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2015 Earthquake Swarm of Fentale Volcano: Multi-hazard Threat for Ethiopia's Access to the Coast

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The Fentale-Dofen magmatic segment was shown to be more active than other volcanic centers in the northern Mid Ethiopian Rift by a temporary seismic experiment, conducted between 2001 and 2003 (Keir et. al., 2006). However, the activity observed during the EAGLE experiment is not swarm like but randomly scattered in time. In this study, we characterize rarely observed seismicity in the Fentale volcano neighborhood that occurred in March and April 2015 using reasonably good quality seismic data. Over 1,350 earthquakes are located and the activity is clustered around "Tinish" Fentale, northeast of Fentale proper with a maximum magnitude of 3.5 ML. There are volcano-tectonic and long-period events, showing that the activity is induced by magmatic intrusion. This intrusion seems to commence at depth and migrate southwestward as it shallows, to the centre of the activity. This may imply that the magma feeding system of the Fentale-Volcanic Complex is either attributed to different sources or may all be influenced by the magma rich Afar Depression. This phenomenon is another geohazard threat, in addition to the lake level rise of Beseka, to Ethiopia's access to the active commercial route. This is a wakeup call to take precautionary measures to the concerned stakeholders.

Promotional text

The Fentale-Dofen magmatic segment is one of the active volcanic centers in Ethiopia that needs monitoring. Characterizing these volcanic sources can be used for Ground Truth events for improving crustal structure and also mitigating potential hazard for fast growing population a

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