Physical scale modelling of the relationship between fixed source and moving source electromagnetic responses to steeply dipping targets in free space and in a conductive environment

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Moving source frequency domain electromagnetic devices are often used in conjunction with fixed source devices to locate and investigate mineral deposits. Highly portable moving source devices are usually used for reconnaissance while the fixed source systems are used for more detailed surveys over an area of interest. Fixed source systems are especially good at exploring to greater depths, with higher resolution (Duckworth et al. 1992), and as some studies have suggested, increased anomaly enhancement due to current gathering in a conductive host (Lajoie and West, 1976). Though both systems may present results in the form of in-phase and quadrature profiles, there is no bases for comparing the profiles of the moving source device to that of the fixed source device, thus at present it is difficult to compare different targets surveyed by different systems. In an effort to understand the relationship between fixed and moving source responses, a physical scale model of a steeply dipping conductive target in free space and in a conductive environment will be discussed for each type of device. The devices will be compared based on their ability to generate meaningful responses as depth increases (strength of signal, conductance resolution), as well as being tested for spatial resolution.

Duckworth, K. and O'Neill, D., 1992, Comparison of scale-model results with field surveys conducted over the night hawk test range using fixed-loop and moving-source electromagnetic systems: Can. J. Expl. Geophys. **28**, 1-5.

Lajoie, J. J. and West, G. F., 1976, The electromagnetic response of a conductive inhomogeniety in a layered earth: Geophysics **41**, 1133-1156.

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