Title: Sinkhole susceptibility assessment (spatio-size prediction) of Florida′s karst sinkhole
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Boo Hyun Nam, Ph.D., P.E.
Professor and Chair, Dept. of Civil Engineering, Kyung Hee University
Courtesy professor, Dept. of Civil, Environmental, and Construction Engineering, University of Central Florida
Email: boohyun.nam@khu.ac.kr

Bio

Dr. Boo Hyun Nam is Professor and Chair of the Department of Civil Engineering at Kyung Hee University (KHU). He received his Ph.D. in Civil Engineering at the University of Texas at Austin. Before joining KHU, he worked at the University of Central Florida (with tenure) for 12 years. He served as the director of UCF′s Sinkhole Research Laboratory at UCF and also as faculty advisor of the ASCE-UCF Student Chapter (recipient of Faculty Advisor of the Year in 2016). His research areas include geohazards (both natural and anthropogenic), geotechnical engineering, remote sensing, transportation geotechnics, and civil engineering materials. Dr. Nam has actively participated in national/international committee activities, including ASCE Geotechnical-Institute (GI), Transportation Research Board (TRB), Korean Geotechnical Society, Korean Geosynthetics Society, and the organizing committees of The Sinkhole Conference, AEG Karst Hazards Forum Conference. He also served as chairman of the 1st US-Korea Geotechnical Workshop in 2022. Currently, he is associate editors of KSCE Journal of Civil Engineering, Journal of the Korean Geotechnical Society, Frontiers in Built Environment, and Frontiers of Earth Science.

Abstract

Sinkholes are a major geohazard in karst terrain. Groundwater flow can easily erode the overburden soils into cavities in the underlying bedrock forming soil cavities. As the soil cavity grows and propagates upward, it ultimately creates a sudden ground collapse or subsidence with the possibility of causing structural damage to existing buildings and infrastructure. The induced ground collapse/subsidence may pose a great threat to human safety and create environmental issues as well. This talk focusses on: (a) probabilistic spatio-size prediction of sinkhole; and (b) development of a geographical information system (GIS)-based regional-scale sinkhole susceptibility map. The study area focused on the east central Florida (ECF) region that has been experiencing more abrupt and large cover sinkhole collapses due to its unique hydrogeological setting; e.g.; active groundwater recharge through aquifers with sandy soils (surficial aquifer) underlain by a thick clayey soil (intermediate aquifer). The research method employs identification of the key sinkhole-causing factors and model development of sinkhole susceptibility via machine learning. The developed sinkhole spatio-size susceptibility map is a powerful tool for sinkhole risk management.