Geophysical Research Abstracts
Vol. 21, EGU2019-17950-7, 2019
EGU General Assembly 2019

Shear-wave velocity structure of the crust and uppermost mantle beneath the Western Ethiopian Plateau and adjacent rift

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The Main Ethiopian Rift (MER) serves as a natural laboratory for investigating the evolution of continental rifting. Most studies on the MER are concentrated within the rift zone, being attracted by the challenging problems related to the tectonic and geodynamic evolution of a continent rift zone from the infant stage. In spite of this, little is known about the Ethiopian plateau which lies a few kilometers from the main rift zone and whose structure is likely being shaped by the ongoing geodynamic processes in the MER. In this study, we utilize the temporal setup of 120 vertical component continuous broad-band seismic stations within the framework of the IRIS-PASSCAL experiment (April 2014 to March 2016), NERC Seis-UK and IRIS-PASSCAL (March 2007 to October 2009) and EAGLE network (2000 to 2002) including Ethiopian permanent seismic stations to provide a 3D shear velocity structure beneath the western Ethiopian plateau and adjacent rift from ambient noise cross-correlations. The resulting fundamental Rayleigh wave group and phase maps between 5s and 50s show significant difference of the crustal structure between the Ethiopian plateau and MER and good correlations with known geological and tectonic features in the study region. We provide a new 3-D shear wave velocity model of the crust and uppermost mantle in the region and we will discuss the resolved features in terms of volcanic hazard as well as in terms of regional geodynamics highlighting the transition between the plateau and the MER.