

### **3D ERT IMAGING OF SUBSURFACE STRUCTURE OF A SINKHOLE IN GREENE COUNTY, MISSOURI**

*Shishay Kidanu, Missouri S&T; Evgeniy Torgashov, Missouri S&T; Neil Anderson, Missouri S&T*

Thousands of sinkholes have been identified in the state of Missouri; Greene County, in particular, is one of the counties in the state most known for the occurrence of sinkholes. Sinkholes that suddenly collapse can result in loss of human life and property; and ground deformation associated with subsidence sinkholes often damage infrastructure, such as highways and utilities. Investigating the subsurface structure of existing sinkholes and their development mechanism helps to predict their subsequent impact and chance of reactivation and provide applicable remedial and mitigation measures. 2D ERT geophysical investigation has been conducted on a sinkhole site in Greene County Missouri (Shishay et al., 2016) and the results have shown the suitability of 2D ERT method to image the subsurface structure and understand the formation mechanism of the sinkhole. In some situations, 2D ERT images are less accurate than desired due to the fact that 2D ERT processing software cannot compensate for the lateral variations in resistivity that occur outside of the vertical plane of 2D ERT profile. Three dimensional (3D) changes in resistivity can be mapped using true 3D ERT acquisition and processing method, but it tends to be costly and time consuming. Therefore, in this study, a convenient alternative called pseudo 3D ERT method is applied, which is expected to have a higher resolution than the previously done (Shishay et al., 2016) conventional 2D ERT and significantly less expensive than true 3D ERT data. As compared to the 2D ERT, the results from the Pseudo 3D ERT showed a better 3D image of the subsurface structure of the sinkhole and improved the understanding of the sinkhole formation processes.