



## **Integrated geophysical approach for karst system characterization: Castello di Lepre karst cave (Marsico Nuovo, Basilicata Region, Italy).**

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The characterization of a karst system is very complex; therefore, it is important to develop new technological strategies that are able to improve the subsoil information in karst context. The geophysical techniques are good candidates as they require a non-invasive approach, high resolution and good depth of penetration. Castel di Lepre karst system is located in Marsico Nuovo municipality (Basilicata Region, Italy) and is disposed in the Mezo-Cenozoic carbonate substratum of the Monti della Maddalena ridge (Southern Appenines). In the karst area is located a cave, which grows in the Monti della Maddalena mountain. It has a total length of 1848 m and a depth of 146 m from the entrance. Part of the cave system was already used for geophysical activities last year (Guerrieri et al., EGU 2017), where a cross-hole ERT acquisition system was applied. During this paper, the authors will introduce a second phase of the Castel di Lepre karst system work. The attention of the second phase was on the entrance of the karst system where a covered sinkhole is disposed. In this second phase the use of electromagneto-metric measurements coupled with ground penetrating surveys and geoelectrical profiles were used to characterize the external area of the cave and identify the subsurface geological structures. Further a dense grid of self-potential acquisition were used to highlight the hydrogeological information of the subsoil water circulation that is a crucial task in the studied area. The target of the investigation is twofold: from one side with the use of electromagnetic techniques a high resolution and three-dimensional reconstruction of the possible sinkhole is attempted, from the other side the capability of these less-common techniques is evaluated for characterization of sinkhole structures. The comparison of the recorded data gave the possibility to identify some interesting geological structures providing to characterize the whole area completing the information obtained during the measurements realized within the cave. Further the comparison and integration of the data recorded during this initial phase of study have successfully reduced the uncertainties related to the application of each individual geophysical technique.