

SURFACE WATER QUALITY MODELLING IN THE ISKAR BASIN: METHODOLOGY AND FIRST RESULTS

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ABSTRACT

Aquapôle is involved in environmental modeling for more than 20 years. Its integrated model PEGASE (Planification Et Gestion de l'Assainissement des Eaux) is devoted to the simulation of the surface water quality.

The deterministic and physically based model:

- extends the “rivers” models to explicitly take into account their watershed;
- has a coherent and complete way to structure pollutants loads and discharges;
- has a complete aquatic ecosystem and water quality description;
- is dedicated to simulate complex future scenarios.

The model also structures the river ecosystem knowledge and represents:

- a new way to assess the water quality, by non-stationary, accurate and physically based calculation on the whole basin, and by comparison on discrete measurements points for validation;
- a new way to assess the impact of decided measures to enhance the quality of targeted water bodies, by performing simulations of scenarios on the basin, before any physical implementation, and thus assess the cost/efficiency ratio of each measure;
- a new operational way to assess the impact of climatic changes on the future river quality, allowing to forecast long term strategies;
- a new way to structure relevant knowledge (construction of operational databases), to ensure the consistency of the data at international levels and to support the coordination on water quality management between states;
- a new way to extrapolate discrete measurements from monitoring networks (in time and space) to each water body by a sophisticated physically based calculation.

In 2011, the PEGASE Model has been implemented for the first time in Bulgaria, on the Iskar River basin. Thanks to a project funded by Wallonie-Bruxelles International, the first Iskar database has been constructed in association with the Danube Region Basin Directorate, and the first simulations have been carried out in 2012. The results of the first simulations are very promising. The perspective for future projects being the validation of the Iskar model, performing prospective simulations to assess the program of measures and extending the model to other Bulgarian basins.

Keywords: Environmental Modelling, Surface Water, integrated Water Management, Quality Assessment, Water Framework Directive