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India-Arabia plate boundary evolution since the Jurassic from marine geophysical, geological and seismic tomographic constraints

Gaina CARMEN¹, van Hinsbergen DOUWE^{2*}, Spakman WIM²

1 University of Oslo

2 University of Utrecht, the Netherlands

As part of the gradual Gondwana dispersion that started in the Jurassic, the Indian tectonic block was rifted away from the Antarctica-Australian margins, probably in the Early-Mid Cretaceous and started its long journey to the north until it collided with Eurasia in the Tertiary. In this contribution first we will revise geophysical and geological evidences for the formation of oceanic crust between India and Antarctica, India and Madagascar, and India and Somali/Arabian margins. This information and possible oceanic basin age interpretation are placed into regional kinematic models. Three important compressional events NW and W of the Indian plate are the result of the opening of the Enderby Basin from 132 to 124 Ma, the first phase of seafloor spreading in the Mascarene basin approximately from ~90 to 80 Ma, and the incipient

opening of the Arabian Sea and the Seychelles microplate formation around 65 to 60 Ma. Based on retrodeformation of the Afghan-Pakistan part of the India-Asia collision zone and the eastern Oman margin, the ages of regional ophiolite emplacement and crystallization of its oceanic crust, as well as the plate tectonic setting of these ophiolites inferred from its geochemistry, we evaluate possible scenarios for the formation of intra-oceanic subduction zones and their evolution until ophiolite emplacement time. Our kinematic scenarios are constructed for several regional models and are discussed in the light of global tomographic models that may image some of the subducted Cretaceous oceanic lithosphere.

* Corresponding author. E-mail: d.j.j.vanhinsbergen@uu.nl