



TERRACORE

GEOSPECTRAL IMAGING

Hyperspectral Drill Core Imaging

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Hyperspectral Core Imaging – Beyond Mineralogy

- **Hyperspectral Background**
- **TerraCore Solution**
- **TerraCore Operational Sites**
- **Hyperspectral Systems**
- **Instrumentation**
 - Instruments types
 - Flexibility of instrumentation and imagery
 - Drill core image data
 - Data capture rates
- **Mineral Identification Across the Infrared**
- **IntelliCore**
 - Exploring the Data
- **Products**
- **Applications**

Outline of Presentation

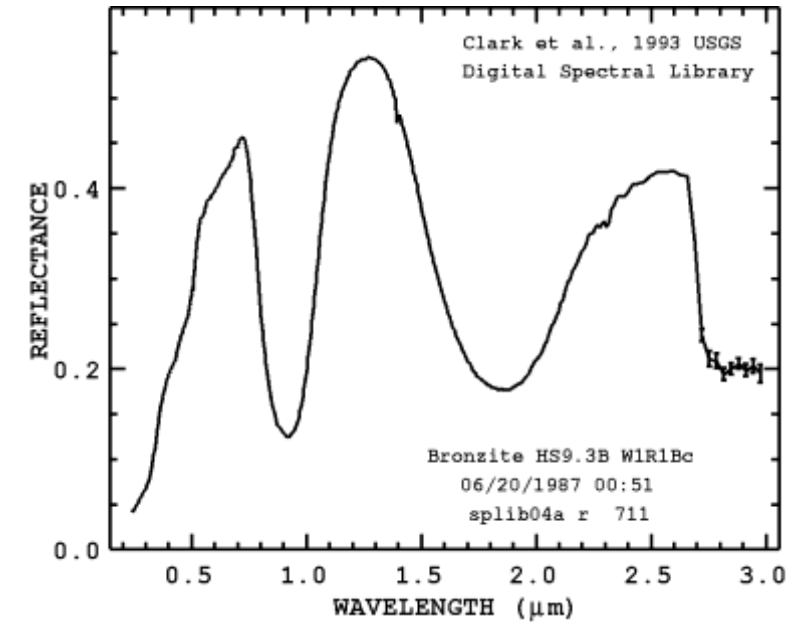
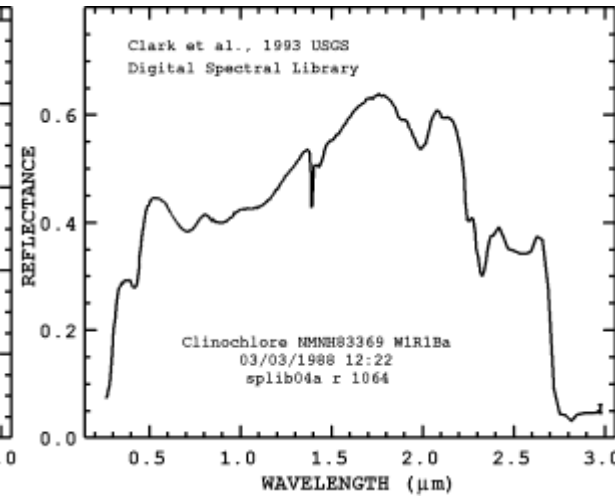
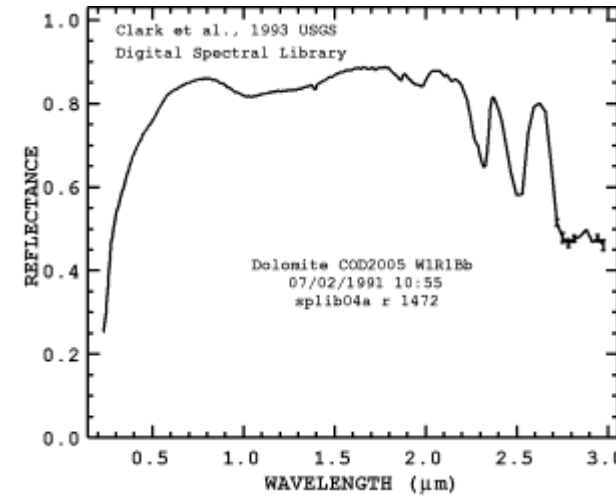
What is Spectral Geology

- **Geoscience Australia:**

“Spectral geology is the measurement and analysis of portions of the electromagnetic spectrum to identify spectrally distinct and physically significant features of different rock types and surface materials, their mineralogy and their alteration signatures”

- **My Definition:**

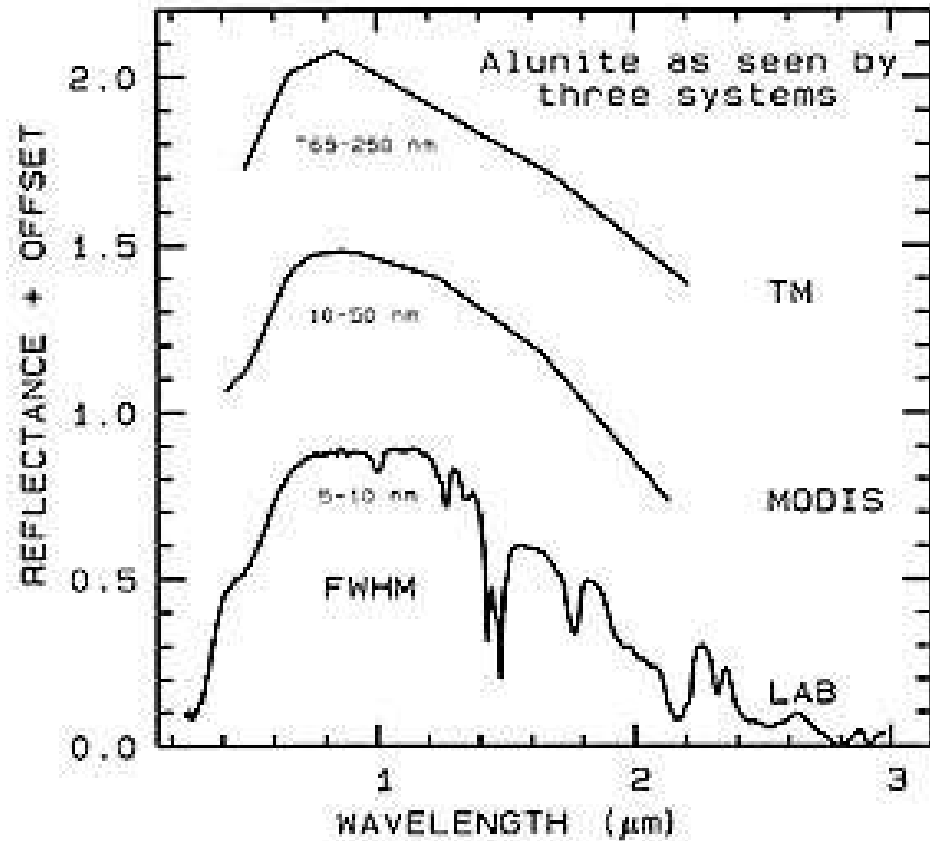
- Find an illumination source
- Point it at a rock
- Collect the reflected energy in a spectrometer
- Look at the wiggly line
- Geologise



