

Depositional Environments, Diagenesis, and Reservoir Characteristics of Gondwana Sediments in Dhansiri Valley Area, Assam, India

Pendkar, Narender¹, M. H. Basavaraju², P. S. Kataki¹, K.C.Das³ (1) RGL, ONGC Ltd, Sivasagar, India (2) KDMIPE, ONGC Ltd, Dehradun, India (3) Mumbai Offshore Basin, ONGC Ltd, Mumbai, India

This study examines the evolution, depositional settings, and reservoir characteristics of Gondwana sediments in the subsurface of Dhansiri Valley of Assam. Key drilled wells were used as examples for presenting types of depositional regimes, diagenetic and reservoir characteristics of both Lower (Permian) and Upper (Cretaceous) Gondwana sediments. Electrolog and seismic data were used to refine the laboratory-based sedimentological observations.

The Upper Gondwana sediments were deposited as alluvial fans with minor marine influence. Lower Gondwana sediments (equivalents of Talchir Formation) were possibly deposited as a part of marine fan delta with debris flows. The depositional environments and the resultant petrofacies are controlling the reservoir properties of the sandstones. Feldspathic arenites are common sandstones with iron oxides, silica, and calcite as cements. The preservation of intergranular porosity has been fair to good. Microporosity is present in altered feldspars and pore filling clays.

The presence of radial monosaccates viz., Plicatipollenites sp, Parasaccites sp, Virkipollenites along with trilete spores Microfaveolatispora sp, Microbaculispora sp and Horriditriletes sp suggest Early Permian (Asselian-Sakmarian) age. Presence of Leiosphaeridia suggests marine influence during Early Permian times. Presence of characteristic palynofossil viz., Plicifera delicata, Ornamentifera echinate, Tricolporites sp, Cyclinospora reduncus, Staplinisporites sp, Cicatricosisporites sp, Classopollis sp and Callialosporites sp suggest Early Cretaceous (Aptian-Albian) age.

The geometry of the sandstone reservoirs is being controlled by the direction and extent of grabens/half grabens, which are well delineated by seismic interpretation. Better sorting associated with stream-influenced sediments for the continental deposits and reworked marine sediments will make good reservoirs.