

Mediterranean and Tethys

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Abstract: The main phases of the kinematic evolution of the Mediterranean area from Triassic to Recent times are outlined.

Résumé: Les grandes étapes de l'évolution cinématique de la région de la Méditerranée sont retracées depuis le Trias.

"Tethys" and "Mediterranean" are marine systems at the Eurasia-Africa and Eurasia-India plate boundaries. These boundaries had a dynamic history from the Triassic on and the boundary seas can only be understood in the light of this history, which may be viewed from the vantage-point of a number of guiding concepts. These are (1) a pre-Jurassic assembly of the continental masses into a Pangaea as proposed e.g. by Dietz and Holden (1970) and modified for the Atlantic by Dewey et al. (1973); (2) an opening history for the Atlantic as proposed by Pitman and Talwani (1972) and modified by Dewey et al. (1973); (3) a distribution of oceanic and continental margin belts in the Mesozoic boundary zone as suggested by surface geology, i.e. a central oceanic domain flanked by continental margins of the Atlantic type; (4) consumption of the Mesozoic ocean and a large part of its margins by Cretaceous-Tertiary orogeny as plate boundaries become compressive, and foundering of the mountain system in a series of successor basins due to new lithospheric instabilities in connection with subduction. It is proposed to call the pre-Mesozoic embayment of Panthalassa that reached as far west as Sicily the "Paleotethys", whereas the term "Tethys" should be reserved for the marine systems associated with Mesozoic rifting, and the term "Mediterranean" for those Tertiary boundary seas dominated by successor basins.

In the Triassic early rifting was associated with widespread volcanism and marine incursions as far west as the Betic Cordillera. Also pelagic domains were established as far west as Sicily though it is doubtful that their basement had been oceanic. In the Jurassic major rifting began in the Central Atlantic, and dominated in the Tethyan domain as far east as the Balkan triple point where independent rifting in the Paleotethys domain began to dictate plate-tectonic development. This rifting in places was discordant with respect to Triassic paleotectonics. Oceanic areas of Tethys today are recognized in the relics of intricately contorted ophiolite nappes which are flanked by nappes derived from Atlantic type continental margins

on both sides. The southern continental margin in particular was characterized by extensive Bahamas-like carbonate platforms large portions of which subsided into sub-photic depths with pelagic sedimentation at one time or another. There is a possibility that the eastern Mediterranean is a relic branch of Tethys.

With the opening of the North Atlantic in the Late Cretaceous the Tethyan scenery was subject to radical change. The sinistral and dilational movements of the Jurassic and Early Cretaceous were substituted by dextral and compressional ones, and the former oceanic areas were consumed in orogeny. At the same time, successor basins began to founder discordantly on the orogenic belt, and have continued to do so up to Recent times, with some of the earlier ones being destroyed by subsequent compression. The rapid change in configuration of these successor basins eventually lead to repeated separation from the open oceans which precipitated the Messinian salinity crises. These were a cluster of pan-Mediterranean events which affected a number of basins of different origin and depth.

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