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Preliminary Analysis of the 2020–2021 Seismic Sequence in Caruaru, NE Brazil

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Introduction

The region surrounding Caruaru, in the state of Pernambuco, exhibits notable seismic activity, primarily associated with the reactivation of segments of the Pernambuco Lineament. Earthquakes with magnitudes of up to 3.9 mR have been recorded and are often felt by the local population. Characterizing this seismicity is essential for understanding the mechanisms of earthquake generation and for improving seismic hazard assessments. Previous studies, based on data from local seismic arrays, have reported a predominance of normal faulting in the region. This study aims to analyze the local seismicity by compiling a seismic catalog and calculating focal mechanisms for the 2020–2021 earthquake sequence recorded by a local temporary array.

Method and/or Theory

The methodology involves the construction of a seismic catalog for the period from November 2020 to May 2021, based on data recorded by a temporary seismic network installed in Caruaru. Earthquake identification, location, and magnitude estimation are being carried out through visual inspection of seismograms using the SEISAN software. To refine the event locations, double-difference relocation will be applied with the HypoDD algorithm. Focal mechanisms will be determined using both P-wave first-motion polarities and amplitude ratios, employing the FocMec program to compute composite focal mechanisms.

Results and Conclusions

Although this study is still in its initial stages, the ongoing analyses are expected to contribute to the characterization of the tectonic regime in the Caruaru region and to a better understanding of intraplate seismicity in Northeast Brazil. The results may also support future seismic hazard assessments in populated areas of the region.