**APPLICATION OF GEOPHYSICAL METHODS FOR MAPPING AQUIFERS: A STUDY AT THE UNIVERSITY OF MISSISSIPPI FIELD STATION**

*Elsie Buskes, Leti T. Wodajo, Md Lal Mamud, and Craig J. Hickey*

*National Center for Physical Acoustics,*

*The University of Mississippi, University MS, USA*

**Abstract**

Complex hydrogeological formations and high spatial variability due to various hydrogeological processes make groundwater exploration challenging. Geophysical methods can address the methodological need for groundwater mapping and identifying optimal locations for extraction. The University of Mississippi Field Station is a 740-acre lot owned by the University of Mississippi for ecological research. The University's Geology and Geological Engineering Department proposed a location to place a groundwater extraction well in the field station. This study is conducted to investigate if the proposed location is optimal for groundwater extraction and to test the capabilities of two ground-based electrical resistivity geophysical methods, electrical resistivity tomography (ERT) and vertical electrical sounding (VES), in mapping aquifers and providing actionable information. New and available well logs are used to identify the different soil layers and calibrate the geophysical results. The geophysical results and the well logs provided information that could be used to identify the location of the aquifer at that site. This study showed that the aquifer at the site changes from confined to unconfined over short distances. The original proposed well location is not optimal for groundwater extraction, and more suitable locations for well drilling are identified. The electrical resistivity methods tested were determined to be successful for groundwater mapping and subsurface characterization.

[This research is sponsored by the Mississippi Water Security Research Initiative Seed Grant under award number 350110528A. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the sponsor's views.]