



Modelling hydrology and water quality in a Mediterranean catchment

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In this study the SWAT model has been used in order to analyse and quantify pollution dynamics at basin scale depending on concentrated and diffuse sources. Nowadays, the receiving water bodies quality safeguarding is of growing importance due to the promulgation of recent laws as well as the growing sensitivity regarding the environment issues by the scientific and practitioner committee. Recently the EU 2000/60 (Water Framework Directive) makes the analysis of receiving water bodies even more complex by integrating the pollution in urban areas in a framework of the pollution sources at catchment scale. and making necessary further integration of environmental impacts associated with discharges concentrates civilian and productive with the widespread pollution linked mainly to agriculture and zoo-technical activities. The complexity of natural systems and the large number of polluting sources and variables to be monitored requires the adoption of models able to get a better view of the whole system in a simplified way without neglecting the most important physical phenomena. Particularly, in this study the SWAT model was considered since it is an integrated hydrological model that are, nowadays, needed to support the implementation of integrated water management plans and to comply with the current requirements of the WFD. In addition, the SWAT model is interfaced with the ARC-VIEW software which allows easy pre-and post processing of the spatially distributed input data, driving the rainfall-runoff process. The model has been applied to the experimental Nocella catchment located in Sicily (Italy), with an area of about 50 km². The river receives wastewater and stormwater from two urban areas drained by combined sewers. The study demonstrates that the analysis of water quality in partially urbanised natural basins is complex depending on variable polluting contributions of the different parts of the system depending on specific polluting compounds. The model was calibrated and then validated, obtaining satisfactory performance. The estimation of loads from diffuse sources was difficult due to limited data availability. Thus, it was only possible to include constant diffuse pollution concentrations at present. In spite of these limitations, the model captured rather well the dynamic of flow generation and was able to predict the range of nutrient concentrations in surface water. The contribution of urban areas to the polluting loads at catchment scale is relevant especially during the dry season.