Geophysical Research Abstracts,
Vol. 11, EGU2009-8116, 2009
EGU General Assembly 2009

Radarfacies and sinkhole hazards.

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The term radarfacies, as defined by Baker (1991) refers to groups of radar reflections whose parameters (configuration, amplitude, continuity, frequency, interval velocity, attenuation, dispersion) differ from adjacent groups. Radar facies are distinguished by the types of reflection boundaries, configuration of the reflection pattern within the unit and the external form or shape of the unit.
The application of radarfacies to sedimentological analyses has been systematically done, permitting the 3D characterization of recent and old deposits where no soil or rock exposures exists or the lateral correlation of discrete data is needed.
The application of radarfacies to alluvial karst environments cannot be directly established from the usual radarfacies classifications. These changes are mainly related to the special conditions of the processes associated with alluvial karst. From the experience of application of GPR-facies classification during the past 8 years in more than forty survey fields, several distinctive features can be established to aid in karst identification.
The filling of subsident zones is usually surrounded by adaptation features (on-lap geometries) that only affect the limits of these zones and are not present throughout the whole depressed zone. This feature, as different from expected, is in many cases related to the particular features of the filling of the subsident zone, as sudden fillings during floodings or by antropic activity. On the other hand, the nature of the filling shows different characteristics, especially when the filling consists of materials different from the host rock (particularly if the material is antropic).
The internal structure of the karstic areas can represent both the sedimentological imprint and also the later modifications by karst activity. In this way, as can be applied in other reflection geophysical techniques applied in structural geology and tectonics, the loose in continuity and change in the dipping of the reflectors, or even the presence of reflectors that cut accross the expected horizontal structure, can be understood as faults and folds. Syn-, pre-, and post-karstic activity sedimentary units related to the karstic activity can be subsequently interpreted. On the other hand, when some of the indicators that can be interpreted as karst-related, can be associated with the sedimentary structure of the subsoil, the lateral correlation of the indicators and the 3D characterization (especially closed envelopes in map view by two-fold characterization) can aid in the assignation of the features.
In this work, from the direct comparison of GPR data with outcrops in quarries, trenches, surface data and correlation with other geophysical techniques, the methodology that can be applied to locate, delimit and characterize surficial karst activity (mainly applied to alluvial karst) is presented. On the other hand, this application of sedimentary features as indicative of processes is also compared with the qualitative changes of the EM properties through changes in the wave amplitude, reflectivity and attenuation, giving a second indicator about the meaning and characteristics of the delimited karstic areas. In this work, the methodology of study is mainly focused in a historical sinkhole with a cavity (identified from boreholes and microgravimetric survey) below the radar penetration depth. The internal structure of the subsoil by means the radar facies characterization permit to determine the radius of the affection area.