Mesozoic kinematic evolution of the Central Atlantic

C. Labails[1,2], J.-L. Olivet[2], D. Aslanian[2], B. Sichler[2], W. Roest[2], M. Evain[2], and P. Unternehr[3]
[1] NGU, Norway
[2] Ifremer, France
[3] Total France

The magnetic anomaly signature of Central Atlantic margins is well defined by the gridded data published by Verhoef et al. (1996) on the North American region. However, a gridded dataset for the West African margin (South of the Canary Islands) was lacking. We have used magnetic data from the Geodas database, an Ifremer dataset and personal communication from H. A. Roeser and W.J.M. Van der Linden in order to produce a gridded magnetic data of the Dakhla margin and to better constrain the kinematics of Central Atlantic early opening.

Our model adopts the breakup timing of 195 Ma as proposed by Sahabi et al. (2004) - 20 myr earlier than what was generally proposed in previous models. According to our interpretation of the newly compiled magnetic data, the early opening of Central Atlantic was characterized by three distinct phases. In contrast to other models, we propose that for the first 30 myr (195-165 Ma, Lias-Dogger) the oceanic accretion was extremely slow (~0.8 cm/y). At the Blake Spur time, (around 165 Ma, Callovian basis), a drastic change occurred, both in the relative plate motions (initially NNW-SSE, it becomes NO-SE) and spreading rate (that increases up to ~ 4.8 cm/y). The BSMA (Blake Spur Magnetic Anomaly) is related to a great basement topographic change. From magnetic chron M22 (150 Ma, Tithonian basis) onwards, the spreading rate slowed down to about 2.6 cm/y and remained constant until magnetic chron M0 (125 Ma, Barremian-Aptian limit).

Keywords: Mersozoic; Kinematic; Central Atlantic; Lias-Dogger