

Outcrop analysis of a counter-regionally dipping welded diapir, Oladdie diapir, South Australia

Thomas E. Hearon, IV
Department of Geology and Geological Engineering
Colorado School of Mines
Golden, Colorado USA
thomashearon@gmail.com

The Oladdie diapir is located in the central Flinders Ranges, approximately 30 km north of Orroroo, South Australia. Strata flanking this diapir are late Neoproterozoic to Middle Cambrian. The Oladdie diapir comprises a deep pedestal of salt linked to shallow salt by an inclined salt weld that separates two minibasins with very different thicknesses and large-scale geometries. Well-exposed outcrops in the Oladdie area indicate complex salt-sediment interaction, salt-related deformation and halokinetic strata, all of which can be seen in plan view and cross section. Preliminary field results indicate several stacked tapered composite halokinetic sequences on the northern flank of the diapir, as well on the southern flank.

The inclined geometry of the welded Oladdie diapir and the associated flanking strata is analogous to counterregional salt welds and leaning passive salt diapirs in the northern Gulf of Mexico, specifically the Grand Isle 16 salt diapir located in a coastal bay 11 km offshore Louisiana. Three-way traps against such welds and leaning diapirs are increasingly important to the hydrocarbon industry, but many key issues are below seismic resolution limits. The recognition of small-scale features in the field, which cannot be seen on high-quality seismic data, will provide a better understanding of salt-sediment interaction and will greatly benefit petroleum companies exploring for resources around this type of structure. In-depth outcrop studies coupled with structural modeling, current models, industry examples and seismic data, will enable greater exploration accuracy and determination of potential salt and sub-salt plays throughout global hydrocarbon-rich basins.