The 600,000-year palaeoenvironmental record from Chew Bahir, Ethiopia: testing hypotheses of climate change and human origins

Henry Lamb[1], Asfawossen Asrat[2], Christopher Bronk Ramsey[3], Andrew Cohen[4], Melissa Chapot[1], Sarah Davies[1], Jonathan Dean[5], Alan Deino[6], Walter Düsing[7], Verena Foerster[8], Matt Grove[9], Annett Junginger[10], Christine Lane[11], Melanie Leng[12], Rachel Lupien[13], Emma Pearson[14], Helen Roberts[1], James Russell[13], Frank Schäbitz[8], Martin Trauth[7], Céline Vidal[11]
[1]Aberystwyth University, Aberystwyth, United Kingdom. [2]Addis Ababa University, Addis Ababa, Ethiopia. [3]Oxford University, Oxford, United Kingdom. [4]University of Arizona, Tucson, USA. [5]University of Hull, Hull, United Kingdom. [6]Berkeley Geochronology Center, Berkeley, USA. [7]University of Potsdam, Potsdam, Germany. [8]University of Cologne , Cologne, Germany. [9]University of Liverpool, Liverpool, United Kingdom. [10]Eberhard Karls University, Tübingen, Germany. [11]University of Cambridge, Cambridge, United Kingdom. [12]British Geological Survey, Keyworth, United Kingdom. [13]Brown University, Providence, USA. [14]Newcastle University, Newcastle-upon-Tyne, United Kingdom

Abstract

Most current hypotheses of climatic influence on human physical and cultural evolution focus on the role of climatic variability in selecting for behavioural flexibility and cognitive development. Those changes are thought to have allowed selected populations to expand geographically and exploit a wider range of habitats, prey and material resources. Similarly, abrupt climatic transitions may have caused differential survival among and within human populations, depending on their vulnerability to climatic extremes, with water resources being especially critical.

Located close to the Omo Kibish, site of the earliest known *Homo sapiens* fossils in east Africa, Chew Bahir, a playa lake in the south Ethiopian Rift, has yielded a 290 m-long core record that spans the last ~600,000 years. That time interval covers the entire history of modern human origins and dispersal, encompassing a number of significant behavioural innovations. With a high temporal resolution of up to tens of years, geochemical and biological indicators from the Chew Bahir core allow close examination of changing amplitude and frequency of past hydroclimatic variation and the rapidity of climatic change. By analysis of the core data across critical transitions in the archaeological record, we aim to show how the Chew Bahir record can contribute to a developing understanding of the consequences of climatic change for early human populations.