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Ecological impacts caused by the alternance of wet/dry episodes occurred in the last 2,000 years in southern Tibetan Plateau: A paleoecological record from Lake Nam Co

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High altitudinal aquatic ecosystems are subject to environmental change due to global warming and increasing solar radiation. The Nam Co catchment is part of the highest and largest alpine plateau on Earth, where the effects of climate change are expressed stronger than the global average. Thus, this area has experienced rapid changes in biodiversity. Fluctuations between wetter and drier periods during the last 2,000 calibrated (cal.) years were detected. These changes may alter the dynamics in ecosystems and therefore their resilience to climate change.

A ~65 cm sediment record from Nam Co spanning the late Holocene, was analyzed to evaluate the assemblage composition of three of the most abundant and diverse benthic taxa (Arcellinidae, Ostracoda and Chironomidae) and the diverse family of small bivalves (Sphaeriidae). In general, the presence of the bivalve *Pisidium stewarti*, together with a high abundance of black-coated ostracod shells, and high Ca/Ti and Zr/Rb ratios correspond to the driest period (~ 1,000 - 1,860 cal. years BP) detected in our sediment record. For the last 256 cal. years, higher lake levels were inferred from aquatic fauna composition and geochemical analysis (XRF and XRD) suggesting a more humid environment. This period was characterized by higher temperatures and a higher input of organic matter. Species not previously reported for Lake Nam Co such as Arcellinida species, the ostracod *Ilyocypris angulata*, several chironomid species, and the bivalve *P. stewarti*, were observed. These new records, as well as the detection of varieties in morphological structures (e.g. spines, aggregate material, valve ornamentations, etc.) highlight the probable existence of cryptic species in the ecosystem, which is an important factor to take into account for

biodiversity evaluation and paleoenvironmental inferences, due to potential misleading ecological interpretation.

Therefore, emphasis should be placed on combining ecology, morphology and DNA analysis to corroborate the taxonomy of species already described, and determine the accurate richness and distribution of the species in an environment where endemism is expected. This is essential in order to evaluate possible losses or gains in terms of diversity that climate change may exert on aquatic ecosystems in the future.