

Application of Electrical Resistivity Tomography to Image the Subsurface Structure of a Sinkhole, a Case Study in Southwestern Missouri

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Abstract : The study area is located in Southwestern Missouri and is mainly underlain by Mississippian Age limestone which is highly susceptible to karst processes. The area is known for the presence of various karst features like caves, springs and more importantly Sinkholes. Sinkholes are one of the most common karst features and the primary hazard in karst areas. Investigating the subsurface structure and development mechanism of existing sinkholes enables to understand their long-term impact and chance of reactivation and also helps to provide effective mitigation measures. In this study ERT (Electrical Resistivity Tomography), MASW (Multichannel Analysis of Surface Waves) and borehole control data have been used to image the subsurface structure and investigate the development mechanism of a sinkhole in Southwestern Missouri. The study shows that the main process responsible for the development of the sinkhole is the downward piping of fine grained soils. Furthermore, the study reveals that the sinkhole developed along a north-south oriented vertical joint set characterized by a vertical zone of water seepage and associated fine grained soil piping into preexisting fractures.

Keywords : ERT, Karst, MASW, sinkhole

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