

A FLUVIO-AEOLIAN SEDIMENTATION MODEL APPLIED TO THE OIL EXPLORATION AND PRODUCTION IN THE RECÔNCAVO BASIN, NE BRAZIL.

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Água Grande Formation sandstones (Berriasian) contain up to 15% of the Recôncavo Basin oil in place volume. The sedimentary facies analysis and the application of high-resolution sequence stratigraphy techniques shows that the Água Grande reservoir is composed of a depositional sequence comprising two distinct system tracts separated by a transgressive succession. The connectivity and production characteristics of these sandstones can be predicted by the proposed model. The lower sequence boundary is a fluvial erosion surface related to a rapid fall and lowstand of the lake level whereas the upper one is a supersurface. The fall and lowstand of the lake level caused the progradation of a braided fluvial system that was entrenched into valley areas. This fluvial system and subordinate deltaic sands, and an overlying, widespread mudstone bed (maximum flooding surface) comprise the lowstand and transgressive systems tracts. The uppermost section of the Água Grande Formation is made of fluvial and aeolian interbeddings, which comprise the highstand system tract. It is characterized by an ephemeral braided fluvial system laterally intertonguing with an aeolian system. Aeolian deposits predominate towards the top of the sequence, following the increasingly arid conditions in the basin. The upper sequence boundary is a supersurface picked regionally at the boundary between aeolian sandstones and the overlying, lacustrine rift mudstones. Lowstand fluvial sandstones have low porosities and permeabilities. On the other hand, highstand sandstones (fluvial/aeolian) have porosities ranging from 7 to 28 % and permeabilities ranging from 20 to 5000 mD. The major oil accumulations in the Água Grande Formation are contained in the fluvial/aeolian sandstones from the upper section. The proposed model is useful for recognizing, mapping and also predicting the quality of Água Grande reservoirs; it is a strong tool that has been used in the exploration and production phases.