



## **Provenance of Permo-Triassic clastic sediments from Chios Island, Greece, using detrital zircon ages**

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The island of Chios in the eastern Aegean region is a key area for understanding the closure of the Palaeotethys Ocean in space and time (e.g. Stampfli et al. 2003) because it is one of the rare localities where very low-grade to virtually non-metamorphosed fossiliferous Palaeozoic to Mesozoic sequences are preserved (e.g. Besenecker et al. 1968). In a simplified view, Chios Island can be subdivided into a Lower Unit and a tectonically overlying Upper Unit. The Lower Unit is commonly assumed to consist of Early Carboniferous clastic sediments (e.g. Groves et al. 2003) containing olistoliths of limestones, radiolarites and volcanic rocks, overlain by Permo-Triassic clastic sediments and Triassic to Early Jurassic, mainly carbonatic, sequences. The Upper Unit predominantly comprises a Permian clastic carbonatic succession and Early Jurassic limestones.

This study is focused on the Permo-Triassic clastic sediments from the Lower Unit. Their provenance is unknown and their precise stratigraphic age is still uncertain. We have therefore investigated the age spectra of detrital zircons, which is a powerful tool to glean information regarding ancient source areas and major magmatic events. The zircons can also provide constraints on the age of deposition. Keeping in mind the effects of polyphase recycling, detrital zircon ages can contribute to a better understanding of plate-tectonic and palaeogeographic reconstructions in the Eastern Mediterranean region.

We present here, for the first time, ion-microprobe U–Pb ages (SHRIMP II) of detrital

zircons extracted from a Permo-Triassic sandstone from the Lower Unit of Chios Island. The detrital zircons gave a range of ages from ca. 2145–326 Ma with prominent clusters around 2000, 990, 615, and 370 Ma, and a gap between 1870–1100 Ma.

The ages around 2 Ga correspond to an Eburnian magmatic event and taken together with the observed gap between 1870–1100 Ma imply a West African provenance. The ages around 1 Ga are evidence for a Grenvillian crustal source, whereas the ages at ca. 563–675 Ma suggest a Pan-African basement input. The Devonian zircon ages can be ascribed to the Sakarya Continent in western Turkey. The youngest zircon of ca. 326 Ma could be related to Carboniferous magmatism due to subduction of a branch of the Palaeotethys Ocean.

We conclude that the Permo-Triassic clastic sediments of the Lower Unit of Chios Island had a heterogeneous northern Gondwana- (West Africa) derived source with Grenvillian and Pan-African inputs, as well as Devonian and Early Carboniferous contributions. We propose that the basement of the Sakarya Continent of Turkey was probably one of the source terranes supplying detritus to the clastic sequences of Chios Island, close to the southern active margin of Eurasia in late Palaeozoic time.

#### References:

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Groves, J.R. et al. (2003). *Geobios*, 36, p. 379-389.

Stampfli, G.M. et al. (2003). *Bolletino della Società Geologica Italiana*, 2, p. 1-23.