1000 years of climate variability in central Asia: assessing the evidence for Mediaeval Warm Period and Little Ice Age signals using a diatom-inferred snow depth model from Lake Baikal (Russia)

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The debate surrounding the extent and intensity of climate variability over the last 1000 years has experienced a renewed vigour recently, especially since the publication of Northern Hemisphere (NH) temperature reconstructions by Mann et al. However, sites in central Asia are very much under-represented.

A diatom-based inference model of snow accumulation on frozen Lake Baikal (situated in south-eastern Siberia) has been developed (r2boot = 0.709; RMSEP = 0.120 log cm), from the mainly endemic diatom planktonic record. Bias in the model has been compensated for by the use of correction factors specifically developed for the dominant species. The model was applied to a short surface sediment core extracted from the lake.

Cluster analysis identifies three significant zones in the core: zone 1 (c. 880 AD - c. 1180 AD), zone 2 (c. 1180 - 1840 AD) and zone 3 (c. 1840 - 1994 AD), coincident with the Medieval Warm Period, the Little Ice Age and the period of recent warming, respectively. Species responses can be linked to changes in large-scale climate indices, such as the position of the Siberian High and impact of the Westerlies. The role of possible teleconnections between Europe and central Asia are explored.