

Correlation of the Paleozoic terranes in Bulgaria and NW Turkey: preliminary results

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Introduction

The Trans-European Suture Zone (TESZ) is characterized by a mosaic of terranes of either Gondwanan-Perigondwanan or southern Laurussian origin, which were accreted during the Variscan orogenic event. The western and central compartments of the suture belt had been the subject of detailed international studies (for a review see Pharaoh 1999). The eastern continuation of the TESZ, on the other hand, is relatively less-known to the international community. Moreover, regional interpretations regarding the affiliation of smaller terranes in the Balkan and NW Anatolian regions are not based on detailed local studies and highly speculative. To overcome this problem, a joint-project with Bulgarian and Turkish earth-scientists had been initiated to correlate the stratigraphy, magmatism and succession of Paleozoic events in the Bulgarian and Turkish terranes. The present paper includes the preliminary results of this joint-project on the Paleozoic Meosian, Thracian and Balkan terranes (Haydoutov & Yanev 1997, Yanev 1993, 2000) in Bulgaria and the Istanbul and Zonguldak terranes (Göncüoğlu et al. 1997; Göncüoğlu & Kozur 1998) in NW Turkey.

The Paleozoic stratigraphy of the Bulgarian and Turkish terranes

In the Eastern Balkan realm, in Bulgaria, the Palaeozoic rocks outcrop in two different areas that belong to the Balkan and the Moesian Terranes. The generalized stratigraphic columnar sections are given in Figure 1.

In these units, the terrigenous-argillaceous and carbonate Silurian and Devonian marine sedimentary successions with rich and diverse benthic and pelagic faunas are involved in the pre-Variscan cover of the Moesian Platform and the Balkan Mt (Stara Planina, Kraishte, etc.). Based on graptolite zonation (Sachanski 1998), the Silurian black shales, lydites and siltstones outcropping extensively in Western Stara Planina Mt. have been subdivided into formations. In the Moesian Platform, the chitinozoans have been used to prove the Wenlock to Emsian age of the black shale succession and to provide arguments on probable Peri-Gondwanan affinities (Lakova 1995). The subdivision of Devonian and Carboniferous sediments from the deep drillings in Moesian Platform are based on conodont zonation (Boncheva 1995; Yanev & Boncheva 1997), sedimentological and lithostratigraphical studies (Yanev 1972). In the Kraishte area of West Bulgaria, there are zonations of the shallow marine Lower Devonian deposits on conodonts (Boncheva 1991) and tentaculites (Sachanski 1996). Based on compilation of sedimentological, paleontological, paleoclimatical and paleomagnetical data on the Silurian and Devonian, it is proposed that these terranes originated from different parts of Gondwana and Perigondwana, migrated towards N and docked to Laurussia (e.g. Yanev 1993, 2000).

In the NW Turkey, recent studies (Göncüoğlu, 1997, 2001; Göncüoğlu & Kozur, 1998; 1999 and Kozur and Göncüoğlu, 2000) have shown that the Palaeozoic successions of the former Istanbul Unit of Sengör et al. (1984) differ in the West (Istanbul-Gebze area) and in the East (Zonguldak-Safranbolu area). The differences include:

a- the post Silurian-pre-Emsian regional unconformity accompanied with a Late Silurian thermal event in the Zonguldak Terrane contrasting with the continuous deposition in the Istanbul Terrane within the same time-span,

b- the deposition of shallow-water carbonates and clastics during the Tournaisian-lower Namurian in the Zonguldak Terrane contrasting with the deposition of radiolarian cherts and flysch-type sediments during the Tournaisian and early Visean in the Istanbul Terrane.

Based on these differences these authors suggested the presence of two different terranes: Istanbul Terrane in the west and Zonguldak Terrane in the East. The generalized columnar sections of the Istanbul and Zonguldak terranes are given in Figure 2.

