

Application of Chemostratigraphy in the Study of Carbonate Reservoirs of the Campos Basin, Brazil

Albertão, Gilberto Athayde¹, Pedro Paes de Carvalho², Marcelo Blauth³, Alexandre Dutra Sayd¹ (1) Petrobras, Macaé - RJ, Brazil (2) Halliburton, Macaé, Brazil (3) Petrobras, Rio de Janeiro - RJ, Brazil

Since 1974, oil was known to be present in limestones of the Tertiary carbonate platform of Campos Basin (Siri Member of Emborê Formation). Nevertheless, very heavy-viscous oil characteristics deferred its commercial production, which was only confirmed in 1997 after a formation test. A program work to develop these reservoirs, including a detailed geological characterization, was then prepared. The first attempts to perform a detailed stratigraphic analysis failed due to the lack of definition provided by traditional tools such as seismic, wireline logs and biostratigraphy. These limitations suggested that inorganic geochemistry could be used as a tool for stratigraphic correlation. Whole-rock elemental data (major and trace elements), determined from cuttings of three wells, were used to construct a chemostratigraphic framework for the interval of interest. Elemental data were generated by the use of conventional sample preparation techniques (powdering, fusion, dissolution) and by proven, high-precision, inductively coupled plasma (ICP) spectrometers. Analyses of this data set identified chemostratigraphic units and determined which elements and elemental ratios were most useful for correlation purposes. The younger Ubatuba Formation was clearly differentiated from the limestones of the Emborê Formation. Furthermore, a very refined internal zoning was obtained: three units within Ubatuba Formation and twelve within Emborê Formation, including the Siri Member. These results demonstrated the potential use of this technology for stratigraphic correlation as well as for geosteering operations.