

Lateral Variations in Diapir-Constrained Deepwater Sediments of the Donkey Bore Syncline, Flinders Ranges, South Australia

Fernandes, Blaise, Tobias H.D. Payenberg, and Carmen Krapf, University of Adelaide, Adelaide, Australia

Cambrian deepwater sediments outcrop uniquely in the Donkey Bore Syncline, Flinders Ranges, South Australia adjacent to a salt diapir. They present a significant analogue of intra-formational, lateral variation in a syn-diapir depositional setting. It is situated adjacent to the Wirrealpa Diapir and contains over 400 m of sediment over approximately 20 km². The strata are shallow dipping and due to the arid climate outcrop are of great quality allowing detailed field analyses of stratigraphic variability within the units of interest.

Field studies involving detailed measured sections were carried out along the southern flanks of the syncline. The predominantly debrite and densite deposits have bed thicknesses between a few cm to 4 m. Two type of sequences/sedimentary units have been distinguished: up to 10s of m of thinly interbedded calcareous sandstones and muddy limestones as well as up to 4 m thick individual massive sandstone beds. Both sequences are laterally extensive but vary in thickness within a distance of 2 km, determined through walking individual beds between sections.

Within the major sandy units, prominent slumping plays a dominant role in thickness variations, imparting a heterogeneity on an apparently constant sequence. There is also general thickening of the sequences with distance from the diapir. These sub-seismic factors are important to consider when predicting reservoir units and their flow characteristics in similar, subsurface salt related sequences.