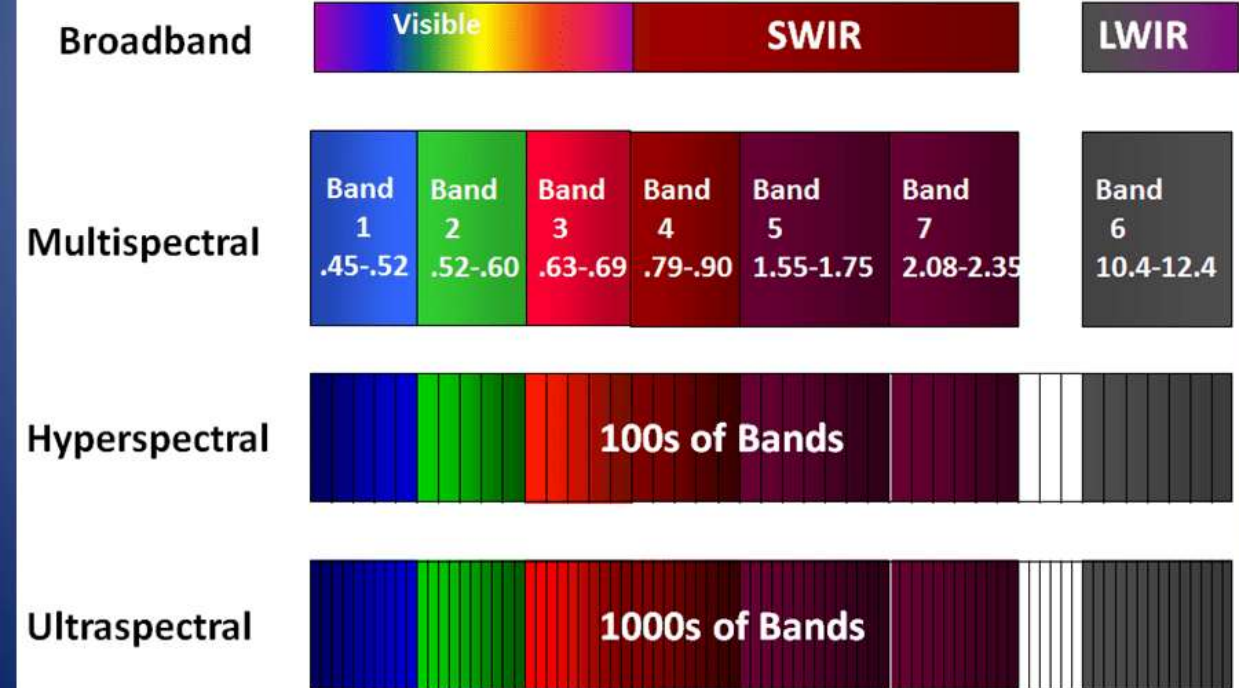
Spectral Geology

Hyperspectral Imaging

- Refers to the number of bands in each spectral image



Difference Between Multispectral and Hyper-spectral Data



Spectral Geology



Partner, Custom or Commercial
Software Integration

DATA ACCESSIBILITY



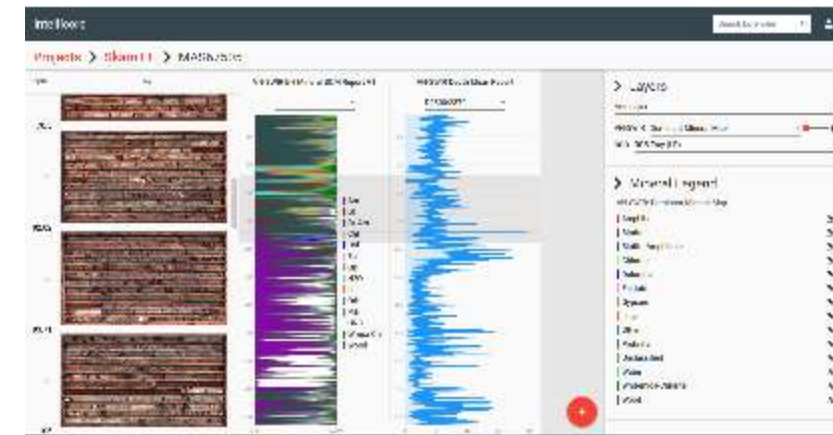
Amazon Web Server



