



Closure of the eastern Tethys: An ocean modeling perspective on the carbon isotopic sediment record during the middle Miocene

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The middle Miocene climate transition at about 14 Ma BP is a major cooling event in Cenozoic climate history and coincides with the tectonic closure of the Tethys. This seaway may have played an important role in the heat budget of the Indian Ocean during the Miocene, and in this way the closure of the Tethys may have catalyzed Antarctic glaciation. Here, we show results of an ocean modeling study in which we investigate the role of a channel mimicking the eastern Tethys on water mass formation and marine biogeochemical cycles. We employ a global ocean carbon cycle circulation model (COSMOS-OB) in a grid setup focussing on the realm of the Mediterranean and the Indian ocean, which allows to study regional processes with enhanced resolution. Our sensitivity study indicates that the eastern Tethys may have been a source of warm and saline water spreading into the Indian Ocean, which is in line with paleoceanographic speculations. Moreover, our results suggest that the marine carbon isotope sediment record of the Miocene should exhibit strong gradients between the Atlantic and the Indian Ocean vanishing with the tectonic disconnection of both oceans.