Assessment of the environmentally minimum lake level based on morphological features

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ABSTRACT

The determination of environmentally minimum water level in lakes is essential for the protection of their ecosystems. The assessment of minimum water level depends on a number of biotic and abiotic factors of the lake ecosystem; however, in many cases these factors are not easy to collect and assess in their entirety. At the same time, the lakes in many cases consist an important water reserve to meet the requirements arising from economic activities, e.g. industry, agriculture. In this paper, the morphological features in four lakes – Vegoritida, Petron, Cheimaditida and Zazari – of Northern Greece are analysed in order to assess their environmentally minimum water level. The morphological analysis is based on the relationship of the lake surface area and volume with the water level. An optimization method is applied taking into account that the biodiversity is favoured as the surface area covered by the lake is increased and the human water requirements are satisfied to the greatest possible extent by the available water volume of the lake. The environmentally minimum water level determined by the morphological analysis in the four lakes is compared with the minimum water level based on the analysis of the requirements of fish fauna and macrophytes.