

# **Inversion of cross-hole radio frequency data in a layered earth**

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## **Abstract**

Cross-hole frequency domain electromagnetic (EM) methods are most commonly applied at high frequencies (> 1 kHz) for definition of petroleum and coal deposits. Interpretation is often based on tomographic reconstruction of the data, assuming far-field, ray-like behaviour. In some cases these assumptions are untenable. Conventional tomography is also questionable if data are recorded at depths which are small in comparison to a wavelength, i.e. if surface reflections are appreciable.

In order to address these limitations of tomography, a program has been written to invert cross-hole data from a vertical magnetic dipole transmitter in a layered earth. 1D inversion and conventional tomography are applied to the same radio frequency data set to illustrate the advantages of the more rigorous approach at shallow depths and short ranges.