

**Late Pleistocene - Early Holocene glacial dynamics, Asian
palaeomonsoon variability and landscape change at Lake
Shudu, Yunnan Province, southwestern China**

Submitted by Charlotte Cook, to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Geography, September 2009.

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(signature).....Charlotte G Cook.....

Abstract

A lack of well-distributed, high-resolution records of Late Quaternary Asian palaeomonsoon variability remains an outstanding issue for palaeoclimatologists, and is especially marked in remote regions such as the mountains of southwestern China (Wang et al., 2005). Characterising the nature, timing and magnitude of climate variability in southwestern China is essential for understanding the regional climate as a whole, and the potential social, economic and environmental impacts that may result from Asian monsoon system changes.

The NERC-funded research presented in this thesis focuses on a high altitude lake sediment record obtained from Lake Shudu, Yunnan Province, China. The lake is located on the southeastern edge of the Tibetan Plateau. The primary aims of this research were to identify and examine key environmental and climatic shifts which occurred in southwestern China during the Late Pleistocene (Dali) - Early Holocene Period; to examine the possible drivers of these changes; and to compare the findings with other regional proxy records in order to better understand climate dynamics in southwestern China. These aims were chosen in order to test the hypothesis that Late Quaternary millennial to centennial scale climatic and environmental changes in southwestern China were driven by changes in solar insolation and / or glacial climate boundary conditions, characterised by stepwise increases in palaeomonsoon intensity.

AMS ¹⁴C radiocarbon dates obtained from bulk sediment samples and pollen concentrations indicated that the seven metre core (06SD) that forms the focus of this research spans the last c. 22.6 ka cal. yr BP, making it one of the longest high-resolution Late Quaternary records available for southwestern China. 06SD was examined using a multi-proxy approach incorporating physical, organic and palaeoecological analyses.

The record captures the shift from colder, drier Pleistocene (Dali) conditions to warmer, wetter Holocene conditions and is punctuated by two events. The first event, centred at c. 17.3 ka cal. yr BP, possibly represents a phase of warmer and / or wetter conditions in response to rising solar insolation during the deglacial period. The second event, commencing at c. 11.7 ka cal. yr BP, possibly denotes the Pleistocene - Holocene Boundary.

Overall, the findings of this research support the view that during the Late Pleistocene, Asian summer monsoon strengthening was non-linear and driven by changes in glacial dynamics and / or solar insolation.

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