



The b-values on the Congo Fracture Zone during the period 2003-2007: a first approach

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The Azores archipelago is located at the triple junction between the American, Eurasian and Nubian lithospheric plates. One of the most important tectonic lineament present on the region is the Terceira Rift, with a general WNW-ESE trend that intersects the Graciosa, Terceira and S. Miguel islands. The Congo Fracture Zone, with a general NW-SE trend is located in the central part of S. Miguel Island, between the two active composite silicic volcanoes with caldera of Fogo and Furnas, with historical eruptions in 1563 and 1630, respectively. It corresponds to an important seismogenic area of the Azores archipelago with frequent seismic swarms of variable duration and frequency/magnitude relationships. The data set used for the seismic analysis for the period 2003-2007 was obtained from the "Azores Preliminary Seismological Bulletin" edited by SIVISA. For the present study the data concerning the offshore earthquakes were not used and the events considered were only those with local magnitude (ML), for a total of 9659 events spread over an area of 14x13 km. The magnitude range between 0.1 to 3.9 and the depth between 0 to 18 km. The studied period includes the increase of energy released that occurred between May and October, 2005. To use the maximum number of events available we calculate the minimum magnitude of completeness (M_c) applying the methodology proposed by Wiemer & Wyss (2000), that gave a M_c of 0.7. The Gutenberg-Richter frequency-magnitude relationship is given by $\text{Log}N=a-bM$, where N is the number of earthquakes with magnitude $\geq M$, a is a constant that describes the productivity of a volume and the b constant quantifies the slope of the frequency-magnitude distribution. The values obtained for the b -value with depth are clearly higher than 1 for depths ≥ 5 km, increase until depths of about

7 km and then decrease for depths greater than 7 km. However due to the small number of seismic stations on the area and its poor geographic distribution, those b-values should be taken as preliminary.