

GEOLOGY OF NORTHERN MARKAGUNT PLATEAU, UTAH

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It has been recognized since the days of Dutton that the High Plateaus section of the Colorado Plateau consists of easterly tilted fault blocks made up largely of Cretaceous sedimentary and Tertiary sedimentary and volcanic rocks. The present study is of the Tertiary geologic evolution of a 250 square mile east-west belt through the northern Markagunt Plateau, the southwesternmost of the High Plateaus. Analysis of the structure is based on use of regional ignimbrites as stratigraphic and structural reference planes.

The earliest geologic event of which there is a record in the northern Markagunt Plateau was the fluvial and lacustrine deposition of the Claron Formation (Eocene - Oligocene?). Volcanism began during the closing stages of Claron deposition; the Claron is here defined to include an informal uppermost member made up of volcanic arenite, mudflow-breccias and volcanic flows. One ignimbrite of the Needles Range Formation (Oligocene) spread across the Claron depositional surface and covered the northern Markagunt with the exception of its northeastern corner. There a large laccolith (?) had previously been emplaced into upper Claron strata; the dome produced by this intrusion remained an uncovered topographic high until the deposition of the Cottonwood Canyon Formation (Miocene? - Pliocene?). Eruption of two ignimbrites of the Isom Formation (Oligocene) followed; one (the lower?) covered the entire Needles Range surface, while the other was deposited only in small down-faulted(?) lows in the south-central part of the northern Markagunt. Block faulting along lines trending generally east-west followed the eruption of the Isom. Ignimbrites of the Leach Canyon Formation (Oligocene) filled grabens formed by this block faulting.

The Bear Valley Formation (Miocene?), herein defined, consists of up to 1000 feet of wind-deposited volcanic arenite with minor interbeds of tuff, lava flows and mudflow-breccias; this unit blanketed most of the northern Markagunt. Deposition of the Bear Valley Formation was ended by an inundation of at least 2000 feet of volcanic flows and mudflow-breccias of the Cottonwood Canyon Formation (Miocene? - Pliocene?), which is herein defined. Small laccoliths were then emplaced.

The present structural pattern of the northern Markagunt Plateau is the result of Pliocene(?) and Recent faulting along a conjugate set of faults, the major set trending about N. 35°E., the subsidiary set, about north-south; and of cross-faulting normal to these conjugate faults. The dominant topographic features today are three northeast-trending horsts separated by the grabens of Bear Valley and Buckskin Valley. The horsts are in general bounded by fault scarps, but in some places, particularly within the larger structures, resequent and obsequent fault line scarps are present. Major drainage lines are in part consequent and in part antecedent to the major structures; subsequent drainage has developed along lines or zones of cross-faulting.