Processing Units



On-Site Logging Products



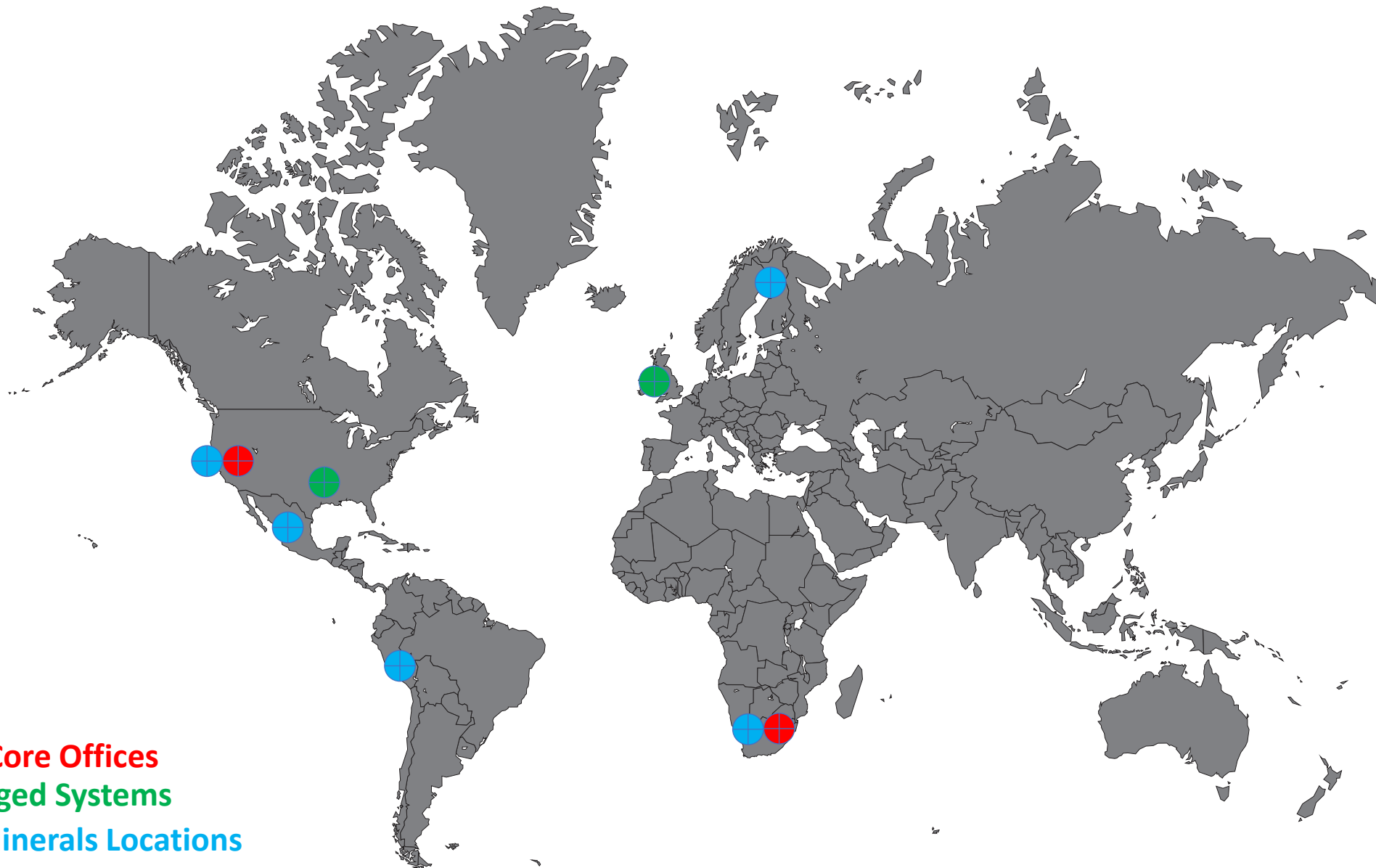
IntelliCore® Viewing and
Collaboration Platform



INSTRUMENTATION

PROCESSING

TerraCore Solution



TerraCore Offices
Managed Systems
ALS Minerals Locations

Operational Sites

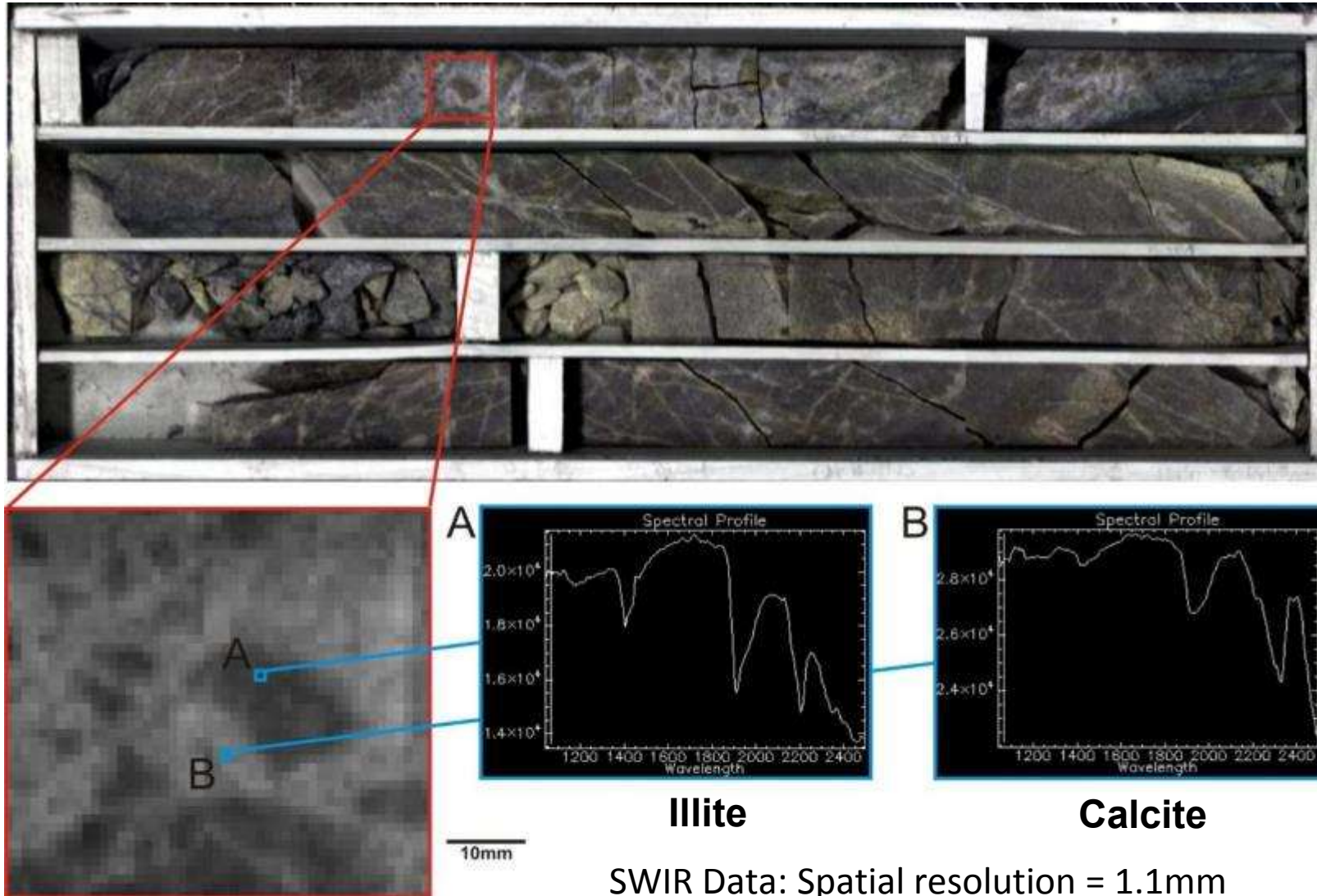


Main Core Imaging Systems:

