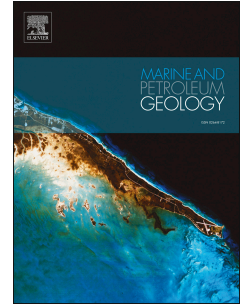


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Mechanical compaction in chlorite-coated sandstone reservoirs – Examples from Middle – Late Triassic channels in the Southwestern Barents Sea

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Abstract

The relationship between diagenetic evolution and reservoir quality in large-scale Middle – Late Triassic aged channel systems (up to 20 km wide) in the southwestern Barents Sea is investigated through core plug data, XRD, SEM- and modal analyses. The studied channel systems are believed to be sourced from the southeastern Uralide mountain range and are characterized by chemically unstable clastic sediment and well-developed, porosity-preserving chlorite coatings. Chlorite coatings occupy potential quartz nucleation sites on the framework grain surfaces and likely prevent significant chemical compaction in deeply buried sandstones. Compaction is believed to follow mechanical compaction trends of similar sandstone compositions. Modelling and prediction of porosity preservation in Middle - Late Triassic channel sandstones in the study area is therefore possible, if temperature histories and sandstone compositions are well constrained.

The tidally influenced channel and fluvial-dominated channels in this study show significant variation in reservoir quality. These differences are found to be linked to amount of allogenic matrix and grain size, which significantly reduces the permeability in the tidally influenced channel. If seismic distinction between different channel types is impossible, the distribution of permeability is considered unpredictable.

Chlorite coatings in the investigated channels are interpreted to be diagenetic overprints of an amorphous precursor clay phase, which appears to have a strong link to the Uralian provenance. Coating precursor emplacement likely occurs prior to significant burial, but the exacting physical conditions enabling this process remains elusive without systematic laboratory and analogue studies.

Keywords: Barents Sea, Triassic, diagenesis, reservoir quality, chlorite coating.

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