

ABSTRACT

Glycerol diacyl glycerol tetraethers (GDGTs), a palaeoclimate proxy based on the relative abundance of lipids produced by archaea and bacteria, is gaining wide acceptance for the determination of past temperature and pH conditions. This study looks at the spatial distribution and abundance of GDGTs in soil and sediment samples along an altitudinal transect from 3 crater lakes of Mt. Kenya (Lake Nkunga, Sacred Lake and Lake Rutundu) ranging in elevation from 1700m - 3080m above sea level. GDGTs were extracted with solvents and then analysed using high performance liquid chromatography/atmospheric pressure chemical ionization-mass spectrometry (HPLC/APCI-MS). Mean annual air temperature and pH were estimated based on the relative abundance of the different branched GDGTs, i.e. on the MBT (Methylation index of Branched Tetraethers) and CBT (Cyclization ratio of Branched Tetraethers) indices. Substantial amount of GDGTs were detected in both soil and sediment samples. In addition, branched GDGT distribution was observed to vary with altitude. These results highlight the importance of quantifying the branched GDGTs to understand the environmental parameters controlling the distribution of these lipids. The MBT/CBT proxy is a promising tool to infer palaeotemperatures and characterize the climate events of the past millennia in equatorial east Africa.