Paleogeographic Maps of the Central and North Atlantic Oceans*

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Search and Discovery Article #30196 (2011)
Posted October 3, 2011

*Adapted from poster presentation at 3P Arctic - The Polar Petroleum Potential Conference & Exhibition, Halifax, Nova Scotia, Canada, August 30-September 2, 2011, hosted and organized by AAPG and Allworld Exhibition

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Abstract

The kinematics of the Central and North Atlantic between the North America (NA), the Africa (AF), the Meseta (MES), and the Iberia (IB) plates have been established from Late Triassic to Late Cretaceous. The relative motions of NA, AF, and MES are constrained using the Labails et al. (2010) parameters of rotations. We have established new IB/NA parameters of rotations for the Late Triassic-Middle Cretaceous period and introduced the relative motions of the Flemish Cap (FC) and the Galicia Bank (GB) plates in between. Seven palaeogeographic maps, as listed below for various geological periods, with structural elements and magnetic lineations are presented:

1) Late Triassic - Pre-rift configuration (Norian/Rhaetian limit, about 203 Ma)
   Paleogeography of Early Jurassic (Sinemurian-Toarcian)
2) Early Jurassic - end of rifting (after CAMP and salt deposition) (ECMA, Sinemurian/Pliensbachian limit, 190 Ma);
   Paleogeography of Middle Jurassic (Bajocian-Bathonian)
3) Middle Jurassic (BSMA, Middle Bajocian, 170 Ma); Paleogeography of Middle Jurassic (Bajocian-Bathonian)
4) Late Jurassic (M22, Tithonian, 150 Ma); Paleogeography of Late Jurassic (Oxfordian-Portlandian)
5) Early Cretaceous (M11, Valanginian, 136 Ma); Paleogeography of Early Cretaceous (Berriasian-Barremian)
6) Middle Cretaceous (M0, Late Barremian/Early Aptian, 125 Ma); Paleogeography of Middle Cretaceous (Aptian-Albian)
7) Late Cretaceous (C34, Santonian, 83.5 Ma); Paleogeography of Late Cretaceous (Cenomanian-Danian)

In addition, we will present the maps of salt distributions at the Sinemurian/Pliensbachian limit (190 Ma) (after salt deposition) and in middle Bajocian (170 Ma). Paleo-oceanographic informations are mainly from Gradstein et al. (1990), while the salt structure and distribution is a compilation of numerous studies.
References


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Abstract: The kinematics of the Central and North Atlantic between the North America (NA), the Africa (AF), the Meseta (MES) and the Iberia (IB) plates have been established from Late Triassic to Late Cretaceous. The relative motions of NA, AF and MES are constrained using the Labails et al. (2010) parameters of rotations. We have established new IB/NA parameters of rotations for the Late Triassic-Middle Cretaceous period and introduced the relative motions of the Flemish Cap (FC) and the Galicia Bank (GB) plates in between. Seven palaeogeographic maps, as listed below for various geological periods, with structural elements and magnetic lineations are presented:
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References:

Updated magnetic grid of the northeastern central Atlantic Ocean (Berther, 2010) along with detail of the northeasterncorner of ECMO (bottom). Dashed lines are continuous magnetic anomalies and continuous black lines are bathymetric contours every km. In white the portion of ECMO already identified by Sahabi et al. (2004) and in grey what we suggest as a reasonable northern prolongation of ECMO.

Northeastern central Atlantic magnetic anomaly map based on Verhulst (1996) data set compiled by S. Dodet personal communication, 2010) and detail of the northern portion of the VACMA (bottom). In grey, bathymetric contours every km. Continuous white lines are the VACMA-contoured magnetic anomalies of Sahabi et al. (2004) and Labails et al. (2010) and continuous black lines are the ECMO-contoured magnetic anomalies (palaeo-magnetic parameters of Labails et al. 2010). In white the portion of ECMO already identified by Sahabi et al. (2004) and in red what we suggest as a possible northern prolongation of the VACMA. In brown, the seaward limit of the thinned continental crust based on the results of SIMBAD reflection line and further southwest on the emergence of a crustal detachment fault on MCS SBS1004/10 line.

Kerimetric reconstruction at closure (Rhaetian/Rhaetian limit, about 250 Ma) superimposed on the 200 Ma reconstruction.