



Revised model of the East Gondwana Break-up and formation of the Gateway between India and Antarctica

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The history of break-up and sea-floor spreading between India and Antarctica long remained vague mainly because of the data scarcity off both continents. Geophysical studies carried out recently in the Enderby Basin (Southern Indian Ocean) provided new information and advanced our knowledge on this problem. Magnetic surveys discovered there a prominent linear high-amplitude bipolar magnetic anomaly (HBMA), which stretched more than 1000 km westward from the southern Kerguelen Plateau. This anomaly was interpreted by many as the contact between stretched continental crust and oceanic crust. Gaina et al. (1987) suggested the existence of an abandoned spreading centre in the eastern Enderby Basin and inferred that the Elan Bank (established as a microcontinent) was isolated from the India margin by a ridge jump at about M0 chron (c. 120 Ma). South of an abandoned spreading centre, they identified a series of magnetic anomalies from M2 to M9. New magnetic data collected in the western Enderby Basin and revision of all available geophysical data gives a new notion on the geodynamics of the East Gondwana break-up and separation of India from Antarctica. According to a new model, the HBMA corresponds to M34o chron and its increased intensity can be explained by the emplacement of the Kerguelen Hotspot and thickening of the oceanic (magmatic) crust at that time. A relationship between hot-spots and appearance of high-amplitude magnetic anomalies is observed elsewhere in the World Ocean. In our model, the continent-ocean boundary is located about 150 km landward of the HBMA, and anomalies from M4 to M0 are identified between these features. The ridge jump (which isolated the Elan Bank) occurred about 110 Ma ago when the Kerguelen Hotspot moved toward the India margin. This model is consistent with the interpretation of sea-floor spreading history off Western Australia. An earlier (around 120 Ma) ridge jump probably occurred in the area of the southern Kerguelen Plateau, which was thought to be underlain by continental crust. This work was conducted under the RSF grant (Project No 16-17-10139).