Salt Shoulders: New Insights Into Salt-Sediment Interactions Involving Dissolution, Partial Burial, and Salt Flow

David Lankford-Bravo[1]
[1]University of Texas El Paso, Sedimentology, El Paso, TX USA
dfbrav@gmail.com

ABSTRACT

Salt shoulders are recently recognized structures created by syndepositional sediment interaction with rising salt diapirs. Defined by an abrupt inward step at the margin, concordant or onlapping strata contacts with the diapir as short wavelength folds, potentially forming important salt-related hydrocarbon traps. The detailed structural, sedimentological, and stratigraphic characteristics salt shoulders have not been documented, and formation mechanisms have not been determined. Observed sysedimentary shoulder geometries and local caprock associations suggest dissolution and/or differential salt flow may control shoulder development. Studies will be conducted on 2 shoulder-bearing diapirs in the Willouran Ranges of South Australia and 4 in the Paradox Basin, UT & CO in order to create integrated 3D models of shoulder evolution. Recognized shoulders are found in different tectonic settings (rift and foreland basins) of different ages (Neoproterozoic vs. late Paleozoic and Mesozoic), climatic regimes (icehouse vs greenhouse) and depositional settings (marine to terrestrial). Drone photoscan modelling integrated with standard geological field mapping techniques, measured stratigraphic sections, and geophysical data will be used to quantify syn/postdepositional structure & deposition facies distribution architecture on salt shoulders. Petrographic thin section analysis will be used to identify sedimentary facies, estimate fluid flow effects, and interpret changes in sediment sources during shoulder development. C, O, and S stable isotope analysis in conjunction with U-Pb dating on shoulder carbonate caprock will be used to determine fluid sources and formation ages. Computer modelling will be conducted to analyze fluid flow, heat flow, and to interpret geophysical models built from field-acquired data.

AAPG Search and Discovery Article #90321 2018 Grants-in-Aid Projects