Volcanic Eruptions, Tree Rings and Multielemental Chemistry: In Search of an Absolute Date for Volcanic Eruptions of the Prehistoric

Charlotte Pearson Department of Archaeology / P.R.I.S., The University of Reading, PO Box 227, Whiteknights, Reading, Berkshire, UK, RG6 6AB (e-mail: c.l.pearson@rdg.ac.uk); Sturt Manning, Department of Archaeology, The University of Reading, PO Box 227, Whiteknights, Reading, Berkshire, UK, RG6 6AA (e-mail; s.w.manning@rdg.ac.uk); Max Coleman, P.R.I.S., The University of Reading, PO Box 227, Whiteknights, Reading, Berkshire, UK, RG6 6AB (e-mail: m.l.coleman@rdg.ac.uk); Kym Jarvis, NERC ICPMS facility, CEESR, School of Earth Sciences and Geography, Kingston University, Penrhyn Road, Kingston upon Thames, Surrey, KT1 2EE. (e-mail: kym.jarvis@kingston.ac.uk).

Volcanic eruptions can effect dramatic change on human history and the natural environment through both regional destruction, and more global effects on climate. However, accurate records dating such eruptions - the basis to any analysis of impact - exist only for the last couple of hundred years. The major volcanic eruptions of pre-modern times thus 'float' against archaeological, historical, environmental, and climate data. A potential means to resolution lies with tree rings: these can be dated precisely by dendrochronology, and have been shown to record global climatic alterations following various eruptions. As yet, however there is no positively proven causal connection between the growth anomalies in dendrochronological sequences and major climatically effective volcanic eruptions.

It is proposed that a chemical connection maybe found by multielemental analysis of individual growth rings using inductively coupled plasma mass spectrometry (ICP-MS) in conjunction with a laser ablation induction system. Preliminary results suggest the technique, though requiring further refinement, has the potential to procure, for the first time, an absolute date for some of the major volcanic events of prehistory.