

Depositional Setting, Provenance, and Paleogeography of the Ali Baba Member, Lower Triassic Moenkopi Formation, Salt Anticline region of the Paradox , eastern Utah-western Colorado

Robert P. Fillmore
Department of Natural and Environmental Sciences
Western State Colorado University, Gunnison, CO 81231
rfillmore@western.edu

The Ali Baba Member of the Lower Triassic Moenkopi Formation is confined to the salt anticline province of the Paradox basin in eastern Utah and western Colorado. This coarse-grained fluvial deposit records the uplift of the salt anticlines and concurrent subsidence in intervening salt withdrawal basins.

Paleocurrent data from 11 localities show a consistent N-NW paleoflow direction for Ali Baba rivers, parallel to the rising anticlines and the western margin of the Uncompahgre highlands. This indicates a system of axial N-NW flowing fluvial systems that ran between the salt anticlines, and a local sediment source within the anticlines. Sandstone and pebble conglomerate that make up the Ali Baba consist dominantly of quartz, feldspar, granite rock fragments and carbonate rock fragments, indicating a sediment source of reworked upper Paleozoic strata exposed on the rising flanks of the salt anticlines. Regionally, this pattern suggests a drainage outlet somewhere to the northwest, out of the region of salt uplift, where the rivers were able to escape the confines of the anticlines and flow unimpeded to the shallow sea that lay to the west.

One locality on the northeast flank of the Castle Valley salt anticline illustrates the relations between sedimentation and salt anticline uplift. The lower part of the section, which is dominated by trough cross-stratified granule/pebble conglomerate shows a northeast paleoflow direction (57°). This is concurrent with the appearance of up to 30% fossiliferous carbonate clasts. Fossils in these clasts include rugose corals and crinoids columnals. This lower part of the section records the progradation of a short tributary system that drained off the east limb of the Castle Valley anticline. This tributary drainage tapped into sediment of the Permian Cutler Formation, the lower Cutler beds, and Pennsylvanian carbonates as it cut headward into the rising east flank of the anticline. In contrast, the upper part of the section, which is dominated by planar tabular cross-stratification, shows northwest-directed paleoflow (315°). This section records a return to the northwest-flowing axial fluvial system confined between the Fisher Valley and Castle Valley salt anticlines that is similar to those throughout the salt anticline region.