape measure or by 1.5 m length Jacobs staff.
- measured to the nearest 2 centimeters and were typically bounded by either gradational changes, erosional surfaces, or significant changes in lithology,
- In all 1.013 paleocurrent measurements were made through the 9 sections.
- Paleocurrent measurements were made using a Brunton compass and measuring either strike and dip or trend and plunge of foresets, imbrication, scours, and tool marks.
- Paleocurrent data was entered into StereoWin and beds were restored to paleo-horizontal by rotation
- Circular statistics were used to determine mean vector and magnitude of displacement in 10 degree intervals.
- The mean vector was calculated paleocurrent vectors for each measured section.
- Data was plotted in rose diagrams to evaluate the direction of flow in fluvial systems. Measured sections were drawn to scale for each study location and then compared to evaluate facies changes through out the western margin of the Central Colorado
- The resulting paleocurrent data and measured sections were compared to interpret environments of deposition for the study locations.

#### odular anhydrite and gypsum Paleocurrent indicators in the Cathedral Peak section beds in the Teocalli section









igmoidal bedding in the Jacque Ridge section

Thinly bedded, horizontally laminate carbonate bed in Cathedral Peak section Ancestral Uncompa Ancestral Cement Mountain

ncestral Uncompangre Uplift

**Conglomerate bed surrounded by siltstone in the Red Peak Section** 





ate beds typical of the Cement **Creek and Bear Creek sections** 

## Results



- Crystal Peak Measured Section



- Vector means for paleocurrent measurements at each study location



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