
Cryptotephra offshore the Main Ethiopian Rift and their potential to date hominin fossils

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Résumé

The Main Ethiopian Rift (MER) is the northernmost part of the East African Rift System (EARS). Quaternary silicic centres and hominin-bearing sedimentary formations lie within the MER. To date fossils, most scientists perform Ar-Ar dating on tuffs stratigraphically above or beneath them. However, such technique requires pure feldspar crystals, which is not always the case, and the uncertainty may be high (e.g. ± 47 ka). The aim of this study is to find cryptotephra in a marine core (MD96-2073) and to date them using an age model. Core MD96-2073 is a 34 m-long piston core retrieved near Socotra Island, 1500 km north-east (N-E) from the MER. 356 $\delta^{18}\text{O}$ analyses have been carried out to build the age model, with a 10 cm resolution. To find cryptotephra, XRF analyses, X-ray images and magnetic susceptibility were performed, with a 1 cm resolution. Sediment was sieved at 45 μm (1 cm resolution) and shards were counted under a stereo microscope. 69 volcanic shards were analysed by electron microprobe analysis (EMPA).

Age model shows that core MD96-2073 reaches more than 300 ka, with a $\pm 5-6$ ka uncertainty (2σ) throughout. Background shard number noise is around 400 shards per g of dry weight sediment. Two cryptotephra layers have been identified, by counting. Other techniques were not effective in detecting them. The first one is dated at 74 ka BP. It is 40 cm thick, with more than 2000 shards/g throughout, and a maximum value of 160000 shards/g. Based on major and minor elements, it is identified as the Youngest Toba Tuff (YTT). Its thickness may be due to bioturbation. The second one is dated at 154 ka BP. It is 10 cm thick, with maximum values of ~ 6000 shards/g. Based on major and minor elements, it may be the Konso Silver Tuff, from the MER. This preliminary study shows that recent (< 750 ka) volcanic ashes from the MER can be found offshore. YTT may be found onshore (e.g. Chew Bahir), which raises the possibility of studying its impact on the hominin communities in N-E Africa.

Mots-Clés: cryptotephra, tephrostratigraphy, Homo sapiens, oxygen isotopes, youngest toba tuff, silver tuff

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