

STRUCTURAL FRAMEWORK AND TECTONIC EVOLUTION OF THE ALTO TAPAJÓS BASIN

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ABSTRACT: The Alto Tapajós Basin is an intracratonic basin located in the Amazon Craton, which consists of predominantly Paleozoic siliciclastic sedimentary layers with Mesozoic subvolcanic rocks. Although it covers an area of about 97,000 km², equivalent to Portugal, it has few detailed studies regarding its main geological structures and potential for hydrocarbons, with scarce surface mapping, absence of seismic surveys and only one well drilled to the SE. The basin is oriented NW-SE, perpendicular to the axis of the Amazonas Basin to the NW. Both basins are contiguous, but the Paleozoic units indicate an isolation of the Alto de Tapajós Basin, shown by the isopachs maps of Amazonas Basin suggesting that the Purus Arc might worked as an structural high at that Era. In addition, the Tapajós Basin main axis is overlain on an important precambrian zone limiting the Tapajós-Parima and the Rondonia-Juruena geochronological provinces. The basin is mainly seated on geological units related to Paleoproterozoic sedimentary sequences, Beneficente and Buiucu groups, which might indicate that could have being a fossil rift. In order to corroborate with the understanding of the tectonic evolution of the Tapajós Basin during the Paleozoic, we analysed geological maps and topographic, gravimetric and magnetometric data. The results of these analyses and the integration of this data are the recognition of two sets of normal faults, distributing basement highs and parallel to an extensive swarm of mafic dikes. The structural framework of the Alto Tapajós Basin presents dominant NNW-SSE and NE-SW structures, the former follows the lithospheric architecture of the Amazon Craton. The strong inheritance factor is corroborated by the distribution of the Paleoproterozoic sedimentar units, which might indicate that the Paleozoic rifting event related to the formation of the Alto de Tapajós Basin reactivated an ancient rift, hence it would be a fossil rift, also recognized in other cratons through the world. The Alto Tapajós Basin rifting event is still not well constrained. Cambrian mafic dykes could be the evidence that would position the initiation of this basin during the breakup of a supercontinent in the early Cambrian (Pannotia), in the dawn of the Gondwana. However, the first phase of Alto Tapajós Basin filling occurred only in the Devonian, continuing through the Permian. To account for the basin subsidence, intraplate passive rifting might have being the mechanism to define this basin, in response to continental collisions on the western margin of the Gondwana (Terra Australis and Allenghaniana orogenies). In the Mesozoic, the Alto Tapajós Basin was affected by a tectono-thermal event, related to Pangea breakup, evidenced by an extensive NE-SW mafic dikes swarm identified in the field, with ages between 220 and 180 Ma, and mostly in the magnetometric maps (analytical signal amplitude and vertical derivative of total magnetic field maps).

KEYWORDS: ALTO TAPAJÓS BASIN, AMAZON CRATON, INTRACRATONIC GONDWANA BASINS