Characterization of the recent seismic activity in the mining region of Jacobina-BA

The recent known seismic activity in the mining region of Jacobina-BA was first observed by the Brazilian Seismographic Network (RSBR) in 2018. After that, in 2021, we observed an increase in the seismic activity rate, which included some events that were felt by the local population. Therefore, in early 2022, the Seismological Laboratory from UFRN deployed a local temporary seismographic network in the area. The six short-period station network remained active until July 2023 and recorded continuous data. Only one station has been active in the area ever since. Preliminary analysis has shown that many events occurred in this period. Moreover, these events present a very shallow hypocentral depth (< 1 km) and are located on the mining operational complex. Since blasting operations are included in mining activities, we are using a method to discriminate seismic events from blasts based on waveform signature and the event's origin time.

This work aims to characterize the observed seismicity using the data provided for the local network employed in the area. The characterization comprises the event location, magnitude estimation, and determination of some source parameters. For the identification of the seismic signals embedded in the continuous data, we used the tool Python Matching Phase Algorithm (PyMPA). It is an open-source seismological software created to increase the capability of seismic signal detection using advanced routines. This methodology is optimized to increase the detection sensibility of micro-seismic events. Since the background noise might hide such signals, we expect that the PyMPA will enhance the detection efficiency of seismic events, especially the smaller ones.

Finally, we will investigate the correlation between the seismicity and the local and regional geological features (stress regime, preexisting faults, dykes, etc.) and evaluate the impact of the mining activity in triggering earthquakes.