



## **Rome: sinkhole events and network of underground cavities (Italy)**

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The anthropogenic sinkholes in the city of Rome are closely linked to the network of underground cavities produced by human activities in more than two thousand years of history. Over the past fifteen years the increased frequency of intense rainfall events, favors sinkhole formation. The risk assessment induced by anthropogenic sinkhole is really difficult. However, a susceptibility of the territory to sinkholes can be more easily determined as the probability that an event may occur in a given space, with unique geological-morphological characteristics, and in an infinite time. A sinkhole susceptibility map of the Rome territory, up to the ring road, has been constructed by using Geographically Weighted Regression technique and geostatistics. The spatial regression model includes the analysis of more than 2700 anthropogenic sinkholes (recorded from 1875 to 2015), as well as geological, morphological, hydrological and predisposing anthropogenic characteristics of the study area. The numerous available data (underground cavities, the ancient entrances to the quarry, bunkers, etc.) facilitate the creation of a series of maps. The density map of the cavity, updated to 2015, showed that more than 20 km<sup>2</sup> of the Roman territory are affected by underground cavities. The census of sinkholes (over 2700) shows that over 30 km<sup>2</sup> has been affected by sinkholes. The final susceptibility map highlights that inside the Ring Road about 40 km<sup>2</sup> of the territory (about 11%) have a very high probability of triggering a sinkhole event. The susceptibility map was also compared with the data of ground subsidence (InSAR) to obtain a predictive model.