

## An Evaluation of Recent Plate Reconstruction Models in the Indian Ocean

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From the 1970s to today, various plate tectonic reconstruction models have been proposed to explain geologic observations in the Indian Ocean. Despite the abundance of proposed models, significant debate still exists concerning the processes and timing of the events that eventually created the Indian Ocean as we know it today. Initial formation of the Indian Ocean began with the rifting of East Gondwana (India, East Antarctica, Madagascar, Sri Lanka, and the Seychelles) away from W. Africa during the Jurassic. The evolution of the region following this initial breakup can be inferred by deciphering the history of seafloor spreading preserved in the oceanic crust. Using satellite gravity data we are able to create detailed maps of ocean bottom topographic features including transform faults and possible abandoned spreading centers. Because transform faults form perpendicular to spreading ridges they provide a fairly accurate method for estimating divergent plate motion. The timing of seafloor spreading can be estimated through analysis of marine magnetic anomaly data available in the literature and NSF-sponsored global datasets. Using bathymetric and magnetic anomaly data to model the growth history of the Indian Ocean is complicated by an abundance of volcanic activity, multiple rift events, and at least one major seafloor spreading reorganization event. Using GPLates and software developed by UTIG's PLATES group, we have created a plate reconstruction model following a holistic approach that incorporates available paleomagnetic, gravity, and geochronologic data, while adequately addressing observed geologic features of the region. We have also investigated the plausibility of recent published Indian Ocean reconstruction models which propose that ridge jumps may explain some of the anomalous magnetic observations.

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