- Desktop Systems
- Mobile Systems
- Workstations
- Production Long Term Installations



TerraCore Instrumentation



Drill Core Image Data



RGB Data:
0.13mm pixel size

Imaging Possible :

- Round Core
- Broken Core
- Fragments

- The high spatial resolution colour image provides a true representation of the core for the digital library

Drill Core Image Data

	Structure	Group	Example	VNIR Response	SWIR Response	LWIR Response
Silicates	Inosilicates	Amphibole	Actinolite	Non-diagnostic	Good	Good
		Pyroxene	Diopside	Good	Moderate	Good
	Cyclosilicates	Tourmaline	Dravite	Non-diagnostic	Good	Moderate
	Nesosilicates	Garnet	Andradite	Moderate	Non-diagnostic	Good
		Olivine	Forsterite	Good	Non-diagnostic	Good
		Zircon	Zircon	Good	Non-diagnostic	Non-diagnostic
	Sorosilicates	Epidote	Clinozoisite	Non-diagnostic	Good	Good
	Phyllosilicates	Mica	Muscovite	Non-diagnostic	Good	Moderate
		Chlorite	Clinochlore	Non-diagnostic	Good	Moderate
		Clay Minerals	Kaolinite	Non-diagnostic	Good	Moderate
			Illite	Non-diagnostic	Good	Moderate
	Tectosilicates	Feldspar	Orthoclase	Non-diagnostic	Non-diagnostic	Good
			Albite	Non-diagnostic	Non-diagnostic	Good
		Silica	Quartz	Non-diagnostic	Non-diagnostic	Good
Non-silicates	Carbonates	Calcite		Non-diagnostic	Good	Good
		Dolomite		Non-diagnostic	Good	Good
	Hydroxides	Gibbsite		Non-diagnostic	Good	Moderate
	Sulphates	Alunite	Alunite	Non-diagnostic	Good	Moderate
			Barite	Non-diagnostic	Non-diagnostic	Good
	Borates		Borax	Non-diagnostic	Good	Uncertain
	Halides	Chlorides	Halite	Non-diagnostic	Moderate	Uncertain
	Phosphates	Apatite	Apatite	Moderate	Moderate	Good
			Amblygonite	Moderate	Good	Good
	Hydrocarbons		Bitumen	Non-diagnostic	Good	Uncertain
	Oxides		Haematite	Good	Non-diagnostic	Non-diagnostic
		Spinel	Magnetite	Non-diagnostic	Non-diagnostic	Non-diagnostic
	Sulphides		Pyrite	Non-diagnostic	Non-diagnostic	Non-diagnostic

