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# Terrestrial environmental changes in southern Europe during the penultimate climatic cycle (MIS 6 & 7)

**K.H. Roucoux** (1), P.C. Tzedakis (1), M.R. Frogley (2), I.T. Lawson (1), R.C. Preece (3)

(1) Earth and Biosphere Institute and School of Geography, University of Leeds, Leeds, LS2 9JT, UK, (2) Centre for Environmental Research, Department of Geography, University of Sussex, Falmer, Brighton, BN1 9QJ, UK, (3) Department of Zoology, University of Cambridge, Downing Street, Cambridge, CB2 3EJ, UK (k.roucoux@leeds.ac.uk / Phone: +44 (0)113 2436833)

During the penultimate climatic cycle (marine isotope stages [MIS] 6 and 7) high orbital eccentricity gave rise to insolation changes of very high amplitude while changes in temperature, greenhouse gas concentration and ice volume were relatively subdued. We present new palynological and sedimentological data spanning this interval in core I-284 from Lake Ioannina, NW Greece. Combining ecological sensitivity and high temporal resolution (70-500 years), the record has the potential to expand our understanding of climatic change, and biotic responses to it, during this interesting interval. The record reveals forested intervals and intervening periods of herbaceous vegetation equivalent to the marine isotopic substages of MIS 6 and 7. Millennial-scale changes in vegetation cover are also present throughout, for example Younger Dryas-type events at the start of MIS 7e and 7c.

In MIS 7d and 7c, high amplitude changes in insolation appear directly translated into large changes in tree population extent but there are also features that insolation cannot explain. In line with other evidence, the warm substages of MIS 7 appear to have been cooler than MIS 5e or MIS 1, perhaps due to larger remnant ice volume. Similarly, pronounced insolation decline in MIS 7b is accompanied by only minor tree population decline, matching marine evidence for minor ice accumulation and muted Mediterranean cooling. The next step will be to use modelling to explore the climatic

and ecological forcing factors and feedbacks in operation during this interval.