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MULTIVARIATE STATISTICAL ANALYSES OF WATER QUALITY OF DANUBE RIVER AT GALATI, ROMANIA

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Abstract

This paper presents the research on the temporal variability of water quality parameters for the most important river system in Romania and Europe – the River Danube. The data on the river water quality had been obtained between January 1990 and December 1998. The investigation was systematic and complex. Using the Kolmogorov-Smirnov test, and traditional statistical methods based on correlation matrix - Principal Component Analysis (PCA) and Factor Analysis (FA), and ANOVA all the samples data sets were classified in order to determine the seasonal variability of the water quality state parameters and to identify the key quality factors that cause variability. The methodology for the systematic analysis due to the identification of the fundamental and the dependent parameters will not be exposed in this article. This is the subject of another paper. These statistical analyzes showed that more than 70% of the total variance can be explained by three main factors: a) the first factor (**F1**) is the tutorial involving inorganic human influence type and flow variations and provides a natural buffer system perspective of the ecosystem; b) the second factor (**F2**) is the trophic factor; c) the third factor (**F3**) is related to the impact of anthropogenic activities. The analysis revealed that the weight of the three main factors is not the same over the course of the year. This work highlights two major aspects: the first one is due to the fact that the site of research is the meeting point of the borders of three countries: Moldova, Ukraine and Romania. The second significant issue is caused by the fact that the study was conducted in the predeltaic area of the Danube Delta. This study was carried out over 10 years, and highlights the auto-filtering capacity of the Danube (River). Research of this type is extremely useful because there are no other previous studies of this complexity.

Key words: ANOVA, Danube River, Factor Analysis, Principal Components Analysis, temporal variability

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