



Specific Kinematic Evolution of the Santos Basin – Sao Paulo Plateau

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The Sao Paulo Plateau is a prominent marginal plateau in the Southern Brazilian margin, located at the boundary between the central segment and the austral segment of the South Atlantic Ocean. These two segments are in two different geodynamic contexts, since southern segment opens at the anomaly M7 (132 My according to Gradstein et al., 2004) whereas the central segment opens at the end of the evaporite deposit (Upper Aptian – Lower Albian: 112 Ma). The two segments are also in two different structural contexts, since the margins of the austral segment are considered as volcanic margins (Gladczenko et al., 1997, Gladczenko et al., 1998, Hinz et al., 1999, Bauer et al., 2000. . .), whereas the margins of the central segment as described as saliferous, non-volcanic margins (Butler, 1970, Leyden et al., 1972, 1976).

Although many geophysical investigations were carried out on the Sao Paulo Plateau during the 1970's (more than 10 000 wells and several hundred thousands kilometres of seismic reflections profiles were acquired), its origin, history and evolution remained largely unknown. Since 40 years, a variety of structural and geodynamic models has been proposed to explain the different geological and geophysical observations. Some arguments (refraction data, magnetism) support the evidence that thickened oceanic crust underlies the Sao Paulo Plateau. Whereas some others (gravity modelling, seismic study, re-interpretation of refraction data, backstripping modelling, . . .) support the evidence of extremely stretched continental crust. At last, some authors (Gladczenko et al., 1998) suggested that the core of the Sao Paulo Plateau might be a micro-continent, in part covered by break-up extrusive material. Understanding the geological evolution of the Sao Paulo Plateau became more crucial since the giant oil field discovery (Tupi) in November 2007, in the Santos basin.

We provide here a detailed kinematic model of this area. Following Moulin et al., (2007, Earth Science Reviews, submitted), we suggest that the area including the Paraná-Etendeka CFB's, the Santos Basin and the Sao Paulo Plateau, plays a role of "kinematic buffer" between the Austral and the Central segments of South Atlantic Ocean. At chron M4 and until Aptian, the Santos block seems to start to follow the general westward movement of the southern part of the South America. The northern and southern boundaries of the Santos Basin therefore were the place of intraplate deformations and became the locations of a "second-order intra-plate boundary" as defined by Olivet et al., (1984). This detailed kinematic model together with the interpretations of seismic industrial profiles seem to provide evidence of the existence of a continental microplate on the eastern part of Sao Paulo Plateau, which is linked to Africa until the Aptian-Albian time. Then, break-up jumped eastward, close to the Mocamedes area, leaving a very asymmetrical passive margins system. In this hypothesis, the central part of the Santos Basin seems to be made of thickened oceanic crust or exhumed mantle and, on both sides, of exhumed lower continental crust (the allochthonous continental slope of Aslanian et al., 2009); the eastern part represents the continental relic of Africa.