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learned from active and passive seismic surveys at a test site in Romania

This work presents the methodological framework for MAM Microtremor Array Measurements (MAM) and Multichannel Analysis of Surface Waves (MASW) techniques applied for a test site in Magurele, near the headquarters of the National Institute for Earth Physics. MAM provides information about deeper subsurface layers using low-frequency seismic waves, while MASW utilizes high-frequency surface waves to provide detailed information about shallower layers. These are non-invasive and non-destructive geophysical methods widely applied in site characterization, geotechnical investigations, engineering studies, and earthquake hazard assessments. In order to achieve the purpose of this study, we employed a network of fourteen ATOM units with 3-component 2 Hz sensors and a 24-channel Geode array equipped with 4.5 Hz and 14 Hz sensors. The ATOM units were used for both passive (ambient noise) and active (sledgehammer shots) measurements, while the Geode system was dedicated exclusively to recording active surface wave data. Various configurations (L-shape, triangle, circle, linear, irregular arrays with different lengths) were tested to enhance data quality and depth resolution alongside different acquisition parameters (different timeframes for data acquisition, sampling rates). The results obtained from the active investigations performed with both equipments were compared to assess their effectiveness in subsurface site characterization.

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