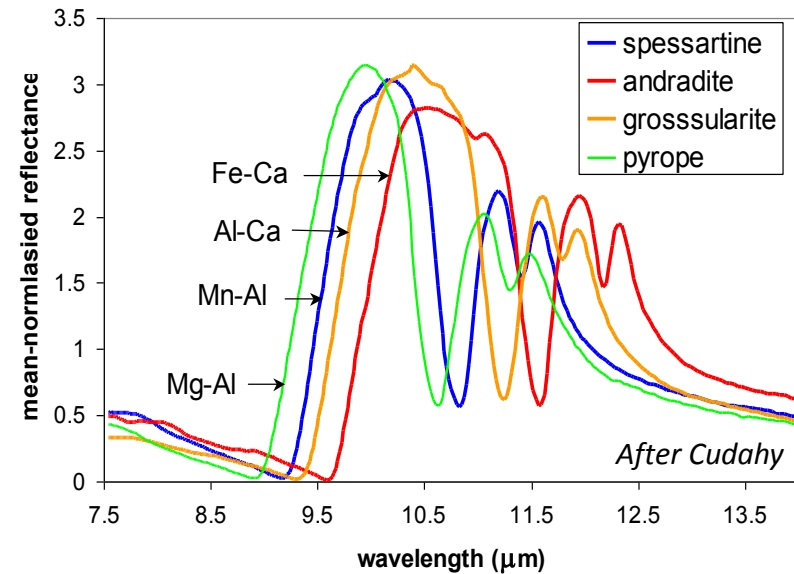
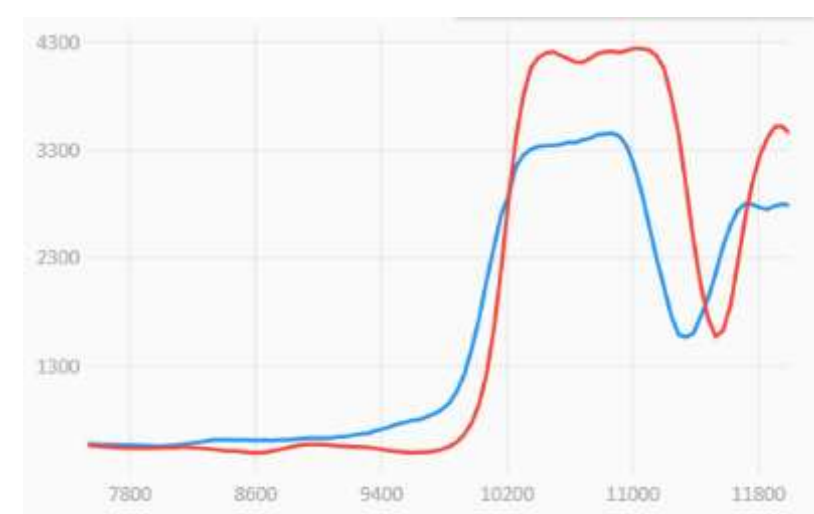
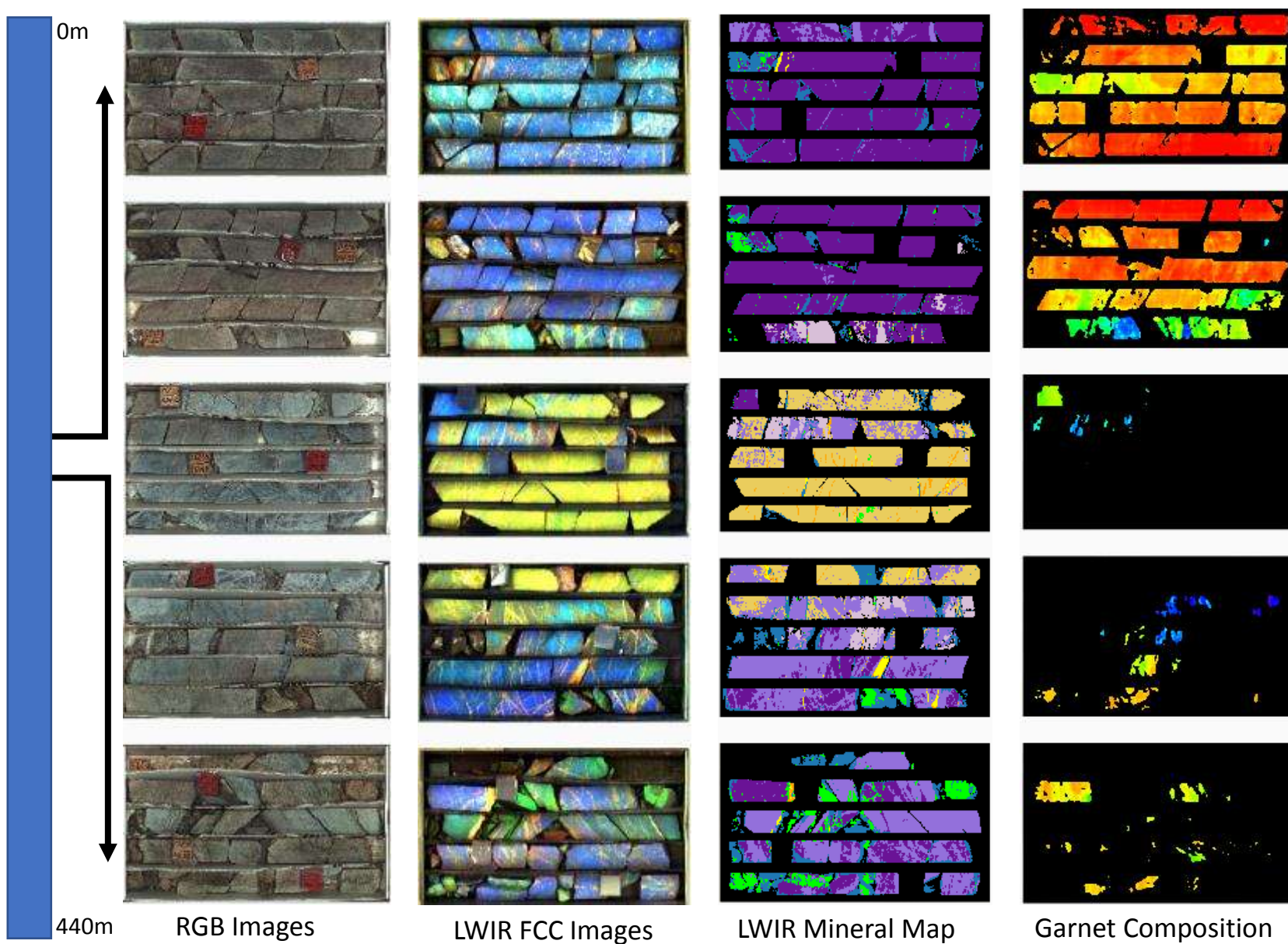
Mineral Identification Across the Infrared

IntelliCore – Geo Intelligence

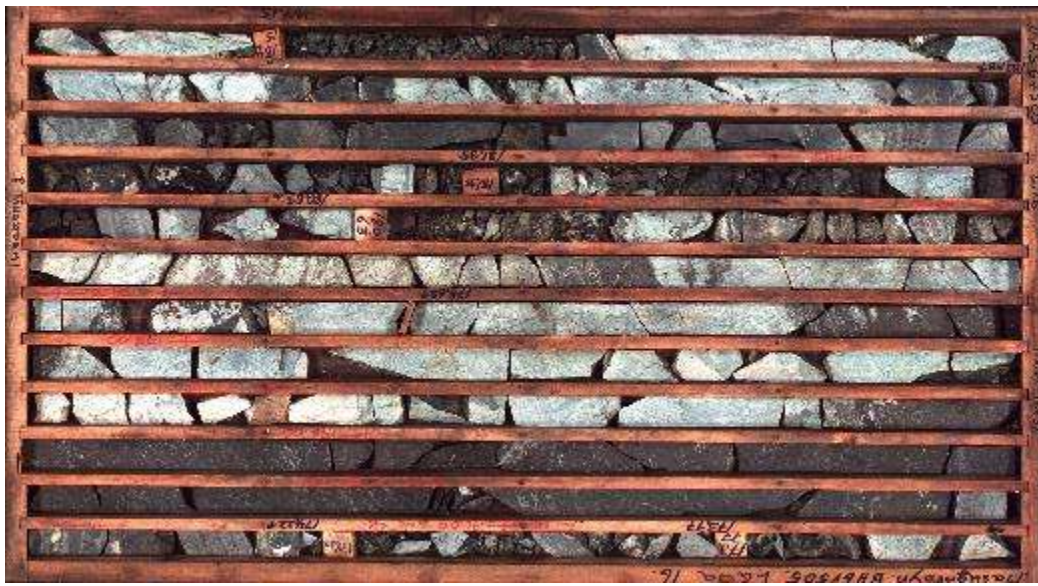
- **Improved Image Visualization**
 - Simpler image data access
 - High resolution image presentation
- **Improved Data Access**
 - App vs Browser
 - Ability to cache data
- **Off-Line Functionality**
 - Download data for off-line access
 - Intranet access for site data management
- **Advanced Product Suite**
 - Standard, advanced and custom products
- **Secure access to data at clients authorisation**



