Application of the multichannel seismic method for the determination of stratigraphy of the confluence of the Amazon and Tapajós rivers in Santarém-PA.

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Introduction

The confluence between the Amazonas and Tapajós rivers, near Santarém (PA), represents an area of great geological, hydrological and environmental relevance. This encounter of waters, characterized by the clear separation between the clear and warm waters of the Tapajós and the waters with a large load of sediment in suspension and cold of the Amazon,reflects not only physicochemical and hydrodynamic differences between rivers, but also a complex interaction with the geological structure of the Amazon Basin.

In July 2023, French and Brazilian researchers executed the Amanaus project,funded by the institutions ISBlue EUR, ANR, CAPES-COFECUB. The project, with a vision holistic, was developed to monitor the behavior of the Amazon River in relation to its response to local and global climate change, as its geomorphology and flow rate can be affected by the planned representatives and already in operation, causing an impact on the dynamics of the flood plains and how the river flow contributes to sea level. For 20 campaign days, multi-channel seismic data and multi-beam bathymetry were acquired in the river Amazonas, leaving Manaus for the city of Santarém in the state of Pará. The project ceded two seismic profiles acquired on July 15 and 16, 2023 to the development of this work.

Our goal is to process seismic data and interpret seismic sections in order to understand the geological structure of the confluence region between the Amazon and Tapajós rivers.

Method and/or Theory

Multichannel very high-resolution seismic data were acquired using a freshwater-designed Sparker Source by Geo Marine Survey Systems with a geo-source 400 FW (400 tips). The streamer used was a 48 channels streamer Geo-Sense also from Geo Marine Survey systems with a total length of 150m. The streamer was kept at a constant depth using two buoys: a head buoy with two mooring points on the structure allowing recovery effort of the streamer and streamer depth adjustment; a tail buoy with a flag and flash for visibility. Seismic data are being processed in the free Seismic Unix program, following the basic seismic data processing flow: i) Pre-processing: acquisition geometry and filtering; ii) Pre-stack: gain, deconvolution, velocity analysis and NMO correction; iii) Post-Stack: stacking, migration and interpretation.

Results and Conclusions

At the moment, the pre-processing steps have been carried out, the application of gains and the deconvolution process. The next steps are being carried out in partnership with a researcher from the French Institute for Ocean Science (Infremer). It is expected with the interpretation of seismic sections to understand the processes of erosion and deposition and the main geological differences between the beds of the Amazon and Tapajós rivers.