



The ODUSSEUS project: Developing an advanced software system for the analysis and management of water resource systems

A. Efstratiadis (1), G. Karavokiros (1), S. Kozanis (1), A. Christofides (1), A. Koukouvinos (1), E. Rozos (1), N. Mamassis (1), I. Nalbantis (1), C. Noutsopoulos (1), E. Romas (1), L. Kaliakatsos (1), A. Andreadakis (1), and D. Koutsoyiannis (1)
(1) Department of Water Resources, School of Civil Engineering, National Technical University of Athens, Greece. (Contact Email: andreas@itia.ntua.gr /Fax: +30 210 7722832)

The ODYSSEUS project (from the Greek acronym of its full title “Integrated Management of Hydrosystems in Conjunction with an Advanced Information System”) aims at providing support to decision-makers towards integrated water resource management. The end-product comprises a system of co-operating software applications, suitable to handle a wide spectrum of water resources problems. The key methodological concepts are the holistic modelling approach, through the conjunctive representation of processes regarding water quantity and quality, man-made interventions, the parsimony of both input data requirements and system parameterization, the assessment of uncertainties and risks, and the extended use of optimization both for modelling (within various scales) and derivation of management policies. The core of the system is a relational database, named HYDRIA, for storing hydrosystem information; this includes geographical data, raw and processed time series, characteristics of measuring stations and facilities, and a variety of economic, environmental and water quality issues. The software architecture comprises various modules. HYDROGNOMON supports data retrieval, processing and visualization, and performs a variety of time series analysis tasks. HYDROGEIOS integrates a conjunctive hydrological model within a systems-oriented water management scheme, which estimates the available water resources at characteristic sites of the river basin and at the underlying aquifer. HYDRONOMEAS is the hydrosystem control module and locates optimal operation policies that minimize the risk and cost of decision-making. Additional modules are employed to prepare input data. DIPSOS estimates water needs for

various uses (water supply, irrigation, industry, etc.), whereas RYPOS estimates pollutant loads from point and non-point sources, at a river basin scale. A last category comprises post-processing modules, for evaluating the proposed management policies by means of economical efficiency and water quality requirements. The latter include sophisticated models that estimate the space and time variation of specific pollutants within rivers (HERIDANOS) and lakes (LERNE), as well as simplified versions of them to be used within the hydrosystem simulation scheme. An interactive framework enables the exchange of data between the various modules, either off-line (through the database) or on-line, via appropriate design of common information structures. The whole system is in the final phase of its development and parts of it have been already tested in operational applications, by water authorities, organizations and consulting companies.