



Maranhão aftershocks activity studies with local seismic network for getting the main shock as a GT5 event

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Abstract

The low Brazilian seismicity, with only three continental earthquakes of magnitude five in the last three decades and, until recently, the low number of seismic stations, explain why it is very difficult to detect events at regional distances that can be classed as Ground True 5 (GT5). In the first PTS - CTBTO RSTT meeting (in Vienna June, 2012) seismologists from the South and Central Americas were encouraged to cooperate in identifying GTx events. With the deployment of the Brazilian Seismographic Network (RSBR) and using aftershock sequences well recorded by local and regional stations as reference events, it was possible to relocate the Maranhão mainshocks suitable for GT5 events. In Brazil, the expected variations in P and S-wave velocities, due to structural variations in the upper mantle, on the order of $\pm 4-5\%$, not taken into account by 1D velocity models, can cause epicenter mislocation on the order of 10 - 30 km. Epicenter mislocation has a negative effect in studies of seismic risk currently done in Brazil. Using a local network, we studied the aftershock activity after a 4.6 mb mainshock (MMI V-VI) on January 3, 2017. This event was registered by 25 regional stations of the RSBR with the nearest station located about 40 km from the epicenter. The focal mechanism solution indicates a strike slip fault with compression parallel to the coast line, in agreement with previous studies. For hypocentral location an accurate velocity model determined using phase conversion in the interface sediment-basement (P to S - Ps, and S to P, Sp) and Wadati diagram, was used. A local seismic network, with 4 stations, together with the ROSB station of the regional network permitted the Maranhão main shock earthquake to be relocated with an accuracy of a GT5 event.

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