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Evidence for Existence of Strandja Massif along the Intra-Pontide suture zone, between Istanbul and Sakarya Terranes

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We provide stratigraphic and isotopical data from the greenschist metamorphic units along Intra-Pontide Suture Zone, which indicate that one of these units once, was probably a part of Strandja Massif. The study area is located south of Sapanca Lake between the İstanbul and Sakarya terranes in northwest Turkey. These two terranes along with the Strandja Massif make up the Pontides. These three terranes show different geological histories, as reflected in their stratigraphic record, and are juxtaposed along the Intra-Pontide suture. The new U/Pb, Pb/Pb zircon and Rb/Sr mica ages come from south of the Sapanca Lake and Almacık Mountains in northwest Turkey. The İstanbul terrane has a late Proterozoic basement overlain by a sedimentary sequence of Ordovician to Carboniferous age. The Sakarya terrane is characterized by Carboniferous high temperature metamorphism, Paleozoic granitic plutonism, and by the presence of Palaeo-Tethyan subduction-accretion units. The Strandja terrane has a Variscan basement with Carboniferous and Permian granitoids and an epicontinental Triassic to Jurassic sedimentary cover.

South of the Sapanca Lake, three main tectonostratigraphic units have been differentiated. They have steeply dipping tectonic contacts. In the east, an amphibolite-facies metamorphic unit crops out consisting of an intercalation of amphibolite, metaperidotite, metapyroxenite, metagabbro and gneiss representing the Proterozoic basement of the Istanbul Zone. This old basement has a right lateral strike slip contact with a Cretaceous accretionary complex of metabasite, metachert, serpentinite, slate, phyllite sequence metamorphosed in greenschist facies. The third tectonic unit is a metasandstone, slate, phyllite and marble unit metamorphosed in greenschist facies. Our new U-Pb and Pb-Pb single zircon evaporation geochronological data comes from the metasedimentary unit. The age of deposition and metamorphism of this metasedimentary unit were previously not constrained. The U-Pb ages of the clastic zircons from metasandstones are between 264-504 Ma and the Pb-Pb evaporation ages of the clastic zircons are between 283-557 Ma. These new clastic zircon ages from the metasedimentary unit show that deposition of the sandstones must be later than Permian (264$\pm$8,9 Ma). The Rb-Sr muscovite ages from the metasedimentary unit and the accreationary complex give Early Cretaceous(138-111 Ma).

Pre-metamorphic position of the metasedimentary unit is problematic. This unit was interpreted as the equivalent of the Karakaya complex within the Sakarya zone (Robertson and Ustaomer, 2004). We interpret that the metasedimentary unit as a part of Strandja Triassic clastics. The Triassic cover units of the Strandja Massif have a very similar inner stratigraphy, and similar formation (Sunal et al., 2008) and metamorphism ages (e.g.; $\sim$139 Ma of Sunal, 2009). Along with these similarities paleogeographical positions of Istanbul, Sakarya and Strandja Zones during Early Mesozoic interval also plays a crtitical role. Istanbul was the eastern continuation of the Moesian platform before the Late Cretaceous opening of the West Black Sea basin (Okay et al., 1994). Strandja Massif was in the south of the Moesian platform of Balkans. Before the opening of the Black Sea Basin and the formation of the Eocene Balkanide thrust belt; existence of the units of the Strandja Massif along the southern border of the Istanbul Zone is a strong possiblity. Indeed in the regional map view of elongated structure of the metasediments south of Sapanca Lake seems continuing through the Strandja Triassics.

References

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