Title:	Investigating the role of meltwater versus precipitation seasonality in abrupt lake-level rise in the high-altitude Tso Moriri Lake (India)
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Abstract:	We present late Quaternary lake level reconstruction from the high altitude Tso Moriri Lake (NW Indian Himalaya) using a combination of new and published data from shallow and deep water cores, and catchment geomorphology. Our reconstruction indicates two dramatic lake level increases – a late glacial (ca. 16.4–12.6 cal kyr B.P.) rise of 65 m, and a 47 m rise during the early Holocene wet phase (ca. 11.2–8.5 cal kyr B.P.) which are separated by the Younger Dryas (YD) event. We decouple the role of precipitation seasonality and snow melt using a combination of proxies sensitive to the Indian Summer Monsoon (ISM), and a regional spatio-temporal transect that provides information on the eastward penetration of the winter westerlies. A comparison of shallow and deep water cores shows that (i) the first lake level increase (~ 65 m, ca. 16.4–12.6 cal kyr B.P.) is caused by melt water inflow triggered by the increasing summer insolation; (ii) the second lake level increase (~ 47 m, 11.2–8.5 cal kyr B.P.) is largely caused by a rise in annual precipitation coupled with reduced summer evaporation; (iii) in contrast to the onset of ISM (Bay of Bengal branch) at ca. 14.7 ka in lower elevations in NE India, the hydroclimatic influence of ISM in the high altitude Himalaya is seen only between 12.7 and 12 cal kyr B.P., though the influence of solar insolation (via increased snowmelt) is visible from 16.4 cal kyr B.P. onwards; (iv) the eastward penetration of westerlies in Indian Himalayas is strongly influenced by the strength of the Siberian High.
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