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18-20 NOV | Rio'25

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Submission code: 45G0V79D6X

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Analysis of bathymetric profiles of the Tapajós River between cities of Santarém and Belterra - PA

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Introduction

The Tapajós River is the fifth largest tributary of the Amazon. It is formed by the confluence of the Teles Pires and Juruena rivers in regions of Precambrian rocks in central Brazil. About 80% of its area is composed of Cretaceous rocks from the Alter do Chão Formation. The river is 2,700 km long and can be over 20 km wide in some stretches. The Tapajós is a river with clear waters, with a transparency of 1.10 to 4.30 m. Although the river's current is weak, rapids are found along the main course and in the Juruena and Teles Pires tributaries. It is a large basin and of great importance for the flow of products, water supply for the population and agriculture. From 5th-25th July 2023, a survey of bathymetric, seismic and sedimentological data was carried out along the Amazon rivers, from Manaus to Santarém, and Tapajós, from Santarém to Belterra, by the Amanaus project, the result of international collaboration between Brazilian and French researchers, financed by the ISBlue EUR school, ANR, CAPES-COFECUB. Some bathymetric data of Tapajós river were provided for the purpose of carrying out this work, which aims to obtain the thickness of the water column and the amplitude of the backscattered signal in the study area.

Method and/or Theory

The bathymetric data was obtained with the Reson Seabat T50P multibeam sonar operating in the frequency range of 200-400 kHz, with 511 equidistant beams, together with the Novatel Vector dual-antenna GNSS differential positioning system. Regarding the bathymetric data, the processing is being carried out at the Laboratory of Seismic and Seismological Studies of the Amazon (Lessam in portuguese) using the free software GLOBE (v. 2.5.3), following the steps: 1. Conversion of .s7k files to .mbg; 2. Data quality control; 3. Automatic data filtering; 4. Spike removal; 5. Data interpolation (.grd). 6. Export of profile and MNT navigations in GeoTIFF, for integration into GIS. 7. Interpretation of profiles with existing seismic data in the area.

Preliminary Results and Conclusions

Preliminary analysis of the profiles revealed smooth topography changes and water column thickness ranging from 10 to 30 meters, with the deepest portions in the region close to the city Belterra. Future results will allow analysis of the morphology of the bottom of the Tapajós River, but with preliminary analysis, it is not possible to identify largest structures such as dunes or erosion grooves as found in some areas of the Amazon River. It is hoped that this work will encourage further studies in the region, which is little known from a geological and stratigraphic point of view.