Sediment records from Tibetan lakes record dramatic climatic variability of the Tibetan Plateau in NW China during the Holocene. Here we investigated ancient communities of photosynthetic microbial communities in Kusai and Qinghai Lake on the Tibetan Plateau and their responses to important climatic events in the late Holocene (ie., fossil DNA). In both lakes, the fossil DNA approach revealed distinct temporal changes in the abundance of photosynthetic plankton groups in response to well-known climatic events, such as the Heinrich 1 (H1), the Older Dryas (OD), the Younger Dryas event (YD), the Preboreal period (PP), 5-ice rafting events, mid-Holocene climatic optimum, Medieval Warm Period (MWP) and the Little Ice Age (LIA). These correlations suggest that climate-induced changes in salinity, nutrient level, light intensity, and temperature contributed to the observed temporal changes of paleo planktonic communities. Based on these paleo-ecology proxies, we propose a Phytoplankton Index (PI) as a paleo-ecological indicator for paleo-environmental changes in Tibetan lakes. Our results collectively demonstrated that Tibetan lake sediments not only recorded local and regional (such as paleo-precipitation and Asian monsoon) but also global paleoclimatic events (such as North Atlantic ice rafting events and sunspot minima). Therefore Tibetan lakes continue to be important sites for studying microbial response to the decadal to centennial Asian monsoon variations and other regional and global paleoclimate changes.


Response of Photosynthetic Plankton Communities to Late-Holocene Climate Change on the Tibetan Plateau

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