Geophysical Research Abstracts
Vol. 18, EGU2016-877-1, 2016
EGU General Assembly 2016

The Evolution of the Tethysides during the Medial to Late Triassic

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The Triassic is a time of widespread rifting within the future Alpides of the circum-Mediterranean countries. However, this rifting had little to do with the later, Sinemurian-Hettangian rifting that penetrated the Tethyan realm from the Atlantic Ocean. The eastern part of the rifting occurred south of the Palaeo-Tethys and seems to have been related to stretching above its extensional arc. Evidence for his stretching is seen in the Karakaya-Pelagonian-Pindos- Meliata-Hallstatt zones and the Eastern Mediterranean. The Eastern Mediterranean is separated from the other extensional zones by a Mikrasian continental fragment that had begun separating from Gondwana-Land already during the Permian. The rifting propagated eastward along the Carpathians (Transylvanian Nappes) and the Eastern and the Southern Alps from where it entered the future Provençal chains and finally the Pyrenees where evaporites were laid down in extensional basins. In the south, an area of rifting went from the Eastern Mediterranean into the High Atlas thus delimiting an Iberapulian continental fragment. The Iberapulian fragment became divided into an Iberian and an Apulian parts later during the Hettangian-Sinemurian rifting that also invaded the earlier extensional areas in the Atlas.

The extension directions during the medial and late Triassic are controlled by the tectonics of the eastern end of the Palaeo-Tethys. Along its northern margin, i.e. along the Scythides, right-lateral motion dominated. Along the northern margin of the Mikrasian fragment subduction was nearly head-on (slightly oblique so as to impose a slight right-lateral motion along the arc), but the stretching along the Karakaya rift zones was probably orthogonal because of the similarly orthogonal stretching in the Eastern Mediterrarean. The kinematics is dependent on what sort of motion is imposed onto the Palaeo-Tethyan plate (s) along its (their) northern margin and the direction of stretching in the Eastern Mediterranean. The rifting in areas farther west may have been a consequence of the origin of secondary shear structures along the Mikrasian and Iberapulian fragments. The Italian rifts, such as the Lagonegro and the Sclafani seem to have resulted from a similar process. Plate kinematics, as reconstructed, imposes a slight right-lateral motion onto the East Alpine/Southern Alpine areas.

It is remarkable how independent the later Jurassic rifting seems to have been. It avoided in many places the former regions of stretching and opened new avenues of rifting for itself. One wonders whether the lithosphere in the older areas of rifting had recovered sufficiently to pose a hindernis to fracturing or whether the newer rifting followed older, Hercynian zones of deformation. For the time being we favour the second alternative as the time between the Triassic rifting and the Jurassic rifting seems insufficient to allow the lithosphere to recover to build sufficient strength.