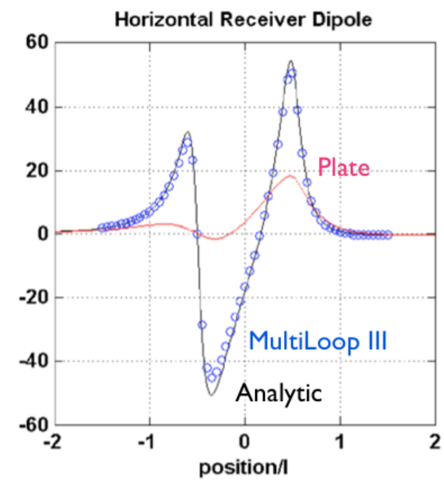
MultiLoop III

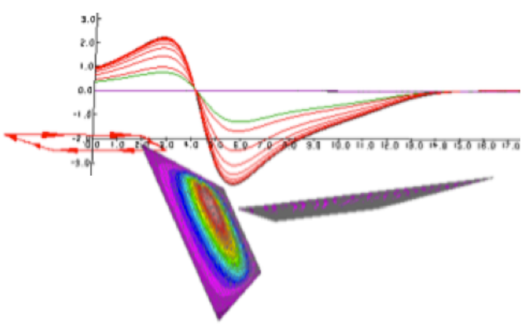
The Better Way To Model

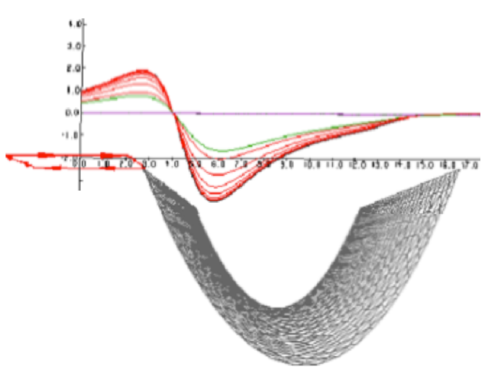
State of the art accuracy:

MultiLoop III uses a mesh to represent conductors and so can accurately represent the response of conductors in challenging geological environments. Many plate-based simulation programs use simple approximations to represent the response of a conductor. One effect of using such approximations is illustrated in the figure to the right, where a plate has been used to represent the response of a long ribbon-like body to a Slingram-type system. The "best" plate response is shown in red, while the MultiLoop III response is shown in blue. The analytic response is shown in black.



Modelling real features:





When geophysicists use thin-plate models to represent EM data, they are assuming their targets to be discrete tabular structures such as is shown to the left. Geologists and geophysicists know this is often a gross approximation which often does not conform to reality.

Because MultiLoop III uses a mesh to represent conductors, the geophysical model can more faithfully represent the geological one. In the illustrations to the left, MultiLoop III has been used to model the response of two discrete plate conductors (above) and a synclinal conductor (below). The results, for all practical purposes, are identical. An interpreter limited to modelling with plate software would conclude the response is due to the structure illustrated in the upper figure. The geological model could in fact be quite different. Our perception of the world can be limited by the tools we interpret it with.

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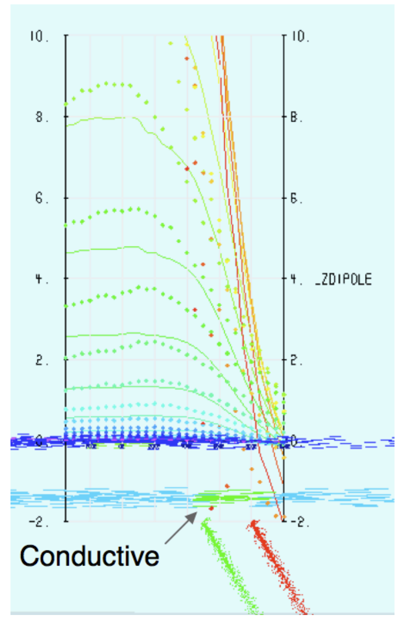
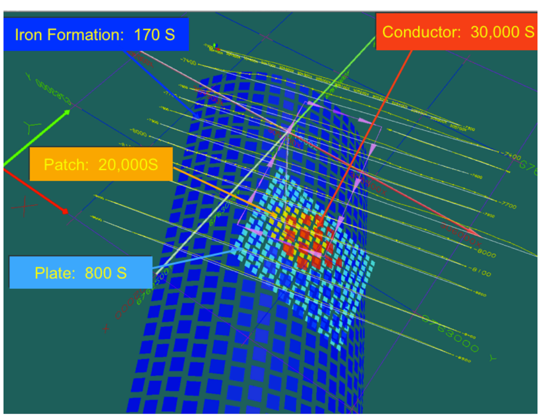
Modelling variable conductivity: Alteration

EM measurements can play an important role in exploration, but to date, our ability to model anything but discrete conductors with a constant conductivity is very limited. As a consequence, conductivity variations due to alteration are difficult to model and so can be difficult to detect.



The figure to the right shows a model of Cameco's Millenium deposit constructed with MultiLoop III. The model consists of two dipping basement conductors overlain by large flat-lying conductors representing the Athabasca sandstone. The greenish area in the sandstone, indicating a modelled area with higher conductance that overlies the basement conductors, was required to fit the mid-time decays. Such a conductive patch would be consistent with alteration in the sandstone. The ability to model such alteration can contribute significantly to the geological understanding of an area of interest.

Putting it all together



Mineral deposits often form in complicated settings, and understanding the electromagnetic data can be a challenge. The figure to the left illustrates a model of the Gamsberg Sedex Zinc Deposit constructed with MultiLoop III. The model consists of a large synclinal resistive feature representing a carbonaceous iron-formation (dark blue) in which is embedded a conductive 30,000 S patch representing the conductive zone associated with the zinc mineralization. An 800 S plate (light blue) with a 20,000 S conductive patch (yellow) was also modelled for comparative purposes. With MultiLoop III, the synclinal model fits the EM data across a large span of response times, allowing both the shape of the syncline as well as the location and size of the mineralization within it to be modelled. An important advantage to the MultiLoop III approach to modelling is that both current channelling from currents induced in the syncline and flowing through the mineralization, as well as simple induction in the mineralization, is modelled. If a plate model were used, the model would be limited to representing simple induction alone - a simplification that could result in erroneously rendering the shape and location of the target.

More information on these examples is posted on the web at ***www.lamontagnegeophysics.com***