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Regional Integrated Structural and Alteration Analysis of Magnetic and Infrared Remote Sensing Data from the Kerman Belt, Iran

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A method for integrating structural and alteration interpretations based on regional remote sensing magnetic and infrared spectral data is presented. The aim of the integrated interpretations is to provide insight on the controls that basement structural architecture exert over porphyry mineralization. The method is illustrated by a study of the porphyry-endowed Kerman belt of Iran, for which structural interpretations of EMAG2 first vertical derivative magnetic data were refined using alteration lineaments interpreted from Landsat-8 infrared spectral data.

Previous structural and alteration interpretations of remote sensing data for the Kerman belt focused on combining surficial structural interpretations of satellite imagery and hydrothermal alteration minerals directly associated with mineralization. Our method makes use of regional linear alteration trends indicative of lithological discontinuities to refine and to enhance the understanding of deep-seated structures interpreted from regional magnetic data.

The integrated structural and alteration analysis of the Kerman belt of Iran highlights a first-order fault that is continuous at depth over approximately 500 km and appears to control the location of most porphyry deposits and prospects. The analysis also allowed for the visualization of a premineralization regional dilational zone that hosts the most prolific portion of the Kerman porphyry belt.