



Intraplate seismicity around Rodrigues (Indian Ocean) from time-domain array analysis

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Rodrigues Island is located at the eastern end of the Rodrigues Ridge, approximately 650 km east of Mauritius. Rodrigues Ridge connects the Reunion hotspot track with the Central Indian Ridge (CIR) and has been suggested to represent the surface expression of a sub-lithospheric flow channel. From global earthquake catalogues, the seismicity around Rodrigues Island has been generally associated with events related to the fracture zones at and off the CIR. Here, we report on the seismicity recorded at a temporary array of ten seismic stations operating on Rodrigues Island from Sept. 2014 until June 2016 with a focus on the possible seismic activity along Rodrigues Ridge.

Based on our initial estimates on earthquake distance and frequency content, the aperture of the array was set to about 4 km. The 10 stations were arranged such as to minimize the influence of sidelobes of the array response function. However, to infer backazimuth and apparent velocity, the array analysis was performed in the time domain - by time shifting and stacking of the complete waveforms. Event distances were estimated based on a simple 1-D velocity model and the travel-time differences between S- and P-wave arrivals. Based on the results local magnitudes of the events were also obtained.

From the array analysis, we detected and located 62 new events, which were not reported by the global networks. Most of the events are located off the CIR and can be classified as intraplate events. Three different seismic clusters were observed around the island. Most of the events were localized in the north-east of Rodrigues at distance of about 140 km from the reference station of the array. A distinguishable swarm of earthquakes was observed to the west of the spreading segment of the CIR during the period from March to April 2015. Local magnitudes of the events varied between 1.6 and 3.7. The Rodrigues Ridge appeared aseismic during the period of operation.