GRAND JUNCTION GEOLOGICAL SOCIETY

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FEBRUARY MEETING
WEDNESDAY, FEB. 15, 2O17

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

Rex Cole, CMU, Geosciences
Will Speak On
"Geochemical Variation of Grand Mesa Volcanic Field, Western Colorado"

Guests Are Always Welcome

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GEOCHEMICAL VARIATION OF GRAND MESA VOLCANIC FIELD, WESTERN COLORADO

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Note: this presentation includes input from
Bill Hood (CMU) and Allen Stork (Western State Colorado University)

A major-element geochemical study of the Grand Mesa volcanic field (GMVF, area ~155 km^2) shows significant geographic variation in three areas. Area 1 (largest) consists of the Flowing Park and Palisade lobes and their confluence. Flow-sequence thickness ranges from 56 m (6 flows) to 187 m (26 flows) and decreases from east to west. Individual flows are laterally extensive, have well-defined vertical and lateral boundaries, and are associated with thin (<1 m) sedimentary interbeds. Argon-argon age dates (18 flows) range from 9.52 to 11.07 Ma (mean = 10.23 Ma). A TSA plot (SiO_2 *v* Na_2O+K_2O in wt%) shows that Area 1 samples (N = 281) are mainly basaltic andesite (BA) (55.2%) and basalt (B, 29.5%), followed by trachy-basalt (T-B, 8.5%), and basaltic trachy-andesite/shoshonite (BT-A/S, 6.8%). Area 2 is associated with a well-defined aeromagnetic anomaly and consists of Crag Crest (CC), Crag Crest bulge (CCB), Quarry knob, and JB knob. The CCB flow sequence is about 100 m thick and consists of a chaotic mix of cooling units with agglutinated pyroclastics. A 10-m-wide, northeast-trending dike is exposed in the slumped margins of CC but does not penetrate the CCB flow sequence. Age dates (2 dikes, and 2 flows) range from 10.56 to 10.90 (mean = 10.67). Samples (N = 105) are dominated by BT-A/S (81.9%), followed by T-B (5.7%), trachy-andesite/latite (T-A/L, 5.7%), BA (4.8%), and B (1.9%). Area 2 probably represents a major vent area. Area 3 consists of eastern outliers of basaltic flows such as Leon Peak, Crater Peak, and Mt. Darline. Total flow thickness ranges from 15 to 140 m and decreases from west to east. The west-trending Lombard dike occurs near Mt. Darline, but is geochemically different from the adjacent flows. Age dates (7 flows, 1 dike) for Area 3 range from 10.07 to 10.48 Ma (mean = 10.30 Ma). Samples (N = 45) are mainly BA (44.4%), followed by BT-A/S (24.4%), T-B (20.0%) and B (11.1%). One possible vent, now represented by the Chimney Rocks dike, is similar in age (10.19 +/- 0.05 Ma) and composition to the flows at Mt. Darline, Crater Peak, and Mt. Hatten. It crops out 10.6 km northeast of Mt. Hatten in the West Muddy Creek drainage.

Results of this study confirm that the eruptive history of GMVF is more complicated than previously thought. The geochemical characteristics of the vent complex (Area 2) are considerably different from the flows in Areas 1 and 3. This suggests that other vent areas remain to be discovered or that magmatic differentiation occurred during eruption cycles.