

Constrained joint inversion of gravity and MT applied to mineral systems mapping

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SUMMARY

Inversion of geophysical data is a crucial step in geophysics in turning observations into models of the physical parameter distribution of the subsurface. Nowadays, it is a common step in the interpretation workflow to map the subsurface, however, there are still challenges associated with the inherent non-uniqueness of the inverse process and with it the indefinite number of models that can explain the data within a level of misfit.

Here, we present three-dimensional resistivity and density models derived from joint inversion of magnetotelluric and gravity data collected across areas of mineralisation within Gawler Craton, South Australia. We present models of individual MT and gravity inversions compared with joint MT and gravity inversion approaches to derive robust models of the subsurface.

Furthermore, we augment the joint inversion approach by incorporating prior information for the sedimentary cover. This information is derived from 1D probabilistic models of MT, AEM, drillhole data, and geological constraints.

Keywords: magnetotellurics, gravity, joint inversion, Gawler Craton, mineral systems
