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# Large scale obduction of preserved oceanic crust: linking the Lesser Caucasus and NE Anatolian ophiolites and implications for the formation of the Lesser Caucasus-Pontides Arc

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During the Mesozoic, the Southern margin of the Eurasian continent was involved in the closure of the Paleotethys and opening Neotethys Ocean. Later, from the Jurassic to the Eocene, subductions, obductions, micro-plate accretions, and finally continent-continent collision occurred between Eurasia and Arabia, and resulted in the closure of Neotethys.

In the Lesser Caucasus and NE Anatolia three main domains are distinguished from South to North: (1) the South Armenian Block (SAB) and the Tauride-Anatolide Platform (TAP), Gondwanian-derived continental terranes; (2) scattered outcrops of ophiolite bodies, coming up against the Sevan-Akera and Ankara-Erzincan suture zones; and (3) the Eurasian plate, represented by the Eastern Pontides margin and the Somkheto-Karabagh Arc. The slivers of ophiolites are preserved non-metamorphic relics of the now disappeared Northern Neotethys oceanic domain overthrusting onto the continental South Armenian Block (SAB) as well as on the Tauride-Anatolide plateform from the north to the south. It is important to point out that the major part of this oceanic lithosphere disappeared by subduction under the Eurasian Margin to the north.

In the Lesser Caucasus, works using geochemical whole-rock analyses, 40Ar/39Ar dating of basalts and gabbro amphiboles and paleontological dating have shown that the obducted oceanic domain originates from a back-arc setting formed throughout Middle Jurassic times. The comprehension of the geodynamic evolution of the Lesser Caucasus supports the presence of two north dipping subduction zones: (1) a subduction under the Eurasian margin and to the south by (2) an intra-oceanic subduction allowing the continental domain to subduct under the oceanic lithosphere, thus leading to ophiolite emplacement.

To the West, the NE Anatolian ophiolites have been intensely studied with the aim to characterize the type of oceanic crust which they originated from. Geochemical analyses have shown similar rock types as in Armenia, Mid Ocean Ridge Basalt (MORB) to volcanic arc rocks and Intra-Plate Basalts (IPB). Lithostratigraphic comparisons have shown that the relations between the three units, well identified in the Lesser Caucasus, are similar to those found in NE Anatolia, including the emplacement of stratigraphically conform and discordant deposits. New field data has also shed light on an outcrop of low-grade metamorphic rocks of volcanic origin overthrusted by the ophiolites towards the south on the northern side of the Erzincan basin, along the North Anatolian Fault (NAF).

We extend our model for the Lesser Caucasus to NE Anatolia and infer that the missing of the volcanic arc formed above the intra-plate subduction may be explained by its dragging under the obducting ophiolite with scaling by faulting and tectonic erosion. In this large scale model the blueschists of Stepanavan, the garnet amphibolites of Amasia and the metamorphic arc complex of Erzincan correspond to this missing volcanic arc.

We propose that the ophiolites of these two zones originate from the same oceanic domain and were emplaced during the same obduction event. This reconstructed ophiolitic nappe represents a preserved non-metamorphic oceanic domain over-thrusting up to 200km of continental domain along more than 500km. Distal outcrops of this exceptional object were preserved from latter collision which was concentrated along the suture zones.