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DEVELOPMENT OF AN EXPERT SYSTEM FOR SURFACE WATER QUALITY MONITORING IN THE CONTEXT OF SUSTAINABLE MANAGEMENT OF WATER RESOURCES

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Abstract

The paper presents and discusses some aspects concerning the development of an expert system designed for surface water monitoring in the context of sustainable management of water resources in Romania and neighboring countries. Technical considerations, which are worthy to be included in the analysis of such kind of systems, are addressed: the system structure (number, type and location of hydrometric stations), number and type of measured indicators, transducers and sensors used for measurements, sampling frequency and data processing, including some practical and operating issues. Moreover, the article focuses on the water quality monitoring, the dispersion of chemical pollutants and the evolution of water quality indicators by using mathematical models from the Mike software package in the context of sustainable management of water resources.
As an application of the above-mentioned aspects, the development of a monitoring expert system designed for Bahlui River is presented, especially focusing on the urban area of Iasi city, which generates the most significant pollution due to the industrial activities. Based on the experimental cadastral data related to the cross sections located in different monitoring points, the Bahlui River network quality from the entrance to the exit in Iasi city are obtained by using the Mike 11 software package. In order to validate the models, in the studied area, other similar results generated by the previous version of the Mike software (Danish Hydraulic Institute) are included as well.

***Keywords*:** Bahlui River, Mike 11, modelling software, monitoring expert system, water quality indicators

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1. Introduction

In the actual context of the water crisis determined by the continuously growing population and by the diminishing of the natural water resources due to the anthropogenic activities, the management of water resources should provide water in a sustainable manner. This target can be achieved via the integrated water resource management that involves advanced wastewater treatment technologies for appropriate water discharge in the environment or recycling or its reuse (Gavrilescu et al., 2008; Teodosiu, 2007) and water quality monitoring (analytical control of pollutants) (Cretescu, 2013).

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