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Hydrogeological and hydrological modeling for water resources management in karstic landscape at the basin scale. A case study: the Bussento river basin

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Deep groundwater and surface water resources management represents a present key issue, both in the hydrogeological and the hydrological fields. Indeed the development of a community is highly related to the management of the water resources available for the community itself and there is a need, for this reason, to rationalize the existing resources, to preserve water quality, fishery, fluvial habitats, and, on the other hand, to prevent flood risk. An integrated approach, accounting for hydrogeological, hydrological, geochemical and biological features can be a valuable tool, being fundamental in karstic landscape because of the great system variability and because of the frequently complex anthropic interaction.

In this study we focus on a particular case study, the Bussento river basin, located in the Campania region, Southern Italy, which is well know to hydrogeology and geomorphology scientists for its karstic features, as summit highland with dolines and poljes, lowland with blind valleys, disappearing streams into sinkholes and cave systems. The catchment groundwater circulation is very complex, as it will be discussed, and frequently groundwater inflows from the outside of the hydrological watershed and groundwater outflows toward surrounding drainage systems occur. A conceptually based hydrogeological model is investigated as a supporting element in assessing hydrological water quantity and water quality, in a semi-distributed conceptually based

framework, supported by field measurements collected within several seasonal campaigns. Even tough the proposed approach has some similarity with a few well known conceptually schemes, based on the existence of linear reservoirs and liner channel to describe the different components the streamflow can be decomposed in, it is valuable because of the possibility to join all together hydraulic, hydrological and hydrogeological data to achieve reliable results. The use of the proposed conceptually based hydrogeological approach in water quality assessment is also discussed and a well know technique for groundwater vulnerability evaluation has been applied, supported by field surveys and GIS analysis, in order to assess the water quality.