

**Characteristics of Subsurface Features in the Area of Collapse Sinkholes by 3D ERT in
Dan Chang Subdistrict, Nong Bua Lam Phu Province, NE Thailand**

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Abstract

In September 2020, eight large sinkholes collapsed within the sugarcane plantation in Nong Dan village, Dan Chang subdistrict, Na Klang district, Nong Bua Lam Phu province, NE Thailand with depths ranging from 5 to 10 m and diameters between 10 and 30 m, covering an area of about 1.6 km². Additionally, over 100 sinkholes in the Dan Chang subdistrict have collapsed since 2017. These events have not only caused damage to agricultural areas and residential properties but have also instilled worry among the residents regarding their own safety. This study aims to investigate the subsurface structure of the sinkholes in the Nong Dan area, by collecting geological data, structural geology data, and geophysical data. The results from the quasi-3D geophysical electrical resistivity tomography (ERT) examination using a dipole-dipole array show geoelectrical anomalous bodies with apparent resistivity values $>2,600$ Ohm.m, indicative of cavities. The zones with apparent resistivity ranging from 100-2,500 Ohm.m are interpreted as hard rock, while the low-resistive zones, $\sim 5-100$ Ohm.m, indicate topsoil containing sand, gravel, and weathered rocks. The ERT results clearly illustrate the locations of the subsurface cavities. Furthermore, it was found that these cavities are continuous and oriented in a northwest-southeast direction. The preferred 3D ERT section represents the large subsurface shape of a cavity ~ 130 m in size.

Keywords: sinkhole, electrical resistivity tomography, karst, cavity