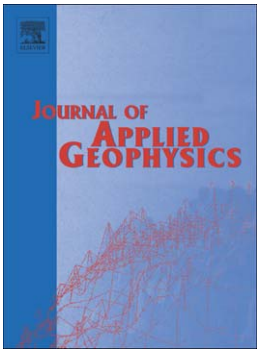

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GPR Impedance Inversion for Imaging and Characterization of Buried Archaeological Remains: A Case Study at Mudu City Cite in Suzhou, China

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Abstract

As a method with high resolution, GPR has been extensively used in archaeological surveys. However, conventional GPR profile can only provide limited geometry information, such as the shape or location of the interface, but can't give the distribution of physical properties which could help identify the historical remains more directly. A common way for GPR to map parameter distribution is the common-midpoint velocity analysis, but it provides limited resolution. Another research hotspot, the full-waveform inversion, is unstable and relatively dependent on the initial model. Coring method could give direct information in drilling site, while the accurate result is only limited in several boreholes. In this paper, we propose a new scheme to enhance imaging and characterization of archaeological targets by fusion of GPR and coring data. The scheme mainly involves the impedance inversion of conventional common-offset GPR data, which uses well log to compensate GPR data and finally obtains a high-resolution estimation of permittivity. The core analysis result also contributes to interpretation of the inversion result. To test this method, we did a case study at Mudu city site in Suzhou, China. The results provide clear images of the ancient city's moat and wall subsurface