

## Characteristics of Permian Tanqua Karoo Deepwater Mudstones

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### Abstract

Turbidite-related mudstones are an integral part of any submarine fan complex. The Permian Tanqua Karoo in southwestern South Africa is an excellent example. Thick-bedded mudstones, 10–50 m thick, subdivide the individual sand-rich fans within a fan complex. The 30–50 cm thick medium-bedded mudstones and 1–30 cm thick thin-bedded mudstones occur within the sandstone layers of a fan system and may act as baffles to fluid flow.

Characteristics of thick-bedded mudstones are that the upper fan (leveed channels) areas show predominantly alternating fining-upward sequences of parallel laminated quartz-rich muddy silts (~10% clay) and slightly clayey mud (~60% clay). A sharp contact typifies the location of the contact between the silt and the overlying mud. The thick-bedded mudstones in the lower (sheet sands) fan reveal alternations of fining-upward sequences of wavy-laminated slightly silty muds (~30% clay) and very clayey mud (~80–90% clay). Clays predominate and indistinct wavy contacts occur between the silty muds and very clayey mud laminations.

Medium-bedded mudstones are typically more siliceous. They are comprised of cyclic fining-upward sequences of quartz-rich muddy silts, silty mud and very clayey mud. A thin-bedded muddy silt (~10% clay), up to 1 cm thick, predominates at the base of each sequence and is capped by laminations of silty mud (~30% clay) and very clayey mud (~80% clay), which are generally less than 1 mm thick.

Thin-bedded mudstones are characterized by fining-upward sequences comprised of silty mud (~30% clay) and slightly to very clayey mud (~60–90% clay) laminae. The sequence is typically mud-rich and often expresses an amalgamated contact with the clay-rich material above.

Even minor tectonics result in fractures. The combination of the clays with some micas and organics suggest that many of these mudstones can be source rocks and gas reservoir at the same time.