

STRATIGRAPHIC ARCHITECTURE AND PETROPHYSICAL CHARACTERIZATION OF THE ALBIAN CARBONATES OF THE MACAÉ GROUP IN THE EASTERN MARLIM OILFIELD, CAMPOS BASIN

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ABSTRACT: The Campos Basin is the main sedimentary basin explored in Brazilian territory and like many other basins in the Brazilian eastern coast, had the development of carbonatic platform systems during the Albian Age. Although this succession has already been studied in some regional works it remains poorly understood in terms of sequence stratigraphy. In this manner, the objectives of this work included the definition of the Macaé Group stratigraphic framework in the Eastern Marlim oil field, considering tectonics, carbonate factories and the sea level variations; the present work also aimed the determination of the petrophysical characteristics of the formations and the analysis of the spatial distribution of the porosity and permeability along the oil field. Therefore, the data employed were 21 2D seismic lines, a 3D seismic volume and the data of 8 wells which included logs and the core samples description reports. As a result were identified 19 lithofacies and 7 facies associations, comprised into 5 third-order depositional sequences which shows distinctive geometric arrangements, facies distribution and petrophysical properties. The first sequence (S1) includes the Lagoon facies association (FA1) which was deposited in shallow and hypersaline marine environment. The second sequence (S2) symbolizes the period of the definitive implementation of the carbonate platform conditions in the basin and comprises three facies associations: shoals (FA2) characterized mainly by coarse facies arranged in the form of oolitic /oncolitic shoals, inter shoals (FA3) typified by intercalations of fine and coarse facies with oncoides and peloides and the outer ramp association (FA4) distinguished by a higher proportion of fine facies associated with relatively deeper water depositional conditions. The third sequence (S3) comprises the drowning facies association (FA5) established during a sea level rise and its facies reflect this variation, with grainstones and packstones typical of carbonate banks superposed by fine granulometry facies of deeper water environments. The last sequences (S4 e S5) comprise two facies associations: high sea-level (FA6) and deep water (FA7), respectively. Both were deposited in a deep marine environment e are composed by fine facies like marls, mudstones, shale and siltstones. The difference between them is that S5 shows a higher proportion of terrigenous facies. The succession was interpreted as part of a transgressive cycle which led to a change in the carbonate production system (*factory*) which was followed by the drowning of the carbonate platform and the formation of a drowning unconformity indicating the end of the carbonate sedimentation system in Campos Basin. In relation to the distribution of the petrophysical properties it was possible to observe that in the basal sequences the highest values of porosity and permeability are associated with carbonate bank facies even though the facies were affected by cementation, in the upper sequences high and inconstant values of these properties in fine granulometry facies suggest the influence of faults and fractures.

KEYWORDS: CARBONATIC SEQUENCES, CAMPOS BASIN, PETROPHYSICAL ANALYSIS