

The Bisse Marl is replaced at a marked contact by flysch type succession of the Bóly Sandstone Formation in the Late Albian. Based mainly on micropaleontological association the lower part of the Villány succession could be compared with the Dobrești and Coposeni members of the Blid Formation, while its middle and upper parts of the Nagyharsány Limestone could be correlated with Valea Bobdei-Valea Măgurii, and Subpiatră Limestones, respectively. The Vârciorog Fm is equivalent to the Bisse and Bóly Formations.

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## **Clay, secondary dissolution, and tectonic controls on the reservoir properties in Upper Eocene tuffs, West Thrace Basin, Turkey**

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The diagenetic history of the Upper Eocene tuffs in the West Thrace Basin is based on petrological analysis of samples from six boreholes. Diagenesis in the tuffs principally involves the progressive development of various types of cements in the following order: quartz overgrowth, zeolite authigenesis, chlorite and illite authigenesis. After the formation of the cementation phases, there was a dissolution phase creating secondary porosity via the dissolution of volcanic glass and feldspars, accompanied by generation of analcime and a late mordenite cementing phase. The tuffs also have been affected by the following diagenetic processes; fracturing and calcite, quartz, and zeolite cementation.

Tuffs in the West Thrace Basin may contain significant amounts of secondary porosity owing to unstable grain and volcanic glass dissolution caused by relatively rapid rates of pore-fluid flow. Also tectonic stress appears to have controlled development of secondary porosity formation in the West Thrace basin which in turn might have been responsible for high porosity of the deep reservoirs. At depths greater than 2000 m, the porosity increases with depth due to secondary solution activities and fracturing in the West Thrace basin. Secondary Porosity is very important for hydrocarbon explorations in the Upper Eocene tuffs in the West Thrace basin. The dominant porosity type produced by dissolution processes (intragranular, intergranular). Fracture porosity also significantly increases reservoir quality. Authigenic clays may affect reservoir quality depending on type of clay and its distribution. However, dissolution and fracturing are generally a more effective diagenetic process than cementation in the tuffs of West Thrace basin.

## **Statistical tidal tomography of the Vrancea intermediate-depth seismic zone**

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The aim of the study is to identify specifically temporal and spatial patterns of the intermediate seismic activity in Vrancea seismic zone using new approaches. We have investigated the influence of the principal lunar semidiurnal tidal component M2 on intermediate seismic activity in Vrancea (Romania) sub-crustal region from 1934 to 2009 with a special regard for the time series of events from 1980 to 2009. The constituent is assigned by HiCum stacking method according to the earthquake occurrence. “Schuster” and “Permutation” independent tests are applied to distributions found by stacking. Null hypothesis between seismic activities and selected tidal periodicities is rejected when the statistical p-values obtained by the two tests are less than 5% level of confidence in term of statistics. The stacking function is applied to time series of events belonging to windows

shifted in time and space, respectively, to evaluate the variability of correlations in both cases. In the case of 3D shifting domain, a specific algorithm, called “statistical tidal tomography”, is described. The results reveal important issues: a). There is a specific temporal footprint of the p-values around the larger earthquakes; b) A Fast Fourier Transform on the n-order polynomial least squares fit (LSF) of the p values variations emphasizes a long-term period about 17 – 18 years; c) Following the 3-D distribution of  $p < 5\%$  values in different sliding time windows we observe a certain pattern confirmed by the CN algorithm for the earthquake prediction and the future strong Vrancea events monitoring; d) the statistical tidal tomography of M2 component has similar patterns with the analysis of seismicity patterns introduced by others for the Vrancea seismic region.

## **Combined petrological, geochemical, and statistical analysis of Eocene-Oligocene sandstones of the Thrace Basin, Greece and Bulgaria**

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The Rhodopean Orogen developed since Late Cretaceous-Lower Eocene during accretionary processes following the closure of the Vardar ocean basin. We concentrate on Paleogene clastic sediments of the Rhodope area, developed synchronous to the post – Cretaceous collisional collapse and the subsequent Tertiary extensional phase. Throughout a multidisciplinary approach, including sedimentary petrology, sandstone geochemistry and compositional data analysis, we argue to reconstruct the unroofing history of the Rhodopian orogen and the abrupt onset of the volcanic activity between Late Eocene and Oligocene across the eastern and southern Rhodopian region. A total of 127 sandstone samples have been analysed. Sandstone detrital modes include three distinctive petrofacies, a quartzolithic, quartzofeldspathic and volcanoclastic. The major contributions are from the metamorphic basement units, represented mostly by low-medium grade lithic fragments for the quartzolithic petrofacies and high grade metamorphic rock fragments for the quartzofeldspathic petrofacies. Volcanoclastic sandstones recorded different composition between eastern Rhodopes and southern Rhodopes samples. Detrital mode evolution testifies contributions from three key source areas corresponding with the two main crystalline tectonic units of the Rhodope Massif, Variegated Complex and Gneiss-Migmatite Complex and from the Circum-Rhodope Belt. The volcanoclastic petrofacies is interbedded with quartzofeldspathic petrofacies reflecting superposition of active volcanic activity. Geochemical analyses for major and trace elements provide useful provenance informations. The Zr/Sc vs. Th/Sc and Cr vs. Cr/Ni plots suggest that sediment recycling is negligible. The use of geochemical diagrams for tectonic setting discrimination confirmed, in most of the cases, the inferred tectonic setting, corresponding mainly to an active continental margin and subordinately to a continental island arc. The idea of a multidisciplinary approach has been represented by the successful attempt to use together the information provided by petrographic and geochemical analyses. Compositional data from Eocene-to-Oligocene sandstones of the Thrace Basin were used to unravel the interplay between tectonics and sedimentation by means of multivariate statistical methods adapted to the particular nature of the available data (concentrations and percentages). The biplot was particularly useful in order to extract details in terms of source area evolution. The indications obtained call for a progressive enrichment from mafic to felsic elements, corresponding to increasing rates of supply from deeper levels of the crust. In conclusion, petrostratigraphic (detrital modes)