

Understanding the drivers of ecosystem change at Tasik Chini to inform sustainable management

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Tropical areas are subject to increasing environmental pressures as a combined result of climate change and human impact on the landscape, which threaten significantly the quality and biodiversity of freshwater ecosystems. Recent economic development in Malaysia has resulted in widespread forest clearance for logging and oil palm plantations, increased mining activity, and pollution from industrial and urban growth. These have impacted directly on Tasik Chini and its surrounding area in recent decades, and conservation of this rare wetland is of great importance due to its ecological and cultural significance. The implementation of sustainable management strategies can help protect the site into the future, however a large proportion of limnological studies and monitoring surveys these plans will be based on were conducted after the start of rapid development in the late 20th century. Therefore, determining how the ecosystem functioned before the influence of major human activity and what effect environmental changes had on Tasik Chini is important for understanding the natural baseline conditions of the lake-catchment system and for generating robust approaches to conservation. Here, we use palaeolimnological techniques to investigate multiple sediment cores from Tasik Chini to study environmental conditions since the lake's formation around 5000 years ago, which will help to identify the key drivers of ecosystem change and provide a longer-term context for the influence of human activity at the site. A combination of elemental, stable isotope, diatom, and pigment analyses indicate substantial shifts in sedimentation, hydrology, and water quality, in particular since the mid-20th century. The palaeorecord confirms recent environmental variability to exceed that of natural changes in the past, where major shifts in the lake ecosystem were principally initiated by land use changes and hydrological impoundment.