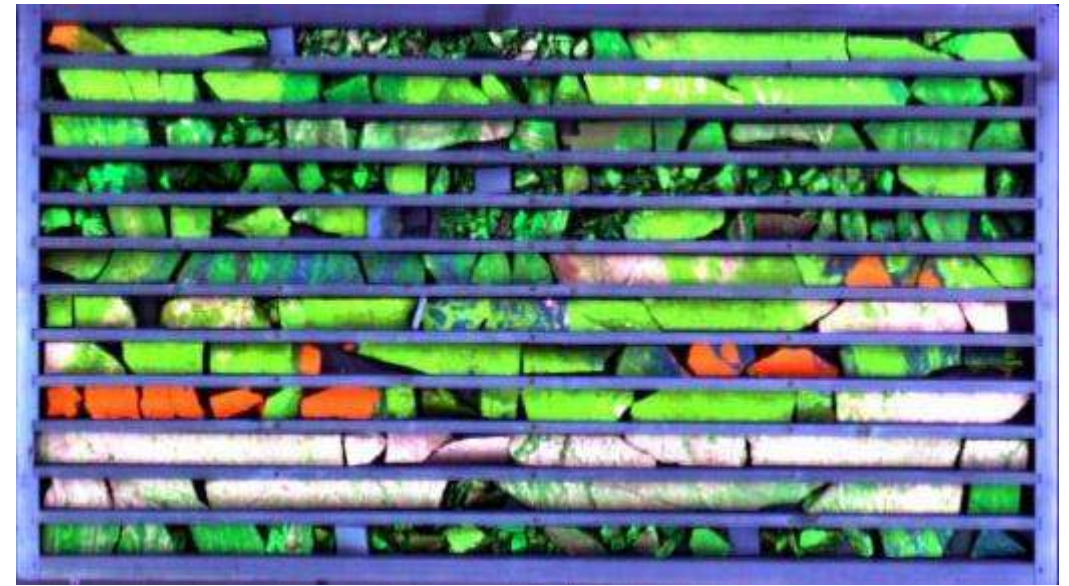
IntelliCore – Exploring the Data



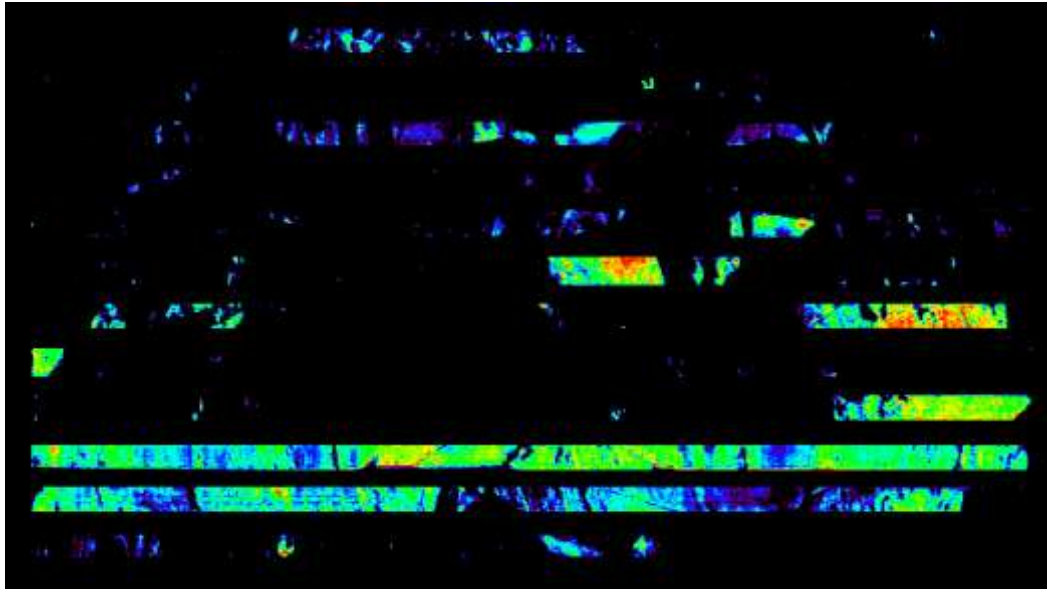
LWIR – Garnet Composition



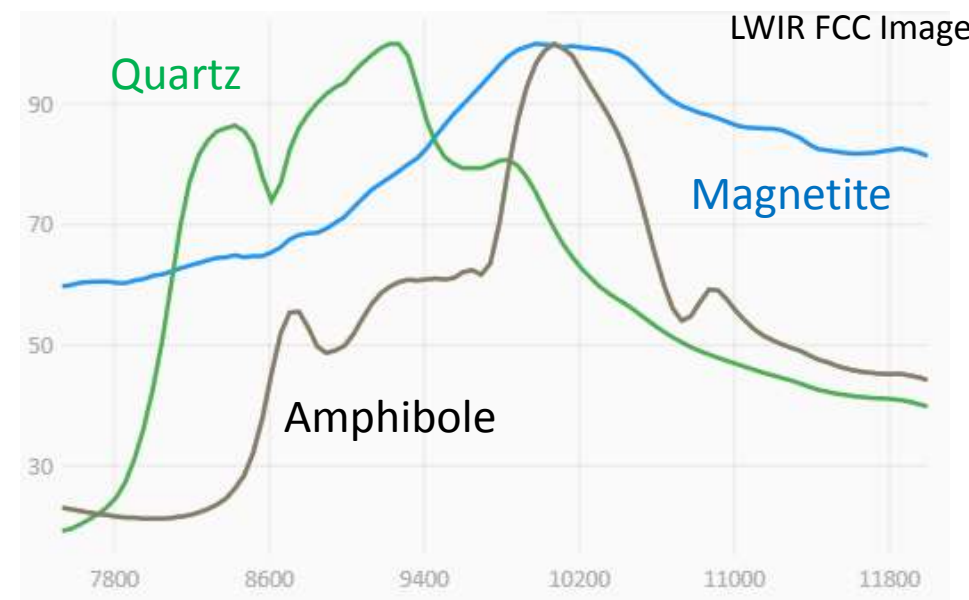
RGB Image



