

Observations and Thoughts on Sands Associated with Mass Transport Deposits

Meckel, Trey, Woodside Energy Ltd, Perth, Australia

Many sands deposited on continental slopes occur immediately above a mud-prone debrite or are inter-bedded within a series of debrites. This characteristic stratigraphic succession, observed in numerous outcrop and subsurface examples, allows three possible temporal and genetic relationships between the sands and the debrites to be considered: (i) that the deposition of the sands preceded externally-driven mass failure, and the sands were subsequently re-mobilized as part of a mass-transport deposit; (ii) that rapid deposition of the sands triggered the failure of the underlying muds as a co-genetic failure; or (iii) that the deposition of the sands post-dated the deposition of the underlying debrite, and the two units are genetically un-related.

These three hypotheses have significant implications in terms of reservoir quality and distribution. In the first case, the sands can have been re-sedimented relatively coherently or not, potentially resulting in a high degree of lateral variability. This variability may be accompanied by a disruption of any existing internal barriers and baffles, leading to improved reservoir characteristics. In the second case, the connectivity and reservoir quality of the sands is often improved by (in particular) dewatering and injection, but may be offset by internal syn-depositional faulting and folding. In the third case, reservoir distribution is often controlled by topography on the tops of the preceding debrites, but reservoir quality is independent of debrite characteristics.

Outcrop analogues, supplemented by subsurface cases, allow us to make detailed observations of the three associations, leading to improved understanding of this reservoir type.