Hyperspectral characterization of white mica and biotite mineral chemistry across the Canadian Malartic Gold Deposit, Quebec, Canada.

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The Canadian Malartic gold deposit is located in Quebec's prospective Abitibi region. Most of the mineralization is located within Archean metasediments, which are challenging to characterize by conventional core logging. Hyperspectral imaging of 168 metasedimentary samples from Canadian Malartic reveals that, in addition to ubiquitous biotite, 70% of the samples contain significant amounts of white mica, which was previously not recognized. Spectral data reveal that compositional changes of white micas within the deposit seem to reflect the degree of hydrothermal alteration, but some of the variability outside of the deposit may be due to the concomitant increase in metamorphic grade, and need to be further investigated. Biotite composition, also derived from spectral data, shows variability (phlogopite to biotite) with respect to distance to mineralization, but to a spatially more limited extent than white mica. The most Mg-rich biotite is found to be spatially associated with mineralized intervals, and no Mg-rich biotite (Mg# > 70) occurs outside of the open pit. Biotite composition could therefore be used as a local (m-scale) indicator of mineralization.