



Subduction initiation in the Neo-Tethys during the Jurassic

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Jurassic subduction initiation in the Neo-Tethys Ocean eventually led to the collision of the Adria-Africa and Eurasia continents and the formation of a ~6000 km-long Alpine orogen spanning from Iberia to Iran. Reconstructing the location and geometry of the plate boundaries of the now disappeared Neo-Tethys during the initial moments of its closure is instrumental to perform more realistic plate reconstructions of this region, of now-closed ocean basins in general, and on the process of subduction initiation. Neo-Tethyan relics are preserved in an ophiolite belt distributed above the Dinaric-Hellenic fold-thrust belt. Here we provide the first quantitative constraints on the geometry of the spreading ridges and trenches active in the Jurassic Neo-Tethys using a paleomagnetically-based net tectonic rotation analysis of sheeted dykes and dykes from the West and East Vardar Ophiolites of Serbia (Maljen, Ibar) and Greece (Othris, Pindos, Vourinos, Guevgueli). Based on our results and existing geological evidence, we show that initial Middle Jurassic (~175 Ma) closure of the western Neo-Tethys was accommodated at a N-S-trending, west-dipping subduction zone initiated near and parallel to the spreading ridge. The West Vardar Ophiolites formed in the fore-arc parallel to this new trench. Simultaneously, the East Vardar Ophiolites formed above a second N-S to NW-SE trending subduction zone located close to the European passive margin. We tentatively propose that this second subduction zone had been active since at least the Middle Triassic, simultaneously accommodating the closure of the Paleo-Tethys and the back-arc opening of Neo-Tethys.