GEOLOGY OF EL CUERVO AREA, NORTHEASTERN CHIHUAHUA, MEXICO

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ABSTRACT

The geologic map of El Cuervo area shows distribution of stratigraphic units ranging in age from Jurassic (?) to Recent. Outcropping strata are principally Cretaceous in mountainous areas and Cenozoic in bolson areas.

From the Late Jurassic Epoch until the Late Cretaceous Epoch the Chihuahua Trough was a negative feature w i t h respect t o adjacent platforms a n d 10,000 to 18,000 feet of Jurassic-Comanchean sedimentary rock, including a thick basal evaporite sequence, accumulated in it; whereas on the adjacent Diablo Platform of Texas about 3,000 feet of sedimentary rock accumulated. The lower part of the Mesozoic sedimentary record shows a gradual transgression, interrupted by numerous minor regressions, from the Chihuahua Trough onto the Diablo Platform.

The upper part of t h e record shows a regression. The eastern edge o f a Jurassic (?) evaporite basin is in the eastern part of the area. Meocomian-Aptian formations are dominantly siliciclastic. Middle Albian formations are dominantly siliciclastic in the eastern part of the area, but are predominantly shallow-water carbonate to the west. Late Albian-early Cenomanian formations are limestone with subordinate shale. During the Cenomanian Epoch siliciclastic deposition again became dominant and the medial Cenomanian-Senonisn formation record a transition from marine to continental deposition.

Mesozoic and Paleozoic "basement" rocks were d e f o r m e d during the Late Cretaceous -Early Tertiary Laramide orogeny. Jurassic (?) evaporites acted a s a decollement zone between Mesozoic and Paleozoic rocks. Major thrust faults , overthrust toward the east, developed along the easternedge of the evaporite basin i n El Cuervo area. During thrust-faulting, evaporites w e r e diapirically injected into younger rocks along thrust-and tear-fault zones. As evaporation flowed into diapirs and cores of anticlinis, blocks settled differentially into space abandoned and chaotic patterns of normal faults resulted. Olivine-disbase sills and dikes and amphibole-rich rocks (where olivine disbase was intruded intoand contaminated by evaporites) may have formed during early states of Laramide deformation.

During and after Laramide deformation denudation created a surface of erosion in the area. During early Tertiary erosion as evaporites were removed, collapse structure developed over diapirs, which had been injected along tear-fault zones. At several places in near-vertical beds on flank of folds, as erosion removed nonresistant beds, gravity developed flaps and detached flaps in adjacent resistant beds of limestone.

During late Eocene-early Oligocene time flow rocks, ignimbrites, and associated sedimentary rocks were deposited i n widely scattered, topographically low areas. Volcanic and associated rocks, deposited in collapse features, were deformed as erosion of evaporites continued a n d they foundered into evaporites. Two porphyritic andesite intrusions are associated w it h Laramide faults; one is in the core of a large anticline. In the southeastern part of the area several trachyte intrusions along east-trending joints formed dikes.

Subsequent to vulcanism, the region was uplifted from elevations near sea level to thousands o f feet above s e a level and Late Tertiary block-faulting w a s superimposed on Laramide structure in the eastern part of El Cuervo area. Intrusion of olivine-biotite "peridotite" may have accompanied faultingor immediately followed the main episode of faulting. Thick sections of bolson fill were deposited in the Presidio and Benigno grabens as a consequence of block-faulting. Although some Laramide faults may have been reactivated during Tertiary blockfaulting, major Tertiary faulting did not take place west of the eastern front o f t h e easternmost range of the Chihuahua Tectonic Belt.