GRAND JUNCTION GEOLOGICAL SOCIETY

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NOVEMBER MEETING

WEDNESDAY 16, 2016

Joint meeting with the CMU Geology Students
7:30 PM
Saccomanno Lecture Hall
(In the Wubben Science Building)

R. Livaccari, A.Trumbo, M. Feil and V. Johnson Will Speak On

"Laramide Structure of the Northern Uncompahgre Plateau and Origin of Unaweep Canyon, Western CO"

Abstract on Reverse

Guests Are Always Welcome
The Election of the 2017 Officers Will Be Held at This Meeting

Your 2017 Dues-$15.00-are due now. Make your check to the GJGS Foundation for a tax deduction as it is a non-profit organization. Bring to meeting or mail to GJGS, P O Box 4045, Grand Junction, CO 81502

Laramide Structure of the Northern Uncompahgre Plateau & Origin of Unaweep Canyon, Weatern Colorado

R . Livaccari and V. Johnson CMU Geology, A. Trumbo and M. Feil, Former Students

ABSTRACT

The Uncompahgre Plateau of western Colorado is a NW-SE striking, Laramide-age crustal arch modified by synkinematic strike-slip faults. WNW-ESE striking, subvertical, left-lateral, oblique-slip faults are the most common structure. These faults accommodated horizontally-driven crustal buckling during NE-SW-directed, Laramide-age shortening. The result was not only classic monoclines associated with steeply-dipping reverse faults, but also Laramide-age normal faulting.

Reverse faults formed as right-stepping transpressive bends and the normal faults formed as left-stepping transtensive bends that splay from the controlling left-lateral strike-slip faults. Evidence for left-lateral strike-slip along the controlling WNW-ESE striking, oblique-slip faults includes: (1) fault slickenline data; (2) the presence of conjugate right-lateral strike-slip faults with a NE-SW strike; (3) occurrence of curving swarms of N-S to NE-SW striking, small-scale faults that are right-lateral R'-shears within an overall zone of left-lateral shear.

Along the northern part of the Uncompahgre Plateau, WNW-ESE striking, left-lateral, oblique-slip faults splay into right-stepping transpressive bends along NW-SE striking monoclines and reverse faults. These structures include the classic Redlands Monocline of the Colorado National Monument.

Along the southern part of the Uncompahgre Plateau, WNW-ESE striking left-lateral oblique-slip structures are typically associated with transtension; the sense of dip-slip is mostly normal and there are no monoclines. The location of many of these faults along the crest of the Uncompahgre crustal arch suggests that Laramide faulting in this area was influenced by local extension in the outer arc of a synchronously developing basement arch. Additional normal faults formed as left-stepping transtensive bends between WNW-ESE striking left-lateral oblique-slip faults. These transtensive bends form 'Lazy-S' shaped grabens between left-lateral, oblique-slip structures. Both Unaweep Canyon and Big Dominguez Canyon represent 'Lazy-S' shaped grabens. These transtensive faults were also more open and porous, allowing fluid migration in the form of synkinematic hydrothermal plumes. Fault zones with plumes are characterized by: widespread development of hydrothermal breccias, synkinematic mineralization, and extensive silicification of permeable sandstones adjacent to these faults. Carbon-bearing minerals such as calcite, strontianite, malachite, azurite are common, suggesting that deeply penetrating left-lateral strike-slip faults served as fluid pathways for influx of mantle CO_2.