



## **GIBSI : an integrated modelling software for watershed management**

**Renaud Quilbé**, Alain N. Rousseau and J.-P. Villeneuve

Institut National de la Recherche Scientifique – Centre Eau, Terre et Environnement (INRS-ETE), Université du Québec, 490 rue de la Couronne, Québec (QC), Canada, G1K 9A9

GIBSI is an integrated modelling system that aims to assist stakeholders in watershed management. It is based on a database that includes spatial and attribute data characterizing the watershed, coupled to a GIS and a user-friendly interface. This allows using GIBSI as a simple information system to visualize and analyse data at different spatial scales. It also provides modelling tools to assess *a priori* the effect of watershed management scenarios on surface hydrology and water quality. They are based on four distributed physically-based models that simulate hydrological processes, soil erosion, agricultural pollutant transport (nutrients and pesticides) and water quality in surface water on a daily time step. Before simulation, management modules enable to define scenarios regarding reservoirs, land use, point source pollution or agricultural management. Finally, post-processing tools (graphics, maps, cost/benefits analysis, probability of exceeding water quality standards) help the user to analyse simulation results.

As an illustration, we present several ongoing research projects regarding GIBSI development or applications on the 6680 km<sup>2</sup> Chaudiere river watershed, located near Québec City (Canada). Management applications include the impact assessment of: (i) timber harvest; (ii) municipal clean water program; (iii) agricultural land use adaptation under climate change, as well as (iv) the determination of achievable performance standards for pesticides. Development works include: (i) pathogen transport model development, (ii) agricultural chemical (nutrient and pesticides) transport models calibration, (iii) integration of a biological integrity index based on diatoms response to pollutants, and (iv) application on other watersheds.

A demonstration of GIBSI will be provided with the poster.