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Evidence for Palaeotethyan origin of a part of the Mersin Mélange (southern Turkey)

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Turkey is made of several continental and oceanic fragments, which were assembled during the Late Cretaceous-Early Tertiary period as a consequence of the closure of different Tethyan oceanic basins. The first assembly of terranes was realized during the Variscan orogeny with an amalgamation of Gondwana and Laurasia derived elements. This was repeated during the Eo-Cimmerian orogenic event in the Late Triassic, during the final closing of the Palaeotethys Ocean. Palaeotethyan remnants are found in different areas in Turkey. The Palaeozoic detritic sequences in the Karaburun Peninsula consist in a thick wildflysch containing blocks of pelagic cherts and shallow water limestones ranging from Early Silurian to Tournaisian. These series are interpreted as a remnant of the Palaeotethys fore-arc basin. In the Konya area, the Palaeozoic sequences can be seen as the passive, then active margin of Palaeotethys. Northwards subduction of the latter induced the development of arc and fore-arc series. In the Lycian Nappes, both an Upper Carboniferous seamount and a Lower Carboniferous wildflysch sealed by Lower Permian sediments are likely to be a lateral equivalent of the Karaburun series. The Nohutluk Formation of the Aladağ Mountains exhibits Lower Carboniferous radiolarian-rich cherty limestones overlain by Visean to Bashkirian shallow water limestones, both sealed by Upper Permian shallow water limestones.

Supported by numerous biostratigraphic data (ammonoids, conodonts, fusulinids, ostracods, radiolarians), the Mersin Mélange has been subdivided into two major units: the Upper Cretaceous Sorgun Ophiolitic Mélange and the Ladinian-Carnian Hacialanı Mélange. Biostratigraphic data have shown that a part of the Mersin Mélange belongs to the Huğlu-type development, other parts correspond to sequences of the Antalya Nappes (both originating in the Pindos-Huğlu Ocean located north of the

Turkish blocks) and some units have a southern Neotethyan *s.str.* origin. In the Hacialanı Mélange, isolated blocks and coherent series present particular development during the Late Carboniferous and the Early Permian which shows good evidences for a Palaeotethyan origin. One isolated block yielded pelagic conodonts including different gondolellids of Kasimovian age (Upper Pennsylvanian). In the western and central Tethys, pelagic conodonts of this age are only known from the Palaeotethys and the Paphlagonian Ocean. The latter ocean is situated north of the Palaeotethys, too far in the North to be a source area for the blocks in the Mersin Mélange. Therefore, the pelagic Kasimovian conodonts are an excellent evidence for a derivation from the Palaeotethys. These sediments originated either from the margin of Palaeotethys or from the slope of seamounts within the Palaeotethys as in the Lycian Nappes. Then, a sequence interpreted as slope deposits recycles Asselian and Sakmarian neritic and slope-type limestones made of an association of ammonoids, crinoids, shelly fossils, and fusulinids of Sakmarian age. The upper part of the sequence is a bioclastic packstone rich in Lower Asselian foraminifers and conodonts. Asselian slope deposits are not known from the western Neotethys. Thus, this development indicates a derivation from one of the passive margin of the Palaeotethys. Finally, broken formations and isolated blocks containing radiolarites with ages ranging from Kungurian to Capitanian are found. At places, these Kungurian radiolarites overlay tuffites. Kungurian radiolarites are unknown from the western Neotethys, where the oldest radiolarites have a (Late) Wordian age. Kungurian radiolarites and pelagic limestones on tuffs and volcanics are common in the Palaeotethys sequences of Iran.

In conclusion, a Palaeotethyan origin of the Hacialanı Mélange *pro parte* is demonstrated. The Ladinian-Carnian Hacialanı Mélange may be regarded as an accretionary complex/mélange which was later, long after the closure of the Palaeotethys transported in its present position and during this transport a few younger blocks were amalgamated. Because of their Triassic opening, the Palaeotethyan back-arc basins of Turkey can be excluded as source. Palaeotethyan fore-arc basins of Turkey should be also excluded as a source area for the pelagic Kungurian rocks and volcanics, because they are either older (Late Devonian to Mississippian in Karaburun and Konya area) or younger (Late Permian to Triassic Karakaya Basin). Nevertheless, a fore-arc origin for the Mersin deposits cannot be denied.