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Unlocking Mineralogical Truth Across the Mining Chain with Integrated Space-based Hyperspectral Imaging: Andean Porphyry Edition

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Unprecedented access to space-based hyperspectral imaging data is re-defining surface mineralogical mapping globally. Legacy districts once denied advanced hyperspectral coverage due to issues around access (logistical and political), money and visualization/processing expertise are now available for exploration (green field and near asset) and mining applications. We present examples across several Andean Cu-porphyry districts that highlight the metamorphosis from early-stage airborne hyperspectral through to spaceborne multispectral systems, high fidelity airborne and proximal systems and finally into the emerging spaceborne hyperspectral paradigm. Case studies from both the Los Bronces and Quebrada Blanca – Collahuasi districts are shown, including data from both public and commercial hyperspectral systems (proximal, air- and space-based). Linked scales and integration of geochemical and geophysical data with hyperspectral-based mineralogy transforms district models, augments ore body models and births new questions around deposit genesis – thus driving novel generative models, exploration strategy and mining workflows in the Cu-Porphyry space.