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Detecting small-scale targets by the 2D inversion of two-sided three-electrode data: application to an archaeological survey

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ABSTRACT

The detecting capabilities of some electrical arrays for the estimation of position, size and depth of small-scale targets were examined in view of the results obtained from 2D inversions of apparent-resistivity data. The two-sided three-electrode apparent-resistivity data are obtained by the application of left- and right-hand pole–dipole arrays that also permit the computation of four-electrode and dipole–dipole apparent-resistivity values without actually measuring them. Synthetic apparent-resistivity data sets of the dipole–dipole, four-electrode and two-sided three-electrode arrays are calculated for models that simulate buried tombs. The results of two-dimensional inversions are compared with regard to the resolution in detecting the exact location, size and depth of the target, showing some advantage for the two-sided three-electrode array. A field application was carried out in the archaeological site known as Alaca Hoyuk, a religious temple area of the Hittite period. The two-dimensional inversion of the two-sided three-electrode apparent-resistivity data has led to locating a part of the city wall and a buried small room. The validity of the interpretation has been checked against the results of subsequent archaeological excavations.

The article can be downloaded from the

<http://www.blackwell-synergy.com/doi/abs/10.1046/j.1365-2478.2001.00233.x>