

Central Romanian Black Sea offshore – opening and evolution of the Istria Depression based on subsidence analysis

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The study area comprises the Central Romanian Black Sea Offshore bounded by Peceneaga – Camena and Heracleea faults, in front of North Dobrogea Orogene. Usually the present observations from the sedimentary basins about the structural, geochemical, thermal and other geological and geophysical data reflect, in a complicated way, the history of basin evolution. Tectonic processes that control the stratigraphy and the geometry of the Central Romanian Black Sea Offshore include mainly the extensional and strike-slip movements creating and modifying the space accommodation. Sediment supply into the basin is other parameter that affects the evolution of the area. The erosion of the proximally uplifted areas and transport into basins increases the sediment load within basin resulting in increase of thicknesses and compaction. A third variable that significantly controls the stratigraphy is eustatic sea level falls and raises that cause progradation and retreat of facies boundary. Any change of these factors resulted in creation and destruction of the accommodation space, depositing and eroding the sedimentary sequences. The evaluation of the tectonic subsidence was analysed using standard 1D backstripping techniques for individual wells, combined in several sections and contour maps. The lithological and stratigraphic data, heat flow and thermal parameters and also the layers thicknesses came out from various sources including published information. Decompaction parameters resulted from the exponential decompaction curves for porosity: $\phi = \phi_0 \exp(-cz)$, and the values of paleowater depth used for calculation of tectonic subsidence were based on sedimentary structures, facies analyses and fossils assemblages.

At the end of Jurassic and beginning of Cretaceous, the geological framework of North Dobrogea Orogen and Istria Depression implicit was inactive tectonic. The North Dobrogea orogenic belt represent a Late Permian–Early Triassic rifted basin, subsequently inverted during the Late Triassic and Early Cretaceous phases of the Cimmerian orogeny. It consists of a system of three major tectonic units: the Macin, Niculitel and Tulcea Nappes which involve Triassic and

Jurassic sediments . The North Dobrogea stratigraphic column shows a Tithonic-Upper Albian stratigraphic gap.

Starting with Barremian-Aptian a part of structural elements were reactivated and involved in an extensional phenomenon that created the small horst and grabens. Some of them (e.g. Peceneaga-Camena Fault, Capidava-Ovidiu Fault, Venus-South Lotus Fault, Venus-Lotus Fault, and Venus–Lotus Graben) preserved the main characteristics, others have changed totally their character (e.g. onshore the Lunca Vita-Consul Fault is a thrust fault separating the Macin Nappe by the Tulcea Nappe; offshore it was reactivated under the name Heracleea fault which is a normal fault deepening southwards remaining active from Aptian to Mid-Oligocene). Later, the extensional phenomenon have spreaded out from local to regional creating the Istria Depression.