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Recent habitat degradation in karstic Lake Uluabat, western Turkey: a coupled limnological-palaeolimnological approach

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Abstract

The Ramsar site of Lake Uluabat, western Turkey, is suffering from eutrophication, industrial pollution and water abstraction, and its naturally-fluctuating water levels are now managed artificially. Here we combine monitoring and palaeolimnological techniques to investigate spatial and temporal limnological variability and ecosystem impact, using an ostracod and mollusc survey to strengthen interpretation of the fossil record. A combination of low invertebrate Biological Monitoring Working Party scores (<10), low ostracod and mollusc diversity across the lake basin, and the dominance of eutrophic diatoms confirms the lake's poor ecological status. Analysis of organic and carbonate content, diatoms, stable isotopes, ostracods and molluscs in a radiometrically-dated sediment core (ULU20A) indicates a 20th century trend towards increased sediment accumulation rates and eutrophication which was probably initiated by deforestation and agriculture. The most marked ecological shift occurs in ca. 1962, however. A subtle rise in diatom-inferred total phosphorus, coupled with an inferred reduction in submerged aquatic macrophyte cover, accompanies a major increase in sediment accumulation rate; an associated marked shift in ostracod stable isotope data indicative of reduced seasonality and a change in hydrological input indicates impact from artificial water management practises, all of which appears to have culminated in the sustained loss of submerged macrophytes since 2000. We discuss the implications for lake restoration in the context of the EU Water Framework Directive. In a wider context, the results have important implications for the conservation of shallow karstic lakes, the functioning of which is still poorly understood.

Keywords

Keywords: biomonitoring, palaeolimnology, diatoms, ostracods, isotopes, eutrophication

