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Mitigation of stormwater flooding by identifying areas suitable for Sustainable Drainage Systems and Aquifer Storage and Recovery (case study: Rome, Italy)

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This study proposes a survey methodology to identify areas for combined Sustainable Drainage Systems (SUDS) and Aquifer Storage and Recovery (ASR), (Dearden et al. 2013, Sharp Jr., 1997); these techniques exploit the hydrogeological and geomorphological characteristics of an area, to increase the natural capacity of water to infiltrate the ground.

The target area of this case study is the city of Rome and the aim of such techniques is to reduce the problems related to rainwater which, in case of extreme events, struggles to infiltrate the ground, overloads the undersized hydraulic systems and floods the urban space.

The proposed method involves GIS geospatial analysis of various data: the permeability of outcropping lithology, the piezometric level of the aquifer, hydrogeological units, geomorphology and land use.

In this aim zones characterised by high permeability and a piezometric level that would confer a volumetric capacity to possibly store even large quantities of water without triggering possible problems associated with fluctuations in the water table, have been identified.

The data have been divided into classes and indexed for comparison and overlap them. Finally, hydrogeological units were also taken into account (by analysing their depth trend) in order to identify areas with similar characteristics of permeability with respect to depth. The latter will also be compared with the previous data to identify the areas suitable for SUDS and ASR.

The final product of the suitable areas from a hydrogeological point of view will be compared with the land use map in order to exclude those areas that, for administrative and other legislative reasons, cannot be used for such activities.