



Crustal thickness of Carajás Mineral Province using P-wave receiver function: Preliminary Results

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Abstract

The Carajás Mineral Province (PMC in Portuguese) is located in the southeastern portion of the State of Pará, Brazil, and is one of the largest mineral provinces in the world. It is composed of well-preserved Archean rocks and is divided into two tectonic domains: the Rio Maria Domain to the south and the Carajás Domain to the north. Its area is delimited to the north by the Bacajá Domain, to the south by the Santana do Araguaia Domain, to the east by the Araguaia Belt, and to the west it borders the Central Amazon Province. Despite the knowledge of its exploratory potential for mineral deposits, there are few studies on the lithospheric structure in the region. Recent efforts have been made to understand the genesis and tectonic dynamics of the province. The University of Brasília, Federal University of Western Pará and the University of São Paulo, in partnership with the Brazilian Geological Service and the company Vale S.A, have come together to develop the research project entitled "Geodynamics (4D) of the Carajás Mineral Province: Passive Seismic" and have implemented a mobile seismographic network consisting of 30 broadband stations. The stations cover the Carajás, Rio Maria, Bacajá, and Araguaia Belt domains, they were deployed in September 2021 and will remain in operation until September 2023. The first 18 months of data from the teleseismic records of the network were subjected to the methodologies of P-wave receiver function in the time domain and Hk-stacking to obtain the first approach of the crustal thickness and Vp/Vs velocity ratio values of the PMC and adjacent regions. The obtained results show that the average crustal thickness of the Carajás Mineral Province is 39.4 km, with values ranging between 37.8 and 41.1 km in the Carajás Domain and between 37.5 and 45.8 km in the Rio Maria Domain. The Bacajá Domain presents a crustal thickness of about 39.1 km, with values ranging between 37.5 and 46.2 km. The Araguaia Belt has an average crustal thickness of 38.2 km, ranging from 37.6 to 43.4 km. Although the average values are very similar, from the analysis of the thickness values, it can be inferred that the western portion of the study area has a slightly thicker crust than the eastern part. Regarding the estimated Vp/Vs values, we observed similar average Vp/Vs values for the Carajás, Bacajá, and Rio Maria Domains, close to 1.73. In the Araguaia Belt, the average Vp/Vs value (1.75) is slightly higher than in the Carajás Mineral Province. The obtained crustal thickness results are in accordance with published works for the region. For a more comprehensive analysis of crustal thickness variations, additional teleseismic record data will be included in the near future, and the integration of the results with other data, such as geological and gravimetric data, will be performed.

Figuras para auxiliar a análise (que não constam no resumo, mas que deverão constar no pôster ou apresentação):

