

The opening of the Indian Ocean: what is the consequence on the formation of the East African, Madagascar and Antarctic margins, and what are the origins of the aseismic ridges?

Joseph Thompson (1), Maryline Moulin (2), Daniel Aslanian (3), François Guillocheau (4), and Philippe de Clarens (5)

(1) IFREMER, Geoscience, Plouzane, France (joseph.offei.thompson@ifremer.fr), (2) Institut Français de Research pour l'Exploration de la Mer (IFREMER), Laboratoire de Géodynamique et enregistrement Sédimentaires (LGS), Plouzane, France. (Maryline.Moulin@ifremer.fr), (3) Institut Français de Research pour l'Exploration de la Mer (IFREMER), Laboratoire de Géodynamique et enregistrement Sédimentaires (LGS), Plouzane, France. (Maryline.Moulin@ifremer.fr), (4) Department of Geoscience, Université de Rennes 1/CNRS (UMR 6118), Rennes, France., (5) Total Petroleum, Pau, France.

Palinspatic reconstructions of the Indian Ocean presents lots of challenges and problems, occasioned mostly as a result of a number of unanswered scientific questions in the ocean due to inadequate data, and in some cases lack of consensus on the interpretation of available data; resulting in kinematic reconstruction model proposals which are inconsistent and incoherent with current data interpretations and independently modeled motions of neighboring plates. Such models are largely characterized by gaps and overlaps in the full-fit reconstruction. Although, there is published significant scientific knowledge and data that confirms Gondwana and the Wilson cycle, a crucial scientific question that still remain unanswered is: what was the true geometry of Gondwana and how has its plates evolved through time? This is a very crucial question which is very critical in deciphering how we position the plates relative to each other. Although there has been a number of attempts to answer this question over several decades, answers so far provided differ widely, and currently there is no consensus on the true answer.

We present here a new initial fit of East Gondwana within the framework of the Passive Margin Exploration Laboratories (PAMELA) project, through the adoption of a multifaceted approach by analysis and interpretation of onshore and offshore geophysical (Seismic, gravity, magnetic, and bathymetry) and geological (Stratigraphic, geochemical and geochronological data from the plate basement and the Karoo volcanics and sediments) data, to have a better understanding of the history of all the events and processes, and to present a global picture by comparing with events in neighboring oceans.

The PhD thesis of Joseph Offei Thompson is co-funded by TOTAL and IFREMER as part of the PAMELA (Passive Margin Exploration Laboratories) scientific project