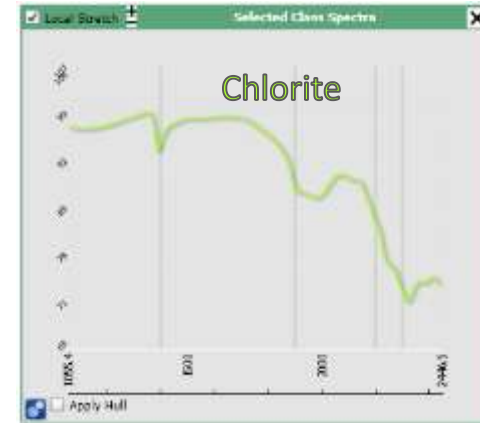
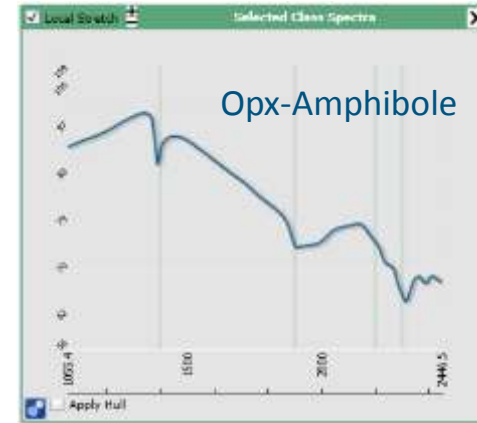
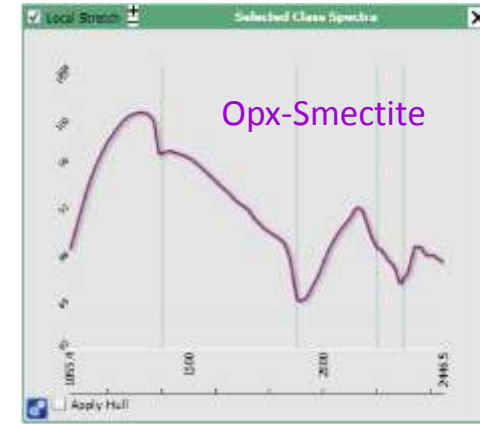
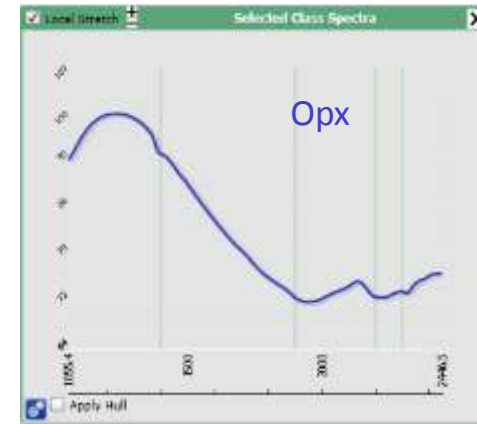
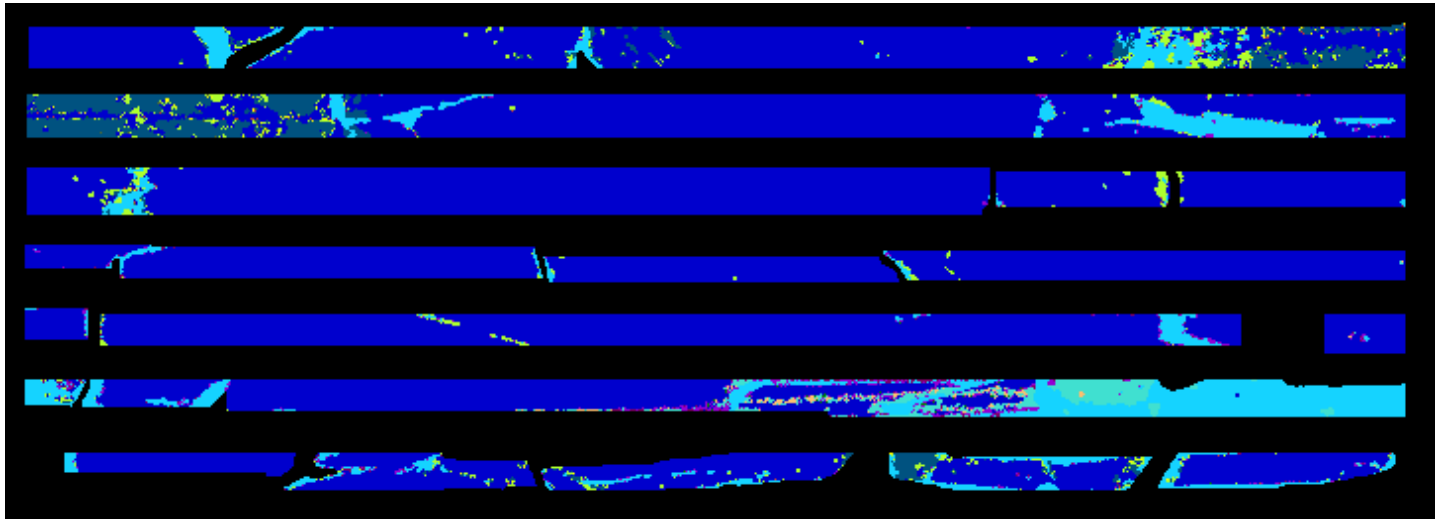
LWIR FCC Image



