

Geocongress 2018 workshop

Title:

Hyperspectral drillcore imaging: Techniques and applications

Facilitators/speakers:

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Duration:

Half day.

Maximum participants:

20

Description:

Hyperspectral core imaging is an optical technology that allows rapid and cost-effective collection of digital mineralogical information from drill cores, chips and cuttings. Hyperspectral core imaging makes use of reflectance spectroscopy, which is a passive and non-destructive mineralogical technique in which a light source is used to illuminate a target material, and the reflected light is measured across a specified wavelength range. Interaction between the incident illumination and minerals in the target material results in absorption of energy at specific wavelengths, and interpretation of the resulting spectrum allows identification of mineral species, and importantly also crystallinity and mineral chemistry.

The range of minerals that can be identified depends on the wavelength range of the spectrometer (in this case a spectral camera for imaging). The visible-near infrared (VNIR) is principally of use for iron oxides and REE minerals, the short-wave infrared (SWIR) important for hydrous silicates (including clays), phyllosilicates, carbonates, sulphates, and phosphates, while in the long-wave infrared (LWIR) anhydrous silicate minerals are responsive. Therefore, depending on requirements, combinations of spectral cameras can be used to optimise mineral identification and mapping.

The workshop will cover various aspects of hyperspectral imaging including, but not limited to, principles of spectral imaging, instrumentation, data processing, and applications of spectral data across the mining cycle.

Some of the topics to be covered in this workshop include:

- The importance of imaging techniques

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- Basic principles (regions of the infrared, measurement methodologies, controls on mineral detection)
- Spectral variation
- Instrumentation
- Data processing
- Applications to the mining cycle