



Testing the hypothesis of Pleistocene East African mega droughts: The chlorine record of authigenic minerals in the Naivasha basin

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The $^{40}\text{Ar}/^{39}\text{Ar}$ -dated Pleistocene lake record of Lake Naivasha has become a reference for East African climate fluctuations between 175 and 60 kyrs BP. The 60-thick-sequence of diatomites, silts and water laid tuffs records orbital-driven variations between freshwater conditions of a more than 100-m-deep lake as documented by diatom assemblages and highly alkaline conditions during lake-level low stands as indicated by the occurrence of smectites and zeolithes. Whereas the precipitation/evaporation ratio during the high stands is well-constrained by lake-balance modelling results, the relative intensity of aridity during the low stands as compared to today is not known. To test the hypothesis of widespread mega droughts between 135 and 75 kyrs BP as proposed by Scholz et al. (PNAS, 2007) we analysed the chlorine content and major elements composition of authigenic minerals to model the hydrochemistry of the waters in equilibrium with the authigenic phases as well as the thermodynamic conditions of authigenic mineral formation. It is a well established fact that the chemistry of lake waters is significantly changed in response to climatic changes resulting in a drier climate and thus a drying up of lakes. This change in water chemistry is recorded in the authigenic phases formed in equilibrium with the water. The first results show significant variations of e.g. Cl from lake-level high stands to lake-level low stands indicating a significantly drier climate as compared to today.