

The Sequence Stratigraphic Context of Mixed Carbonate-Evaporitic Deposition in the Harrisburg Member of the Permian Kaibab Formation, Northern Arizona and Southern Utah

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ABSTRACT

The Kaibab Formation is a mixed carbonate system including evaporates and siliciclastics deposited on a westward dipping epeiric carbonate platform during the early Permian in northern Arizona, southern Utah, and eastern Nevada. It consists of the Fossil Mountain Member, deposited in open-marine conditions and the overlying Harrisburg Member deposited in restricted conditions. The Harrisburg Member includes facies and depositional environments ranging from open-marine shallow-subtidal wackestone-packstone, restricted subtidal dolomitic mudstone, dolomitic sandstone, and peritidal oolitic grainstone, as well as gypsum and red siltstones deposited in a sabkha environment.

Fourteen stratigraphic sections were measured across northern Arizona and southern Utah to analyze the sequence stratigraphic context of the Harrisburg Member. This study interprets four parasequences making up systems tracts of two depositional sequences. The lower two parasequences are indicative of the highstand systems tract of depositional sequence H1. Facies of the lower parasequences consist of the open-marine wackestone-packstone, restricted subtidal dolomitic mudstone, dolomitic sandstone and oolitic-peloidal grainstone. An erosional surface between the second and third parasequence is denoted by a chert pebble conglomerate and represents a sequence boundary SB1. The third and fourth parasequences represent the transgressive systems tract of the second depositional sequence H2, and have a stacking pattern indicative of a landward migration of facies with gypsum and red siltstone facies overlain by a shallow-marine wackestone-packstone. The Permo-Triassic unconformity truncates the Harrisburg Member and represents a major sequence boundary SB2 separating it from the overlying Triassic sediments of the Rock Canyon Conglomerate and Moenkopi Formation.

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