Corrigendum to “A new starting point for the South and Equatorial Atlantic Ocean” [Earth Science Reviews 98 (2010), 1–37]

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Recent debates around our paper (Aslanian & Moulin, 2010, Torsvik et al., 2010) led us to realize that our figure 1 was printed with missing names and explanations leading to misunderstandings of our results. To avoid further confusion we wish to reproduce here figure 1 with all appropriate and detailed explanations.

In Moulin et al. (2010), all reconstructions, and therefore all figures, represent the motion of plates and sub-plates relative to a specific plate, which is considered as the fixed reference. All finite rotations given in the table 2 therefore describe relative movements respect to the fixed West African block. Defining absolute movement for plates is a strong matter of debate and the resolution of absolute movement is one or two order of magnitude greater. It is therefore both convenient and sensible to work first on relative movements between plates or sub-plates, with well constrained fracture zones, magnetic anomalies, and intraplate deformation: a precision of 30-40 km can be reached. With such precise reconstructions, we can then apply, in order to describe the absolute movements, an additional rotation obtained with more debatable and less precise methods (paleomagnetism, fixed plumes: see the debate on the website: http://www.mantleplumes.org/ or the debate between Pangea A et Pangea B).

The main purpose of this picture is to emphasize, whatever is the right position of the Pangea relative to the earth axis, 1) the link between old sutures and break-up 2) the dislocation of Pangea in three main episodes separated by about 60 My: Triassic (200-190 Ma), Early Cretaceous (133-120 Ma) and Tertiary (60-40 Ma), which can be also recognized in the first order magnetic inversions pattern changes (Fig 1B). This 60Ma interval seems to be an important periodicity for the earth geodynamic, which can be, indeed, a good starting point to understand the geodynamic of our planet.
Figure 1: A) Reconstruction at Permo-triassic time (~250 Ma) (Olivet & Aslanian, pers. comm.) just before the break-up of the mega-continent Pangea. This break-up occurred in three main episodes separated by about 60 Ma. The Upper Triassic episode (in blue, about 200-190 Ma) separated the Pangea in three equivalent blocks (Laurentia, Baltic and Angara, Africa and South America, Madagascar, India, Antarctica and Australia). The second episode (in green) occurred during the Early Cretaceous (about 133-120 Ma), and the last episode (in red) during the Tertiary (60-40 Ma). Note that we describe the first movement between two plates for instance India and Madagascar (about 120 Ma) and not the first oceanic crust (80-90 Ma for this part of Indian Ocean). Note the almost general coincidence between the different break-ups and older orogenic belts. The block is considered as the fixed plate. Hammer Projection.

B) Magnetic anomalies inversions. Note the change of the pattern around the Cretaceous and Cenozoic Break-ups.

