Geophysical Research Abstracts
Vol. 12, EGU2010-3193, 2010
EGU General Assembly 2010

Determining temperature changes in Western Iceland over the last millennium: issues and results

Chris Caseldine (1), Peter Langdon (2), Naomi Holmes (3), Gareth Thompson (1), Stefan Wastegard (4), Gudrun Larsen (5), Siwan Davies (6), Melanie Leng (7), and Ian Croudace (2)

(1) University of Exeter, Geography, Exeter, United Kingdom (C.J.Caseldine@ex.ac.uk), (2) University of Southampton, Southampton, UK, (P.G.Langdon@soton.ac.uk), (3) University College Dublin, Dublin, Ireland (naomi.holmes@ucd.ie), (4) Stockholm University, Stockholm, Sweden (stefan.wastegard@geo.su.se), (5) University of Iceland, reykjavik, Iceland (glare@raunvis.hi.is), (6) Swansea University, Swansea, UK (Siwan.Davies@swansea.ac.uk), (7) NERC Isotope Geosciencess Laboratory, BGS, Nottingham (mjl@bgs.ac.uk)

High resolution multi-proxy studies of a core from Baulárvallavatn, western Iceland provide a record of climatic changes since the deposition of the Landnám tephra deposited in AD870±2. Derivation of the climate record has encountered a series of issues relating both to chronology and to proxy interpretation; but a millennial sequence of chironomid-based temperature change has been produced. Chronologically problems relate both to radiocarbon dating and tephrochronology. The lake is surrounded by loessial soils that have suffered from erosion, especially following settlement (the sedimentation rate in the lake has increased from 0.014mm yr-1 pre-settlement to 0.05mm yr-1 post-settlement). This has involved redeposition of both old carbon and tephra shards from earlier eruptions into the sediment. Thus post-Landnám radiocarbon dates are all relatively uniform between 2405-2155±30 BP. The high background levels of tephra made determination of specific post-Landnám horizons extremely difficult. Following over 550 individual shard analyses, and coupled with 137Cs dating of the uppermost sediments an age depth model was produced for the last millennium to provide a chronology for the climate proxies. Chironomid analyses at a resolution of c.10 yrs per sample showed a climatic response that is seen in the first axis of the PCA, rather than the Icelandic chironomid-July air temperature transfer function. The PCA axis correlates with winter/spring and autumn temperatures, possibly reflecting a response to summer season length rather than the expected response to July temperature. However, this has yet to be calibrated in more specific quantitative terms. The core was also subjected to ITRAX scanning; which identified key tephra horizons and reflected the relative consistency of sediment deposition over the last millennium. Oxygen isotope analyses of a limited number of diatom samples have also been undertaken and are the subject of continued research, as is diatom analysis being undertaken by Anna Dadał and Christian Bigler at the University of Umeå.