Practical geological mapping under cover using electromagnetic data

Minerals keynote paper

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SUMMARY

As the world’s ‘easy’ mineral deposits on surface are increasingly discovered, it becomes more and more necessary for geo-scientists to explore under cover. Southern Africa has vast expanses of young cover in the form of Kalahari sands and the Karoo sequence, and this cover is ignored at one’s peril. The big challenge is to map the geology beneath these young sequences, using a variety of techniques to increase the validity of the interpretation. Instead of relying purely on magnetics and gravity, various electromagnetic (EM) techniques are discussed, ranging from airborne EM surveys to 2.5D audio magneto-telluric (AMT) surveys and high-temperature SQUID EM surveys. Datasets are presented from current base metal exploration projects in Botswana, South Africa and Zambia, and the innovative use of these in some cases is demonstrated. The emphasis is on interpreting the general structure and geology, using all available datasets, in ways that benefit the overall exploration strategy. The important role of understanding physical rock properties by using downhole geophysical logging (petrophysics) is also discussed, and related to the geological interpretation. The varying levels of success of some of these methods at a prospect scale are highlighted.