HYPERSPECTRAL MINERALOGY APPLICATIONS IN MINERAL EXPLORATION, GEOMETALLURGY AND GRADE CONTROL

Instructor: Cristal Palafox, Senior Spectral Geologist - Corescan.
Lionel Fonteneau, Global Principal Spectral Geologist – Corescan.

Date: May 23rd 2024 - 08am to 6pm (8h)
Location: Centro de Convenções - Ouro Preto/MG
Number Vacancies: 20

PRESENTATION and COURSE OBJECTIVES

Halfway through this short course, participants will be able to:

• Understand the fundamentals of reflectance spectroscopy and its application in identification of minerals in exploration samples, evaluation and mineral processing.

• Know the different types of spectrometers, data processing, their interpretation and application as spectral images.

• Apply hyperspectral mineralogy images and data for correct identification and distribution of minerals (logueo, mineralogical maps), identification of changes, paragenesis and its extension, as well as the definition of domains and assemblages minerals.

• Use of data to define mineralization vectors, mineral proxies, structural features, texture, veins, fractures, grain size and petrogenesis.

• Employ mineralogical parameters to predict metallurgy and the processing of minerals, as well as for the planning and development of mining project, exploration control, waste characterization and control of pollution.

• Know the application of hyperspectral mineralogy in the most common types of mineral deposits common in Brazil.

PREFERRED TARGET AUDIENCE

Exploration geologists, mining geologists, geometallurgists, both from private companies as well as public institutions (including undergraduate students in the course completion phase, postgraduate, master's and doctoral degrees), who wish to use this tool to be more efficient and effective in defining geological, metallurgical and processing models mineral and contribute to reducing the risk and increasing the productivity of mining projects those who participate.

METHOD

In-person course, language English, without simultaneous translation, using PPT file for presentation through projection and whiteboard (or flipchart). Real case studies will be presented. No handouts or any type of printed material will be available.

PROGRAM

MODULE 1 - Introduction to Reflectance Spectroscopy

- What is reflectance spectroscopy?
- Applications of mineral spectroscopy in mining and mineral exploration

MODULE 2 - Instrumentation and Data Collection

- Types of spectrometers
- Data features
- Imaging spectroscopy

MODULE 3 - Mineral Spectroscopy

- VNIR/SWIR spectroscopy
- Components of a spectrum
- Mineral identification and spectral features.

MODULE 4- Case applications of Hyperspectral Core Imaging in exploration – Brasil focus

- Fe Oxide deposits
- IOCG
- Greestone Au deposits
- Ni – Laterite deposits

MODULE 5 - Geometallurgy & Grade Control

- Geometallurgical assessments on lithology, texture, grain size, hardness proxies and clay & mineral speciation.
- Ore versus waste discrimination, liberation/recovery- altering minerals & blast hole samples mineralogy.

INSTRUCTOR PROFILE

Cristal Palafox, Senior Spectral Geologist – Corescan

Master of Science – Geology with a specialty in mineral deposits from the University of Sonora, Mexico, with honourable mention in mineral deposit typification studies. Seventeen years of experience in the geological mineral exploration sector, in more than 20 projects in Mexico, developing diamond and reverse air drilling programs and implementing spectroscopy for mineralogical identification and alteration control. The last five years fully dedicated to the interpretation and application of hyperspectral data in various projects in North, Central and South America.

Lionel Fonteneau, Global Principal Spectral Geologist – Corescan.

With 9 years of experience at Corescan, he specializes in the interpretation of spectral data related to iron ore, nickel laterite, nickel sulfides, and oil deposits. Drawing upon his background in mineralogy, Lionel possesses the expertise to interpret diverse types of deposits. He also leads the processing/interpretation of Hylogger dataset covering the VNIR-SWIR-MIR-LWIR regions at Corescan and has been involved in research funded projects related to the application of hyperspectral reflectance spectroscopy to various ore deposits. Before joining Corescan, he worked as a Research Projects Officer at CSIRO and as a Research Technician at Institut de Recherche pour le Dévelopement. In his previous roles, Lionel focused on characterizing iron ore and nickel laterite deposits using a wide array of analytical tools. He holds a bachelor’s degree in mineralogy from Université de Poitiers and a Master's degree in Geosciences from Université de Poitiers and Université du Québec à Montréal.