

A 500,000 year environmental record from Chew Bahir, south Ethiopia: testing hypotheses of climate-driven human evolution, innovation and dispersal

This project is part of a programme of research aimed at understanding the long-term dynamics of environmental change in eastern Africa and its relationship to the emergence, development and impact of human cultures in the region. It is part of the International



Continental Scientific Drilling Programme's (ICDP) Hominin Sites and Paleolakes Drilling Project (HSPDP), a multi-national research effort to obtain past records of climatic change from five key archaeological sites in east Africa, covering the last four million years of human evolution (<http://hspdp.asu.edu/>)

In November 2014 280m deep duplicate sediment cores were drilled from Chew Bahir, an ancient lake basin in southern Ethiopia, to examine the past climatic history of this region and the influence past climate changes have had on human evolution. This site is particularly important because it is situated close to some of the world's most famous fossil hominid sites which will enable past climate changes to be examined in the context of influences on human populations.

During the course of this three year project the composition of the Chew Bahir lake sediments will be analysed for variations in mineral composition, microscopic fossils of algae and vegetation, and their molecular composition to provide evidence for changes in rainfall, temperature and vegetation over the last 500,000 years. This period covers the evolution of our species, *Homo sapiens*, and the dispersal of our distant ancestors from Africa into Asia and Europe. Until now, there have been no long environmental records from the African centre of human origins and ideas of how climate change may have influenced the emergence and dispersal of modern humans has been speculative. By combining evidence of the changing climate history of the region with archaeological evidence from key sites nearby the international research team will test hypotheses of climate-driven human evolution, innovation and dispersal to enhance our understanding of climate influences on hominid populations.

The UK Chew Bahir team is led by Professor Henry Lamb (Aberystwyth University) and Dr Emma Pearson's role in Geography at Newcastle is to examine the molecular remains in the Chew Bahir sediments. By combining archaeological evidence for human occupation and dispersal with the molecular record of changes in vegetation, temperature and rainfall we can examine how climatic conditions may have influenced the response and adaptability of humans to climate change in this region. Results will allow us to evaluate the importance of climatic thresholds and abrupt changes which is of key importance to improve our understanding of the environmental and climatic context of human evolution.

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