Geophysical Research Abstracts
Vol. 21, EGU2019-15051, 2019
EGU General Assembly 2019
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Recent tectonic and volcanic evolution of the southern termination of the Main Ethiopian Rift

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The Main Ethiopian Rift, in (East Africa), is a classic example where to analyse the interplay between tectonics and magmatic activity during rifting. This continental rift records indeed all different stages of rift evolution and is characterised by significant volcanic activity spanning from the Oligocene to present. However, despite recent improvements in the knowledge of single volcanic centres thanks to recent scientific projects (e.g., RiftVolc), volcanic activity in many rift sectors still remains poorly documented. In this work we provide new constraints on the timing, evolution and characteristics of the poorly documented volcanic activity at the southern termination of the Main Ethiopian Rift. We present new fieldvolcanological, petrographic, geochemical and geochronological data, together with and the results of a statistical analysis of the distribution of volcanic vents from remote sensing, together with petrographic, geochemical and geochronological analyses on the collected samples, for the Mega and the Dilo-Dukana volcanic fields, near the Kenya-Ethiopia border. In line with previous works, our data delineate the occurrence of two distinct groups of rocks: 1) a group of subalkaline basalts, observed only in the Dilo-Dukana volcanic field, forming a Pliocenic lava basement during Pliocene, faulted during an important rifting phase; 2) a group of alkaline basalts, characterising the Quaternary activity in both areas and sampled from Quaternary volcanic vents or from their associated lava flows, that are associated to several, mainly monogenetic volcanic centres. The products of this activity lay in discordance above the lava platform and seal the rift-related faults. Ar/Ar dating allowed to constrain the large basal lava plateau to $\sim$3.7 Ma, whereas the youngest volcanic activity characterizing the two areas dates back to 134 ka for Dilo-Dukana and Holocene age for Mega volcanic field. Interestingly, no direct relations are observed between the Pliocene, roughly N-S major boundary faults of the Ririba Rift and the NE-SW structures feeding the Quaternary volcanic activity, indicating a non-correlation between recent volcanism and rifting in the area. Conversely, our analysis suggests a major influence exerted by deep, inherited structures on the distribution of the recent volcanic vents under a complex, local stress field resulting from a major episode of reorganization of extensional structures in the region, recording the history of related to rift propagation and abandonment.