

Correlation of Upper Paleozoic sequences of NE Bulgaria and the Istanbul Zone, Turkey: Implications for Coalbed Methane Potential Assessment.

Jordan Jordanov¹, Aral I. Okay², Nikola Sechkarev³, and Dimitar Merachev³

¹Sofia Mining and Geology University; j.m.jordanov@abv.bg

²Eurasia Institute of Earth Sciences and Department of Geology Istanbul Technical University;

³Overgas Ink AD

The current investigation covers two comparatively autonomous geological provinces: The North Bulgarian swell (NBS) in northeast Bulgaria and the well known Istanbul zone in NW Turkey. A major uplift of the Paleozoic sequences is recognized in the NBS at depth 1200 – 1300 m. In Romania, the uplift has been greater and near the Constanza region, along the Capidava-Ovidiu fault Vendian Greenshists are covered by thin (200-300 m) Upper Jurassic-Senonian deposits. The investigated area had experienced a prolonged pre-Permian and/or pre-Mesozoic erosion, which resulted in large scale thinning of the Paleozoic rock sections. This event is documented in the wells, penetrating Jurassic- Middle Paleozoic contacts. The author's emphasis was placed mainly on the Upper Paleozoic sequences from both areas, which demonstrate similarities of the mineral composition as well as textural features of the rock bodies. The Paleozoic sequences in Bulgaria have been penetrated by more than 200 wells and a large amount of rock samples and analytical data are available. The same high exploration degree is achieved for the Istanbul zone, including field geological investigations, geophysical and drilling surveys, which resulted in a number of kinematic models, describing the zone as an exotic terrane with Upper Proterozoic consolidated basement, dated to 560-590 Ma. Exploitation works on the Zonguldak coal realm reveal broad horizons for comprehensive geological and geotechnical analyses of the Carboniferous system.

The seismic surveys and the well logs from Dobrudgea area reveal the presence of three megasequences: Ordovician – Lower Devonian (Emsian) predominantly clastic formations; Middle Devonian – Lower Carboniferous (Middle Viséan) predominantly carbonate group and Upper Carboniferous – Permian volcano-clastic megasequence. All these series are covered by Mesozoic deposits of different ages. A similar stratigraphy is known in the Istanbul zone.

A special attention is focused on the Carboniferous section of both areas, which is well explored within the Dobrudgea coal basins province and Zonguldak group of coal basins, part of which are worked even today. The Dobrudgea coal province includes several coal basins, extended from WN Bulgaria (Svoge basin); central part (Novachene field); NE part - Dobrudgea coal field with more than 2 billion tons of hard coals; Kaliakra and Nanevo fields. The last one is situated entirely offshore. The Nanevo well penetrated Upper Carboniferous deposits from 1680 m to 4000 m, without entering older rocks. On the Turkish territory data are gathered from the Zonguldak group of coal field (Camdağ, Zonguldak, Amasra Safranbolu regions). A comparative analysis reveals a number of significant similarities between Zonguldak and Dobrudgea coal basins with respect to paleogeography (paleoecology), as well as sedimentary settings and lithofacies characteristics.

The recognized similarities reveal broad possibilities for certain progress in understanding the geological evolution of both geological provinces, which are described by the authors as a possible monolith autonomous terrane at least during the Carboniferous Period. This outcome is important

not only for the common geological synthesis but for the practical purposes in the field of coal and petroleum geology. The mentioned conclusion has also a great importance for the CBM resources as an unconventional energy product. Performed correlation is accepted by the authors as a key element for the successful construction of kinematic models for Black Sea opening and overall description of the geological history of the NE Bulgaria and Istanbul.

Key words: Upper Paleozoic sequences, Istanbul zone, Dobrudgea area, correlation