

Title: Paleomonsoon history of the southern Qinghai Lake Basin on the northeastern Tibetan Plateau

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Synopsis: Steve Porter is engaged in a study of the paleomonsoon history of the southern Qinghai Lake Basin on the northeastern Tibetan Plateau, a project funded by NSF and the Chinese Academy of Sciences. Qinghai Lake is the largest saline lake in China and the objective of an International Continental Drilling Program project. Long cores drilled below the lake floor and on the adjacent shore are being analyzed by an international team of scientists who expect to reconstruct a detailed paleoenvironmental record reaching back into the Pliocene. Porter's complementary study is focused on the sedimentary and geomorphic record onshore between the southern lake margin and the adjacent Qinghai Nan Shan, a young mountain range that reaches altitudes of 4500-4700 m. Catherine Rigsby (East Carolina University) is engaged in a similar study along the northern sector of the lake. Both Porter and Rigsby are working in collaboration with young scientists from the Institute of Earth Environment, Chinese Academy of Sciences in Xi'an, who are responsible for radiocarbon and luminescence dating.

Nearly 100 samples have been collected for OSL dating. The dates will help define the timing of lake-level fluctuations during the last 100,000 years, bajada formation along the northern front of the mountains, mountain glaciation, periglacial conditions (ice-wedge casts and involutions), late-glacial loess, dune activity, and late Pleistocene archeological sites. Our preliminary results point to high lake levels during the early Holocene and marine isotope stage (MIS) 3, widespread alluviation during MIS 3, and the spread of permafrost during MIS 2. Dunes were active in the late Holocene and late MIS 2, concurrent with brief occupation of sites by hunter-gatherers along the mountain front about 11,000-12,000 ¹⁴C years ago. The geologic results are consistent with other studies in western China that document high lake levels and glaciation during the late Pleistocene. When the drill-core studies are completed, the dated lake and land records should provide a comprehensive paleoenvironmental history of the basin.

Photo 1. Excavation in lacustrine bar marking a high lake stand during MIS 3, with snowy Qinghai Nan Shan in distance.

Photo 2: Sampling MIS 3 lake sediments in cliff exposure for luminescence dating.