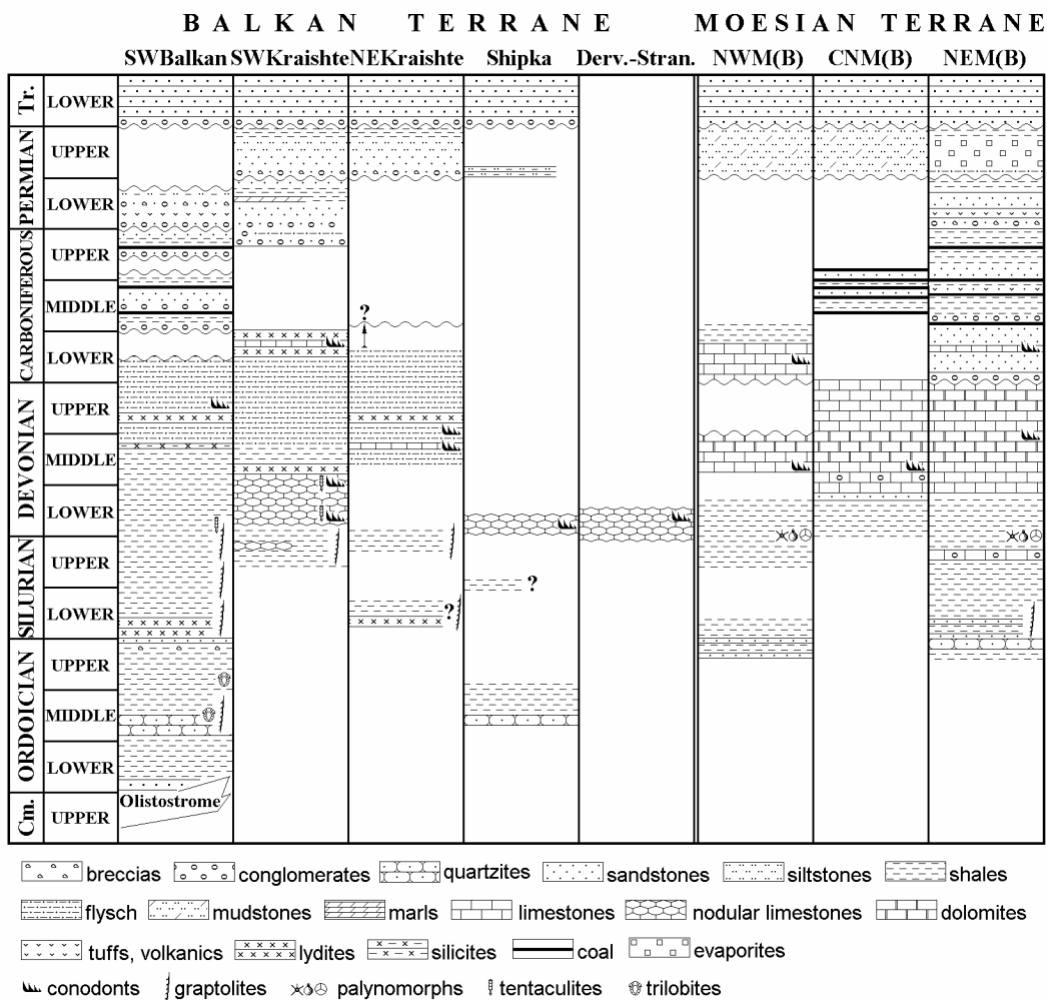


Figure 1. Generalized columnar section of the Meosian and Balkan terranes in Bulgaria.

From Ordovician to Middle Devonian the Istanbul Terrane characterizes a platform-type development above a Pan-African basement. Late Devonian- Early Carboniferous sediments reflect the transition to basin-margin and slope conditions, followed by accommodation of flysch-type deposits during the Visean. The basement and the Ordovician-Early Devonian sediments of the Zonguldak terrane, on the other hand, are very similar to those in Istanbul. However, the Emsian- Early Namurian deposits following an unconformity are mainly shallow-marine and followed by molasse-type coal-bearing sediments until Westfalien D.

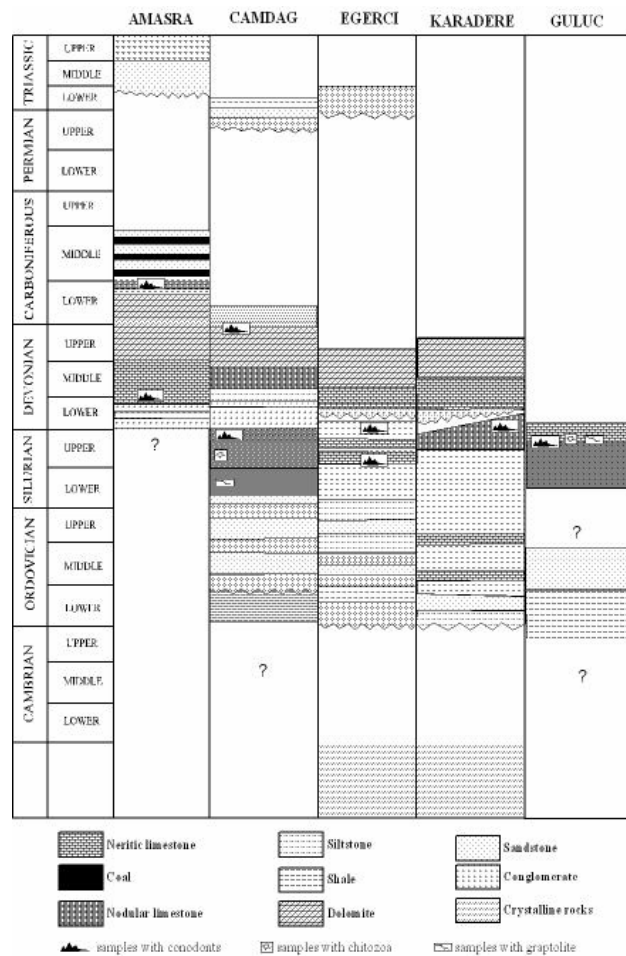


Figure 2. Generalized columnar section of the Istanbul (columns Camdag and Gülüc) and Zonguldak (columns Eregli, Egerci and Karadere) terranes in Turkey

Conclusions

A preliminary approach to the palaeogeographic position of the Turkish terranes suggests that both are of Perigondwanan origin. The Zonguldak Terrane was accreted to the Moesian Terrane during a Late Silurian event, whereas the Istanbul Terrane was located until its Variscan accretion to the Laurussia at the eastern continuation of the Balkan terrane in Bulgaria. The analogy between Balkan and Istanbul Terrane had already been noted by Yanev (1999) who also presented another Avalonian affinity of the Moesian Terrane in the Eastern part of the Balkan Peninsula.

To conclude, the preliminary data suggests an analogy between Istanbul, Balkan, Bohemian and Sakso-Thuringian Terranes (Eastern Armorican group of terranes) and between Zonguldak, Moesian and Rheno-Hercinian Terranes (Avalonian group of terranes).

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