The effect of dike geometry on different resistivity configurations

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Abstract
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Geoelectrical profiling with multi-electrode systems has become an important tool for monitoring dike embankments bordering rivers. Profiles running perpendicular to the dike axis are affected by the dike topography, with the amplitude of this effect dependent on the surface geometry and the choice of the electrode configuration. Investigations using seven different electrode configurations have shown that some configurations are less sensitive to the topography than others. The topography correction method (TCM) is an important tool for processing data from measurements at river dikes. This method is generally recommended for flank angles steeper than 10°. The topography effect is calculated by two-dimensional finite element modelling. The resulting synthetic data of a homogeneous dike body are used to apply a topographic correction for each measurement. The topographic effect and correction procedure is demonstrated for synthetic dike data and for a data set from a river dike in Thai Binh province (Vietnam). The topography can be ignored for flank angles less than 25° if an averaged Half-Wenner electrode configuration is used. This configuration has proved to be less affected by undulated topography and the focusing effect of averaging the two data sets provides reliable structural information without the need for time-consuming data inversion.

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