



A multi-proxy intercomparison of environmental change in two maar lake records from central Turkey during the last 14 ka

C Neil Roberts (1), Samantha L. Allcock (1), Fabien Arnaud (2), Jonathan R. Dean (3), Warren J. Eastwood (4), Matthew D. Jones (5), Melanie J. Leng (3), Sarah E. Metcalfe (5), Emmanuel Malet (2), Jessie Woodbridge (1), and Hakan Yiğitbaşıoğlu (6)

(1) University of Plymouth, Geography, Earth and Environmental Sciences, Plymouth, United Kingdom, (2) CNRS EDYTEM Laboratory, University of Savoie, Chambéry, France, (3) NERC Isotope Geosciences Facilities, British Geological Survey, Keyworth, NG12 5GG, UK, (4) School of Geography, Earth and Environmental Sciences, University of Birmingham, B15 2TT, UK, (5) School of Geography, University of Nottingham, NG7 2RD, UK, (6) Department of Geography, Ankara University, Turkey

Individual palaeoenvironmental records are a combination of regional-scale (e.g. climatic) and local factors. In order to separate these signals, we compare multiple proxies from two nearby maar lake records, on the assumption that common signals are due to regional-scale forcing. On the other side, we infer that residual signals are likely to be local and site-specific, rather than reflecting regional climate changes. A new core sequence from Nar lake has been dated by varve counting and U-Th as covering the last 13,800 years (Dean et al., 2015; Roberts et al., 2016). Periods of marked dryness are associated with peaks in Mg/dolomite, elevated Diatom-Inferred Electrical Conductivity, an absence of laminated sediments, and low Quercus/chenopod ratios. These conditions occurred during the Late-Glacial stadial, at 4.3-3.7 and 3.2-2.6 ka BP. Wet phases occurred during the early Holocene and again 1.5-0.6 ka, characterised by negative $\delta^{18}O$ values, calcite precipitation, high Ca/Sr ratios, a high % of planktonic diatoms, laminated sediments, and high Quercus/chenopod ratios. Comparison with the independently dated record from Eski Acıgöl (Roberts et al., 2001) shows good correspondence for many proxies, especially for $\delta^{18}O$. A ranking of multiple proxies shows the worst correspondence is for clastic lithogenic elements (e.g. Ti flux). Differences between the two lake records are caused by basin infilling at Eski Acıgöl, which fails to register climatic changes during the last 2 ka, and to catchment erosion and increased flux of lithogenic elements into Nar lake; this is catchment-specific and primarily anthropogenic rather than climatic in origin. In separating a regional signal from site-specific “noise”, two lakes may therefore be better than one.

Dean, J.R. et al. 2015 Eastern Mediterranean hydroclimate over the late glacial and Holocene, reconstructed from the sediments of Nar lake, central Turkey, using stable isotopes and carbonate mineralogy. *Quaternary Science Reviews* 124, 162–174.

Roberts, N et al. 2001 The tempo of Holocene climatic change in the eastern Mediterranean region: new high-resolution crater-lake sediment data from central Turkey. *The Holocene* 11, 721-736.

Roberts, N., et al 2016 in press, A tale of two lakes: a multi-proxy comparison of Late Glacial and Holocene environmental change in Cappadocia, Turkey. *Journal of Quaternary Science*