



Structural Interpretation of High Resolution Aeromagnetic Data in Takutu Rift, Brazil

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Abstract

Located in the central-eastern portion of the state of Roraima, extending to the western region of Guyana, occurs the Takutu Riffe, a NE-SW-trending distensive structure with dimensions of 300 km in length and 30 to 50 km in width, it was generated by the reactivation of pre-existing structures, having its genesis associated with the separation of the South American and African plates, during the fragmentation of Pangea. This rift still does not have a well-defined structural framework, due to scarce studies that focused on its first oil exploration campaigns, carried out by Petrobras in the 1980s, through seismic surveys and the drilling of two dry wells in its Brazilian portion. In Guyana, where it was also explored, through pioneering studies carried out by Hunt Oil, finding subcommercial oil in fractured basalt, confirming the basin's potential for hydrocarbons, despite the non-conventional reservoirs finds. A large part of the anticlines in the Guyanas region were subjected to a tertiary hydrothermal event, which led to the overmaturation of the source rocks and destroyed a large part of the porosity of the reservoir rocks. The processing of new high resolution magnetic data, from the Aerogeophysical Project Center-East of Roraima, showed in greater detail the internal structures of the rift, which allowed the interpretation of magnetic domains, which were named based on lithologies of the region and nomenclatures of past studies, defining the structural provinces Boa Vista, Bonfim and Serra do Tucano. These present distinct textural and structural aspects, highlighted by changes in the directions of the magnetic lineaments, in addition to distinct depths in each of the provinces, individualized by means of the Matched Filter (330, 790 and 9,440 m) and Euler Deconvolution (from 100 to 8,000 m). In addition, it is important to emphasize that the boundaries between these structural provinces are marked by regional fault, named Fault of Takutu and Fault of Mel, in reference to the drainages that occur in these regions. These interpretations shows post-rift deformations, associated with a transcurrent event of tertiary age, in which sinister kinematics are observed, marked by curved to wavy magnetic lineaments and sigmoidal structures, which are also pointed out in field data by other authors.