



Terrane accretion in the internal Hellenides

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The Hellenides constitute part of the Alpine orogenic belt connecting the Balkanides in SE Europe with the Taurides and Pontides in Asia Minor. Traditionally, the Hellenides have been subdivided into arcuate, orogen-parallel tectonic zones, a subdivision that was largely based on lithotectonic differences. We herewith present a revision of this view in the light of new geochemical and precise geochronological data. We show that the Hellenides – in contrast to large parts of the Alpine orogen – did not form by continent-continent collision but rather by accretion of suture-bound terranes such as arcs and microcontinents. These terranes are briefly discussed below in order of decreasing crust-formation ages.

The oldest rocks of the Hellenides are ca. 700 Ma old and constitute the Florina terrane which occurs exclusively within the Pelagonian Zone (PZ); the latter is bordered by two major oceanic suture zones, the Vardar Zone (VZ) to the east and the Pindos Zone (PiZ) to the west. The Pelagonian Zone probably formed a kind of continental nucleus that was accreted to the S European margin during Late Carboniferous times ca. 300 Ma ago. The second oldest terrane is the Pírgadikia terrane, a small tectonic inlier, ca. 550-590 Ma old, occurring at the common border between the VZ and the Athos-Volvi Suture (AVS). The Vertiskos terrane, a ca. 425-445 Ma old terrane forming the major part of the Serbo-Macedonian Massif occurs just N of the Pírgadikia terrane and is also bordered by the VZ and the AVS.

The ca. 300 Ma igneous event documents a widespread active continental-margin evolution in the basement of the Hellenides. It is now known from both the PZ and the Attic-Cycladic zone, which, together form the spine of the Hellenides, as well as from the Thracia terrane, which forms the lower part of the Rhodope Massif in NE Greece and SE Bulgaria. We suggest that these zones/massifs were once contiguous at the S

margin of Europe and were later separated to give birth to the various branches of the Tethyan oceanic system such as the Triassic AVZ and the Jurassic VZ.

During the middle/late Jurassic, ca. 150-160 Ma ago, several arc terranes became accreted such as the Rhodope terrane, the upper part of the Rhodope massif including the Kerdillion, upon closure of the Nestos suture. Another terrane is the Thessaloniki/Chortiatis arc which formed during the subduction of the Vardar ocean. The processes of terrane accretion in the internal Hellenides came to an end by the end of the Jurassic. Ocean closure along the southern margin of the Moesian platform in the NE and subduction along the Hellenic arc and related back-arc extension in the S only modified the crust formed by the former accretion orogenies.