

# Reservoir Enhancement Processes for Carbonates of Northern Gondwana

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The Alpha field, in the Timan Pechora Basin (Komi Republic, CIS), is a multihorizon oil-bearing reservoir. The Upper Devonian carbonates of Reservoir A and Permian carbonates of Reservoir B suffered a series of long term subaerial exposure that resulted in reservoir characteristic improvements. The Interpretation of the 3-D seismic data using the in-house developed Sismage software suggested that karst occurred in the Frasnian / Fammenian section in close relationship with the structural features and that karst generated epikarst and collapse created breccia with impact on the Permian carbonates deposition.

Detailed examination of the Devonian cores supports the karstic nature of the reservoir showing conduits, caves network, fissures enlarged by leaching, karstic breccia, and speleothems. The following karst scenario is proposed: 1) several sub-aerial emersion events occurred during Upper Devonian times triggering coastal karst or epikarst, partly controlled by structural geology (fracture and fault patterns) and partly controlled by sedimentary facies distribution; 2) later hydrothermal endokarstic dissolution occurred prior to oil migration and was controlled by a later, post-compaction tectonic event and the preexisting heterogeneities.

The Permian carbonates deposition was structurally controlled by high and lows somewhat related to large scale hydrothermal collapse and faulting controlling lower Permian anhydrite dissolution. The carbonate platform suffered probably long term sub aerial exposure which evidences are found in several wells that resulted in calcrete palaeosol development at the top of the Microcodium invaded zone, indicated by rhizcretions.