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Eastern Mediterranean ophiolites: the perspective of the history of enclosing basins

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Complete understanding of ophiolites requires integration of petrologic/geochemical data on them with the regional history, particularly of the basins in which they formed. The Eastern Mediterranean ophiolite belts formed in several distinct Neothethyan seaways that originated in Early Mesozoic times when several micro- and major continents were rifted apart and began to separate. The ophiolites formed when the basins were 60 and 100 Ma old. The petrological features show strong affinity with rocks formed near new subduction zones in the western Pacific, but differs in many respects from mid-ocean ridges. Commonly the ophiolites along entire individual belts, sometimes $>$1000 km long, formed within $\leq$10 Ma, signifying "ophiolite events" which occurred close to periods of changes in plate motions and beginning of significant reduction of the host basins. These features are interpreted as indicting that the ophiolite complexes formed following initiation (perhaps also modification) of new subduction zones in response to changes of plate motions, when spreading centers formed in back-arc/supra-subduction zone settings as a result of the retreat of the descending slabs. Continuing slab retreat then eliminated the oceanic areas that originally existed between the sites of ophiolite origin and the continental margins on which they were eventually obducted. On the other hand, it is more difficult to reconcile the ophiolite properties with development along mid-ocean ridges that were spreading at uniform rates throughout the previous history of the enclosing basin, unless the spread rates were much slower than along great majority of active ridges. Even in this case, conversion of ridges to subduction zones during the ophiolite events needs to be postulated.

While this scenario is simple from the plate kinematic point for view, its dynamic aspects need further study. The formation of several ophiolite belts in different seaways raises the question as to how the history of motions of the plates carrying the major continents – Africa-Arabia and Eurasia in this case – is related to the motions of the

micro-continents located between them, and how is the shrinking of the different seaways related to the motions of the major plates. What forces drive the micro-plates and produce new subduction zones in the intervening seaways? Subducting slabs are expected to retreat, but in our case this is not simply related to the model of fixed hot spots. It can probably be reconciled with a mantle flow system beneath the shrinking area between the converging major plates which is specific to this area.