

# Middle-Late Jurassic ophiolite obduction and formation of sedimentary mélanges in the Western Tethys Realm

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Component analyses of ancient Neo-Tethys mélanges along the Eastern Mediterranean mountain ranges allow both, a facies reconstruction of the Middle Triassic to Middle Jurassic outer passive margin of the Neo-Tethys and conclusions on the processes and timing of the Jurassic orogenesis. This Middle-Late Jurassic mountain building process in the Western Tethyan realm was triggered by west- to northwestward-directed ophiolite obduction onto the former passive continental margin (wider Adria) of the Neo-Tethys.

Ophiolite obduction onto the former passive continental margin started in the Bajocian and trench-like deep-water basins formed in sequence within the northwest-/westward propagating nappe fronts in the footwall of the obducting ophiolites, i.e. in lower plate position. Deposition in these basins was characterized by coarsening-upward cycles, i.e. forming sedimentary mélanges as synorogenic sediments, in cases tectonically overprinted. In the Middle Jurassic, the oceanic realm and the most distal parts of the former passive margin were incorporated into the nappe stacking. Bajocian-Callovian ophiolitic and Meliata mélanges were formed as most oceanward preserved relics of trench-like basins in front of the propagating ophiolitic nappe stack, often with incorporated components from the continental slope (Meliata facies zone). In the course of ongoing ophiolite obduction, thrusting progressed to the outer shelf region (Hallstatt Limestone facies zone). In Bathonian/Callovian to Early Oxfordian times the Hallstatt nappes

with the Hallstatt mélanges were established, expressed by the formation of the up to 900 m thick basin fills comprising its material mainly from the outer shelf region. In Callovian to Middle Oxfordian times the nappe stack reached the former carbonate-platform-influenced outer shelf region and the reef rim. Newly formed basins received material from this shelf region, occasionally mixed with material from the approaching ophiolite nappes. Ongoing shortening led to the formation of the proximal Hallstatt nappes with concomitant mobilisation of Hallstatt Mélanges. Persistent tectonic convergence caused the partial detachment and northwest- to west-directed transport of the older basin groups and nappes originally formed in a more oceanward position onto the foreland.

Comparison of mélanges identical in age and component spectrum in different mountain belts (Eastern Alps/Western Carpathians/Dinarides/Albanides/Pelso) suggest one Neo-Tethys Ocean in the Western Tethyan realm, instead of multi-ocean and multi-continent scenarios. The evolution of several independent Triassic-Jurassic oceans is unlikely considering the fact that re-sedimentation into newly formed trench-like basins in front of a west- to northwestward propagating nappe stack including ophiolite obduction is nearly contemporaneous along the Neotethyan Belt. The Middle to Late Jurassic basin evolutions with their sedimentary cycles and component spectra are comparable everywhere.