

The Tectonic Origin of the Bay of Bengal and Bangladesh

Manik Talwani (1), Maria Desa (2), Mohammad Ismaiel (3), and Kolluru Krishna (4)

(1) Department of Earth Science, Rice University, Houston, Texas 77251-1892, USA (manik@rice.edu), (2) Geological Oceanography, CSIR-National Institute of Oceanography, Dona Paula, Goa - 403004 India (mdesa@nio.org), (3) Academy of Scientific and Innovative Research, CSIR-National Institute of Oceanography, Dona Paula, Goa - 403004, India (ism07physics@gmail.com) , (4) Geological Oceanography, CSIR-National Institute of Oceanography, Dona Paula, Goa - 403004 India (krishna@nio.org)

We are able to unambiguously decipher the tectonic origin of the Bay of Bengal, a puzzle which has not been satisfactorily solved in the past and are also able to shed new light on the buried 85°E Ridge. We do so by incorporating a number of disparate items into a unified solution. These items are the marine magnetic anomalies in the Western Basin of the Bay of Bengal, the Rajmahal and Sylhet traps and Deep Seismic Sounding lines in India, a prominent magnetic anomaly doublet and seismic Seaward Dipping Reflectors in Bangladesh, and a new precise gravity map of the Bay of Bengal. The 85°E Ridge divides the Bay of Bengal into a Western and an Eastern basin. We identify seafloor spreading magnetic anomalies ranging in age from 132 Ma (M10n) to 124 Ma (M2) in the Western Basin. These anomalies are “one sided”, the conjugate anomalies lie in the Enderby Basin, off East Antarctica. The direction of spreading was approximately NW-SE, and the rate of spreading ranged from 4.2 to 3.0 cm/yr. With the arrival of the Kerguelen plume at around 118 Ma, sea floor spreading was reorganized and a new spreading axis opened at or close to the line joining the Rajmahal and Sylhet traps. The prominent magnetic anomaly doublet connecting the Rajmahal and Sylhet traps indicates that these traps are not individual eruptions, but rather, together, define the new line of opening. Spreading started at this line in a N-S direction as India moved northwards. The new oceanic crust, thus generated, underlies the Bangladesh and the Eastern Basin of the Bay of Bengal, and is younger than 118 Ma. The western boundary of the new ocean floor is a transform boundary which was generated by the spreading axis jump. In part, it lies along the 85°E Ridge. A unique feature of the northern boundary of the new oceanic crust is that it lies on the continent, as opposed to all other ocean continent crustal boundaries in the world, which lie offshore.