



Modeling diffuse pollution loading into a Mediterranean Lagoon

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ABSTRACT The anthropogenic input of nutrients in both freshwater and coastal ecosystems has become one of the biggest environmental problems for a sustainable management of water resources. Nitrogen input to fresh water can be considered as one of the main factor causing eutrophication both of inland and coastal waters. According to European Community statistic 25% of agricultural areas in Europe have nitrate groundwater concentrations above the maximum concentration limit of 50 mg/l, and 80% of the areas have nitrate groundwater concentrations above the guide level of 25 mg/l. The Water Framework Directive requires member states to perform an analysis of pressure and impact on the surface and sub surface water resources. Diffuse sources of pollution have to be identified and the impacts on ecological status of surface and subsurface water have to be identified. In this contest, modeling plays a central role in this analysis. This paper presents the application of the watershed scale model SWAT linked with the physically based groundwater model MODFLOW to the Burano Po di Volano coastal basin, which is situated in Northern Italy. This area is especially important because it has intensive agriculture and because nutrients drain directly into the Sacca di Goro Lagoon. This lagoon has been subjected to eutrophication because of the freshwater inputs from the inland catchment contain high load of organic and mineral nutrients. This integrated tool was applied successfully to the Bonello basin. It captured accurately the river-groundwater interactions and predicted accurately the nutrients loss both in surface and groundwater. The validate tool was then applied to evaluate the impact of alternative land use and water management scenarios on surface and sub-surface water quality.

KEYWORDS: Water quality, Catchment management, Groundwater resources, Diffuse pollution, Integrated modeling.