DEVELOPMENTWATER QUALITY OBJECTIVES APPLICATION MULTIVARIATE STATISTICAL ANALYSIS (LAKE SEVAN)

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The water quality of Sevan Lake has been of great environmental concern for a number of decades since it is the greatest available freshwater resource not only for Armenia but also for the region. The lake consists of two morphometrically different basins - the deeper Minor and the relatively shallow Major Sevan. 29 rivers and Arpa-Sevan tunnel flow into the lake from the watershed and only the River Hrazdan flows out of the lake. Tributaries control the water regime and quality of the Lake Sevan. During the monitoring of water quality both of the Lake Sevan and its tributaries, a significant amount of data is generated, which often results in challenges in interpreting the dataset.

Multivariate statistical methods such as factor analysis and cluster analysis were applied to identify the main factors and pollution sources affecting on the water quality of the Lake Sevan and to evaluate spatial and temporal similarities and propose water quality objectives for the assessment water quality of Lake Sevan.

Water quality of 35 hydrochemical parameters has been considered for the period 2010–2019. Water samples of the Lake Sevan were collected from 17 sampling stations and 3-5 depths (surface, 5–7m, 20–30m and 60m). The water samples were taken May, July and October of each year. The following water quality parameters were included in these analyses: phosphate, total phosphorus, nitrate, ammonia, nitrite, transparency (Secchi disk depth), sulphate, chloride, total dissolved solids, main cations and heavy metals.

It has been demonstrated that the methodology efficiently classifies into various clusters as far as the present data set is concerned.

References

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