

Application of Electrical Imaging to Delineate a Sinkhole at Ban Khao Daeng, Satun Province

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ABSTRACT

A sinkhole developed at Ban Khao Daeng, Tungwa District, in Satun Province on 11 September, 2008. This sinkhole is in a public and community area. Two-dimensional electrical imaging with dipole-dipole configuration and electrode spacings of 5, 10, and 15 meters was used to determine the subsurface cavity of the sinkhole. The survey consisted of five lines across the sinkhole and the populated area. Resistivity interpretation identified three subsurface layers. The top regolith layer is characterized by resistivities that range from 50 to more than 1500 ohm-meters and a thickness that varies from 3 to 12 meters. The middle layer has resistivities of 3 to 50 ohm-meters that clearly indicate that the layer is largely water-saturated regolith. Its thickness varies from 6 to 20 meters. The bottom layer is probably limestone since its resistivity is more than 300 ohm-meters beneath overburden. Moreover, this resistivity value indicates that the bedrock topography is a karst terrain. The linear discontinuity of resistivity values infers a fault or fracture, whereas a low resistivity anomaly with a polygonal shape may indicate an underground cavity in the bedrock layer. However, from a geophysical standpoint, the mechanism of soil subsidence in this area could also be due to solution within the sediment cover. Soil moving downward into an existing karst void associated with either an abrupt change of the level of ground water or with much human activity could be the cause of the sinkhole.

KEYWORDS: Electrical imaging, sinkhole, dipole-dipole, karst, anomaly, resistivity, solution sinkhole.

