

Water depth related Ostracods distribution in Pumayum Co, Southern Tibetan Plateau

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Nine species of ostracods were identified from 55 surface sediment samples and 38 gravity core (72 cm long) samples of Lake Pumayum Co in Southern Tibet. Ostracods species and environmental variables, including water depth, temperature, pH value, dissolved oxygen, electronic conductivity and photosynthetically active radiation (PAR), were tested by using cluster analysis and correlation analysis for discussing relations of ostracods and its host water condition. The forward CCAs were taken out and the following results revealed that PAR and depth significantly drove the distribution of modern ostracods in the lake. Correlation analysis of variables indicated that PAR is highly correlated ($r = -0.98$) with water depth, which highlights the role of water depth as driving variable. Therefore, a water depth transfer function was set up by a WA-PLS model for reconstructing palaeo-lake level based on relative abundance of modern Ostracods. The transfer function presented a good correlation of measured and estimated water depth ($R^2 = 0.87$), and a high Root-Mean-Squared Error of Prediction ($RMSEP = 15.47$). Relative abundances of ostracods from gravity cores were included to this model and produced a series of reliable palaeo-lake level data. Conjunctive multi-proxies were compared to discuss past environmental changes of the lake catchment area which indicated a cool to warm period with an arid events around 5.2 ka BP and a rapid cold event in 1.3 ka BP from mid Holocene (6 ka BP) to present.

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