

Characterization of the Upper Crust in Botswana Using Vp/Vs and Poisson's Ratios from Body Waves

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Abstract : The P and S wave seismic velocity ratios (Vp/Vs) of some aftershocks are investigated using the method of Wadati diagrams. These aftershocks occurred after the 3rd April 2017 Botswana's Mw 6.5 earthquake and were recorded by the Network of Autonomously Recording Seismographs (NARS)-Botswana temporary network deployed from 2013 to 2018. In this paper, P and S wave data with good signal-to-noise ratio from twenty events of local magnitude greater or equal to 4.0 are analysed with the Seisan software and used to infer properties of the upper crust in Botswana. The Vp/Vs ratios are determined from the travel-times of body waves and then converted to Poisson's ratio, which is useful in determining the physical state of the subsurface materials. The Vp/Vs ratios of the upper crust in Botswana show regional variations from 1.70 to 1.77, with an average of 1.73. The Poisson's ratios range from 0.24 to 0.27 with an average of 0.25 and correlate well with the geological structures in Botswana.

Keywords : Botswana, earthquake, poisson's ratio, seismic velocity, Vp/Vs ratio

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