

## Severe Sinkhole Formation Induced by Quarrying: A Case Study in Northeast Thailand

Rungroj Arjwech\* and Felik Destian Putra Amijaya

Department of Geotechnology, Faculty of Technology, Khon Kaen University, Khon Kaen, 40002, Thailand.

\* Corresponding author. E-mail address: [rungroj@kku.ac.th](mailto:rungroj@kku.ac.th)

---

### Abstract

Quarry-induced sinkholes have engendered significant environmental challenges impacting agriculture and communities in Northeast Thailand. Field investigations identified numerous surface manifestations of potentially hazardous sinkholes on the northern side of a limestone quarry. Employing 2D electrical resistivity tomography (ERT), profiles were perpendicular to interpreted fractures, aimed at discerning subsurface structures and voids. A 3D ERT profile was conducted across a sinkhole collapse to unveil subsurface features beneath it. The amalgamated ERT findings delineated potentially hazardous cavities and geological structures linked to existing sinkhole collapses. These collapses tend to proliferate within confined zones often aligned with inconspicuous minor structures. Notably, the presumed collapsed cavities exhibit a spatial connection with surface drainage system or interpreted karst aquifer. Sinkhole genesis was catalyzed by dewatering pumping. The potential escalation of sinkhole collapses along specific narrow fracture zones underscores the necessity for regulatory measures to guide dewatering activities and mitigate further sinkhole occurrences.

**Keywords:** sinkhole collapses, electrical resistivity tomography, cavity