derivative data due to broad conductors is approximately equal to its depth to top, a problem is encountered. Fifty metre sampling of the data, as was done in this case, seriously undersamples the field data for very shallow sources. The splined second derivative data in this case has minimum halfwidths of about 50 metres. As a result, any attempt to quantitatively remove the shallow 'edge' effects is inaccurate. More closely spaced profile data is needed to accomplish this.

The quantitative approach to this type of interpretation is still being developed. A simple filter has been formulated to remove shallow edge effects from data, and a full inversion technique is the next step.

Conclusion

We in the exploration industry who have worked on interpretation problems have been frustrated over the difficulty of 3D-EM generalized modelling techniques to provide answers and inversion algorithms that are usable over a complex set of conductivity structures. As a result the historical tendency has been to discriminate between responses on the basis of their time constants or latest anomalous times. Our experience has however shown that this can be a very dangerous practice, if current gathering effects dominate, as the examples over the Hellyer and Red Dog deposits illustrate. As a result a new discrimination technique had to be found. Current gathering effects can now be recognised through decay analysis, and information about the shape and location of the source can be derived through analysis of the spatial derivatives. Although only some aspects of the spatial derivative and these new modelling techniques have been discussed in this paper and examples have been restricted to understanding current gathering responses, the technique can be applied to a completely general current flow.

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