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First Record of Trans-Foreland Basin Formation Controlled by Slab Tear of Neotethyan Ocean: An Example From Western Anatolia

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The Bornova Flysch Zone (BFZ) is a unique NE-SW trending olistostromal mélange corridor stretching between the Menderes Massif in the southeast and İzmir–Ankara Tethyan suture in the northwest. The BFZ comprises intensely-sheared Late Cretaceous-Paleocene matrix and blocks of various origin. The matrix of the BFZ is made up of flysch type fine-grained clastics and pelagic limestone lenses. The matrix of the BFZ contains dominantly recrystallized limestone as well as ultramafic and radiolarite blocks. There are three basic views in the literature on the formation of BFZ: (1) during the Late Cretaceous-Palaeocene interval, the İzmir-Ankara Zone was formed as a collapsed basin and the flysch type facies was deposited in it, (2) The BFZ rocks were deformed and deposited in a narrow corridor which is controlled by a transform and tear fault together and (3) the BFZ shows a foreland characteristics, due to geochemical characteristics of the mafic volcanic rocks and paleontological findings.

Within the scope of the study, 54 samples were taken from the turbiditic sandstones belonging to the matrix of BFZ in 8 different regions. All samples were examined sedimentologically with point counting method and then were placed in triangular diagrams for provenance analysis. In this direction of the findings obtained, all samples are litarenite and that the source area of the BFZ is characterized by recycled orogenic belt. Samples contain predominantly metamorphic and sedimentary rock fragments and lesser amounts of igneous rock fragments. The metamorphic rock fragments are thought to be derived from metamorphic rocks developed at the base of the ophiolites overthrusting Anatolide-Tauride Block during the closure of Neotethys. The igneous rock fragments were interpreted mostly ophiolites, and a small amount of plutonic rocks in granitoid composition which is probable derived from primarily Anatolid-Tauride Block. In this context, (i) distribution geometry of ophiolitic rocks exposed within the BFZ, (ii) observation of metamorphic fragments in the samples, (iii) the presence of the metasedimentary units as the same facies and geological age which is located southern part of Menderes Massif out of the BFZ, and (iv) existence of İzmir-Balikesir Transfer Zone and its importance for geodynamic evolution recently inferred in the western Anatolia which occurred parallel to the same orientation of BFZ in the Cretaceous period, reveal that the BFZ cannot be evaluated in classical foreland basin concept and it is necessary to propose a new model and terminology for formation of the BFZ and its basin type.

Thus, BFZ is a “trans-foreland basin” (basin type terminology also used here for the first time), which was controlled and shaped by a transform fault and foreland condition together, plus this crustal-scale major bounding transform structure is a geological signature of a first-order slab tear of Neotethyan ocean which is observed in all of current tomographic models in this region.

In this presentation, the findings and the proposed model obtained from this study will be shared and the topic will be opened to scientific discussion.