Geophyscial Characteristics of the Gosowong Goldfield, Indonesia

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The Gosowong goldfield on Halmahera Island in Indonesia includes examples of high-grade low-sulfidation epithermal deposits and subeconomic porphyry mineralization. The goldfield is characterized by highly variable near-surface magnetization, and drill core studies suggest that alteration rather than primary lithological variability is the main factor affecting the distribution of magnetite.

Low-sulfidation mineralization occurs within broad demagnetized zones and often in association with potassium radiometric anomalies attributed to proximal adularia alteration. Porphyry mineralization may be characterized by magnetic anomalism due to magnetite addition in potassic alteration zones but the pattern of porphyry magnetization may be overprinted by regional magnetite destructive hydrothermal systems. A large area in the north of the goldfield that is characterized by near-surface demagnetization due to argillic, advanced argillic and silicic alteration is interpreted as a lithocap.

Regional unconstrained inversions of aeromagnetic data reveal a large magnetic body at depth that is interpreted as a magnetite-series intrusion and its associated alteration system. Prominences in the upper surface of this deep magnetic zone correspond closely with known porphyry mineralization. This interpreted large intrusive body is postulated as the source of magmatic fluids responsible for porphyry mineralization and as the heat source that drove later hydrothermal systems responsible for epithermal mineralization and regional propylitic alteration.