

the country rock, making magnetics and induced polarisation useful methods. Although there is a density contrast of 1 g/cm³, the gravity method was not used, largely because of the success of electromagnetics, but also because of the steep topography around the deposit.

Its short strike length means that the mineralisation does not make a good airborne target using conventional line spacings.

Application of Geophysics to Nickel Sulphide Exploration in the Kambalda District, Western Australia

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Abstract

The limited geological outcrop within the Kambalda district, when coupled with the favourable physical properties of nickel sulphides, make geophysical methods an important tool in the exploration for Archaean nickel deposits in this area. Present exploration strategy uses detailed airborne and surface magnetics in the targeting of favourable ore environments, structures, and prospective ultramafic-mafic contacts. Surface and downhole electrical and electromagnetic techniques are then applied to optimise prospect drilling and directly detect nickel sulphides. Thick, conductive overburden, magnetic 'noise' originating in near-surface laterites, 'false' anomalies due to conductive sedimentary units, and the extensive blanket of lake sediments in certain areas continue to present challenges to successful exploration.

Geophysical Response of the Rocky's Reward Nickel Sulphide Deposit, Leinster, Western Australia

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Abstract

The Rocky's Reward nickel sulphide deposit is located in the Agnew-Wiluna greenstone belt, about 2 km north of the Perseverance (Agnew) nickel mine. The belt lies within the northern portion of the Eastern Goldfields Province of the Archaean Yilgarn Craton, Western Australia. Ore-grade mineralisation was discovered at Rocky's Reward in 1984 as a result of drill testing a geochemically anomalous gossan.

Geophysical surveys (airborne and ground magnetics, induced polarisation/resistivity) had been carried out over or in the vicinity of the deposit well before the discovery of mineralisation. However, even though a magnetic anomaly was clearly delineated over the Rocky's Reward deposit, the target was not selected for follow up at that stage as the surface geological expression did not fit the existing conceptual geological model.

A large amount and variety of geophysical work, including airborne and surface time-domain electromagnetics, induced polarisation/resistivity, controlled source audiomagnetotellurics, gravity and downhole surveys was subsequently

completed following the discovery of mineralisation at Rocky's Reward. The object of these surveys was to map and characterise the deposit geophysically, in order to assist in the delineation of the extent and geometry of the mineralisation, and to evaluate geophysical techniques applicable to further exploration in the area.

The deposit represents an excellent target for several geophysical techniques because of its shallow depth, geometry, and physical property contrasts of the ore and its host with surrounding rocks. A combination of ground magnetics and time-domain electromagnetics proved to be the most definitive and economical for detecting and mapping the deposit.

GOLD

Geophysical Characteristics of the Telfer Gold Deposits, Western Australia

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Abstract

The Telfer gold deposits are hosted by Middle Proterozoic marine sedimentary rocks of the northeastern Paterson Orogen. They occur within two en echelon, asymmetric, doubly plunging anticlines, with ore being extracted from reefs and stockworks.

Regional magnetic and gravity surveys have been undertaken to assist in mapping stratigraphy, intrusions and structures in the Telfer district. These surveys indicate the presence of intrusions close to the Telfer gold deposits, which is regarded as supporting a genetic relationship between granitoids and mineralisation. The Telfer mineralisation itself has no gravity or magnetic signature.

The narrowness of the reefs, deep oxidation and the presence of shallow, thin, electrically resistive beds make the Telfer gold deposits a difficult geophysical target. Direct current resistivity techniques were used to assist mapping of the quartz reefs. Surface and downhole electromagnetic pulse surveys undertaken at Main Dome after overburden stripping detected subtle responses coincident with the Middle Vale Reef.

Geophysical Investigations of the Fortnum Gold System, Western Australia

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Abstract

The Fortnum gold deposit is a structurally controlled gold system hosted by Lower Proterozoic sedimentary and volcanoclastic rocks of the Glengarry Group in the Glengarry Basin of Western Australia. Geophysical techniques applied at Fortnum include ground and airborne magnetics, resistivity, induced polarisation and gravity. Magnetic and resistivity data enabled extrapolation of geological information to areas concealed by transported cover, and the interpretation of