

**Reconstructing Holocene hydroclimate in Central Asia:
¹⁴C-dating and dendrochronology of ancient trees and pluvial lake shorelines in
Tarim Basin, Xinjiang, China**

Aaron E. Putnam, Wallace S. Broecker

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Prior Climate Center proposals:

2007 October: Kaplan, M.R., Schaefer, J., **Putnam, A.** The Puerto Bandera moraine system: A test case for documenting late glacial climate change in the Southern Hemisphere. Results: 1.) Established regional ¹⁰Be production rate in Patagonia. 2.) Developed a ¹⁴C- and ¹⁰Be-based glacial chronology for the late-glacial period in Patagonia.

2010 April: Schaefer, J., Winckler, G., Bromley, G., **Putnam, A.**, Rupper, S. Sensitivity of tropical glaciers to Holocene climate changes – a pilot study from Bolivia. Result: Collected samples for ³He surface-exposure dating in the Tropical Andes.

ABSTRACT: The response of Central Asian water resources to climate change is uncertain, posing a major challenge to 21st Century policy and planning. Here, we propose to approach this problem from a palaeoclimate perspective, and request funds to initiate a field expedition in August 2011 to the Tarim Basin, Xinjiang, western China, where we will collect samples that bear on the Late Holocene hydroclimate history of Central Asia. Wood and shell samples collected during a reconnaissance expedition to the Tarim Basin in 2010 give pilot ¹⁴C ages that place the last pluvial period in the Tarim Basin during the Little Ice Age (LIA; ca. CE1300 to CE1880). These preliminary results suggest that: (1) the hydrology of mid-latitude Central Asia is highly sensitive to remote climate anomalies, and (2) that hydroclimatic changes between Central and South Asia were antiphased during LIA time. We would like to return to the Takalamakan and Lop Deserts, where we will collect a comprehensive set of ancient wood, now partially buried beneath sand dunes, for ¹⁴C dating and dendroclimatology. In addition, we intend to conduct systematic mapping and sample collection for ¹⁴C and U/Th dating of Late Holocene and earlier shorelines of paleo-lake Lop Nor in order to reconstruct Holocene (and perhaps earlier) lake-level fluctuations in the Tarim Basin. From this information we hope to learn more about hemispheric climate linkages, and to anticipate the sign of future Central Asian water balance under continued atmospheric warming.