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# Geophysical mapping of solution and collapse dolines

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Karst rocks such as limestone, dolomite, anhydrite, gypsum, or salt can be dissolved physically by water or chemically by water enriched with carbon dioxide. The dissolution driven by water flowing through the karst aquifer either occurs along fractures and bedding partings in telogenetic rocks, or within the primary interconnected pore space in eogenetic rocks. The enlargement of either fractures or pores by dissolution creates a large secondary porosity typical for karst rocks, which is often very heterogenously distributed and results in preferential flow pathes in the sub-surface, with cavities as large-scale end members of the sub-surface voids.

Once the sub-surface voids enlarged by dissolution grow to a certain size, the overburden rock can become instable and voids and caves can collapse. Depending of the type of overburden, the collapse initiated at depth propagates towards the surface and finally results in a collapse structure, such as collapse dolines, sinkholes, and tiangkengs on the very large scale.

We present results from geophysical surveys over existing karst structures based on gravimetric, electrical, and geomagnetical methods. We have chosen two types of dolines, solution and collapse dolines, to capture and compare the geophysical signals resulting from these karst structures. We compare and discuss our geophysical survey results with simplified theoretical models describing the evolution of the karst structure and three-dimensional structural models for the current situation derived for the different locations.