A large scale model approach finalised to the management of coastal groundwater resources: the case of Salento (southern Italy)

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The general purpose of this paper is to prove the capability of numerical models in management of groundwater resources and in particular for achieve forecast scenarios to evaluate the impacts of climate change on them. A large-scale approach was chosen. The active domain of the study area (active cells) covers approximately 2,300 km^2 with 45,925 cells. Vertically, the area was divided into 12 layers to allow a good lithological and hydrogeological discretization. Thickness and geometry of layers was defined on the 3D knowledge of hydrogeological complexes. Climatic, hydrological, geological, hydrological and agricultural acquisitions were processing and became the input for a variable-density flow and transport numerical modelling. MODFLOW and SEAWAT was used. Qualitative and quantitative groundwater trends from 1930 to 2060 were defined. To achieve predictive scenarios for the management of coastal groundwater resources could be necessary take into account climate changes, with regard particularly to temperature, precipitation, sea level and seawater salinity. The purpose was assessing the effects of climate change on groundwater availability and quality. Results show an important piezometric decrease and an increment of seawater intrusion and in consequence a deterioration of groundwater resource. For these requires different scenarios of pumping were considered to pursue the optimal solution to combine water demand and steady availability and quality of discharged water.