

NUMERICAL MODELING OF WATER QUALITY AS A TOOL FOR DECISION MAKING: THE RECOVERY PROJECT FOR MATANZA- RIACHUELO RIVER

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Abstract. Numerical modeling of water quality is a well established technique in order to provide a diagnosis for a water body, and to analyze the efficiency of possible human interventions on that water body in order to mitigate existing adverse effects, or improve its quality. Mathematically, the problem can be described in terms of an advection-diffusion-reaction equation for the pollutant concentration, with a 1D, 2D, or 3D approach, depending on the length scale of interest. A major challenge for the success of the simulation lies in the adequate estimation of pollutant loads from distributed (non-point) sources, especially complicated in highly urbanized zones. Another difficulty consists in having available enough measured data on pollutant concentration in the water body, in order to calibrate the model; this includes the proper interpretation of those data, which may complicate in highly dynamic flows. These two topics are essential in order for the simulation to qualify as an accepted tool for decision making.

The Recovery Project for the Matanza-Riachuelo River (the highly polluted main urban river of the Metropolitan Region of Buenos Aires) has provided the opportunity to undertake a relatively original experience in Argentina: the newly constituted Water Basin Authority (ACuMaR) set up a modeling approach as the basis to decide the recovery strategy. A 1D model was implemented for the river and its main tributaries, while a 2D model was built for the Río de la Plata, which is the final receiving water body for the most part of the organic discharges, through a pair of sub aquatic outfalls. Surveys were performed on both water bodies to obtain updated data. Water quality criteria for water use are being established through a special inter-jurisdictional commission. Based on these studies, the World Bank has awarded a first-stage loan of 860 million dollars to undertake the main infrastructure works.