



Sequence Stratigraphic Analysis for Delineating the Sedimentation Characteristic and Modeling of Nidoco Area, Off-Shore Nile Delta, Egypt

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The Egyptian Nile Delta has recognized over the different human civilizations, as the source of life/ basket of wheat. In the recent time, the Nile Delta revealed another hidden treasure that hidden below the Mediterranean Sea within its sediments. This treasure reflects a number of giant gas reservoirs that require only the suitable technology and the assured ideas to commence injecting gas into the industrial veins of the growing Egyptian economy. The current study is aiming to discuss the Messinian Prospectivity of the concerned area, which is located in the offshore of the Nile Delta, about 25 Km from the Mediterranean Sea shoreline. An integrated exploration approach applied for a selected area, using a variety of subsurface borehole geologic and log data of the selected wells distributed in the study area, as well as biostratigraphic data. The well data comprise well markers, and electric logs (e.g. gamma ray, density, neutron and sonic logs), where the geological data represented by litho-stratigraphic information, as well as ditch samples analysis of the studied interval. Biostratigraphic data include biozones, benthonic to planktonic ratios, nannofossils and foraminiferal data. Different methods and techniques were applied by using different softwares such as Petrel and Interactive petrophysical software. Four missing times were identified intra-Pleistocene, Late Pliocene, Late Pliocene-Early Pliocene and Messinian. It has concluded that, the depositional environments ranged from shallow marine to middle neritic and may reach upper bathyal toward the northern part of the study area. The top of Abu Madi Formation dated with the calcareous nannofossils zone NN12a, while the base dated with NN11c, and its age varied from 5.2 Ma to 5.7 Ma. The maximum flooding surface is dated with the calcareous nannofossils zone NN13 and the planktonic foraminiferal zone SN18 at 5 Ma (the acme presence of the *Sphaeroidinellopsis* sp.). From the utility of wireline logs for sequence stratigraphy using the different log tools for lithological interpretation and their impact upon the reflection characteristics and sequence stratigraphic interpretation, it is concluded the parasequence sets, system tracts, surface boundaries and their distribution within each well and their control on the sand distribution within each formation. In the present work, the Late Miocene (Messinian) and the Early Pliocene (Zanclian) pay-zones are the only rock units, that have integrated wireline logs approach, so it can be divided into 4 sequences; UM-1, UM-2A, UM-2B and LZ-1.