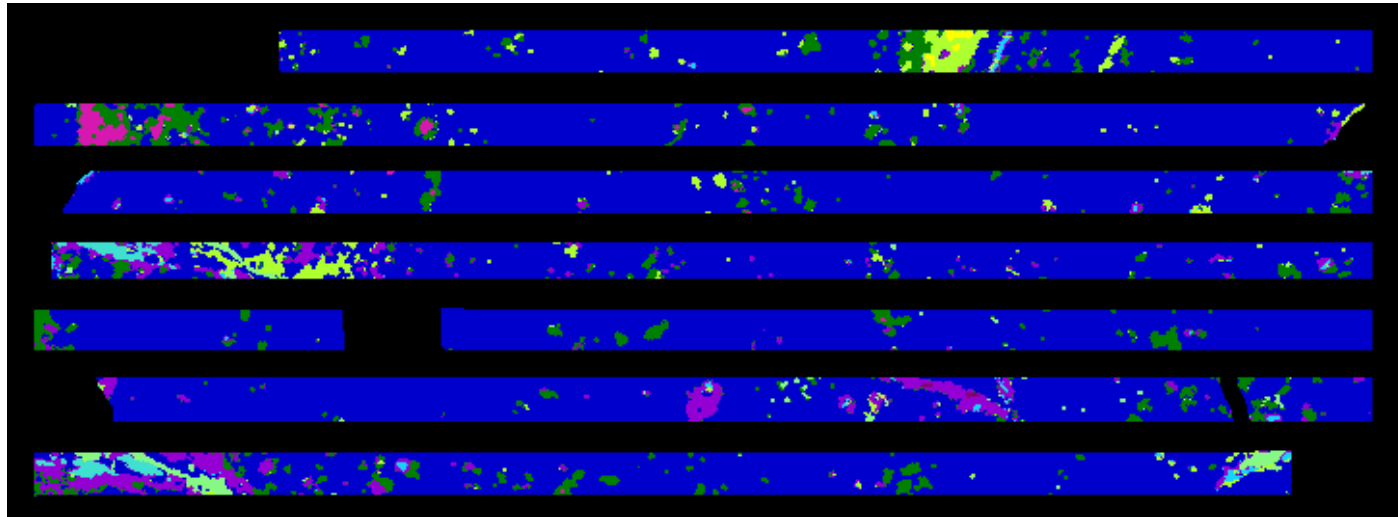
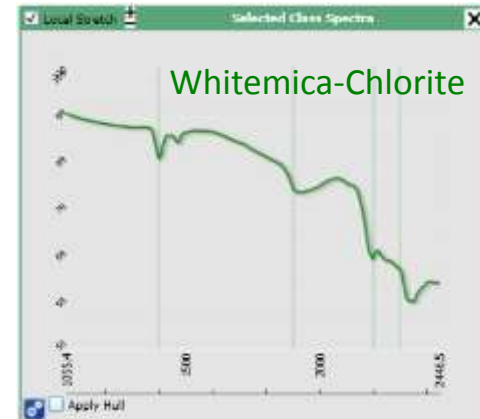
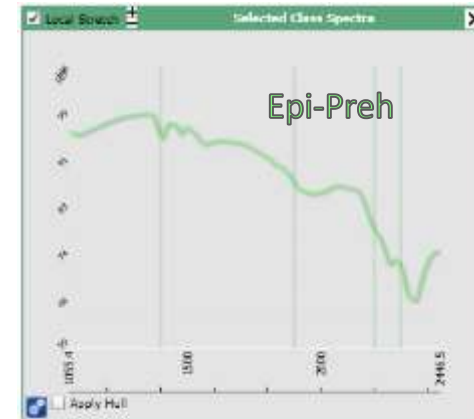
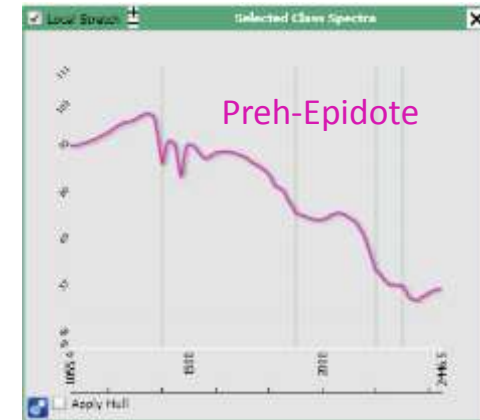
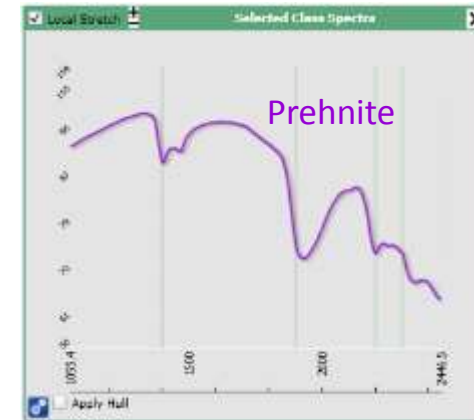
Sulphide/Oxide Image

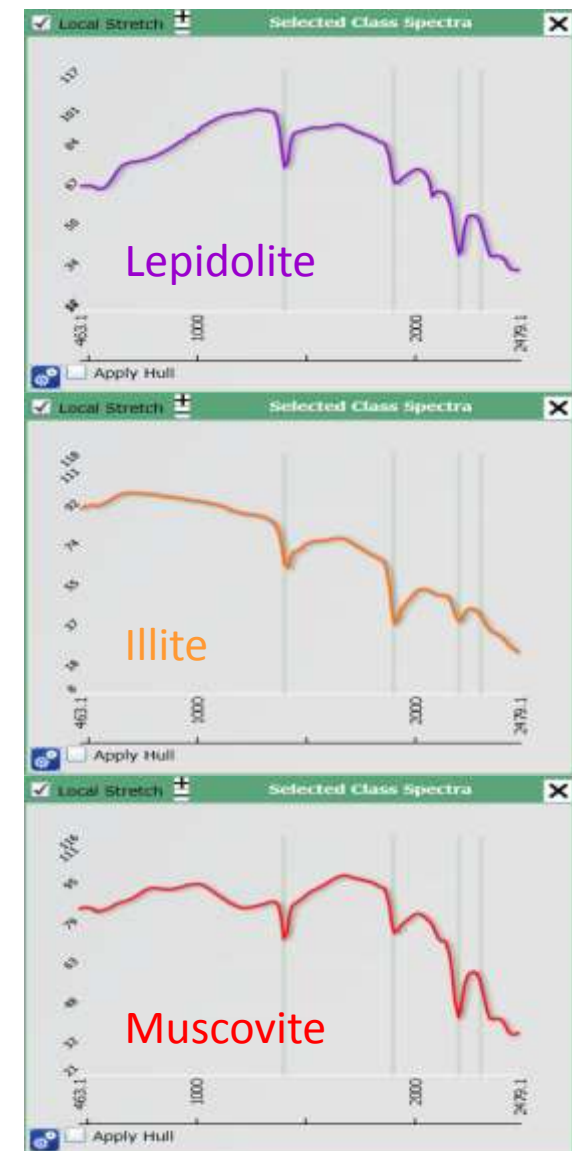
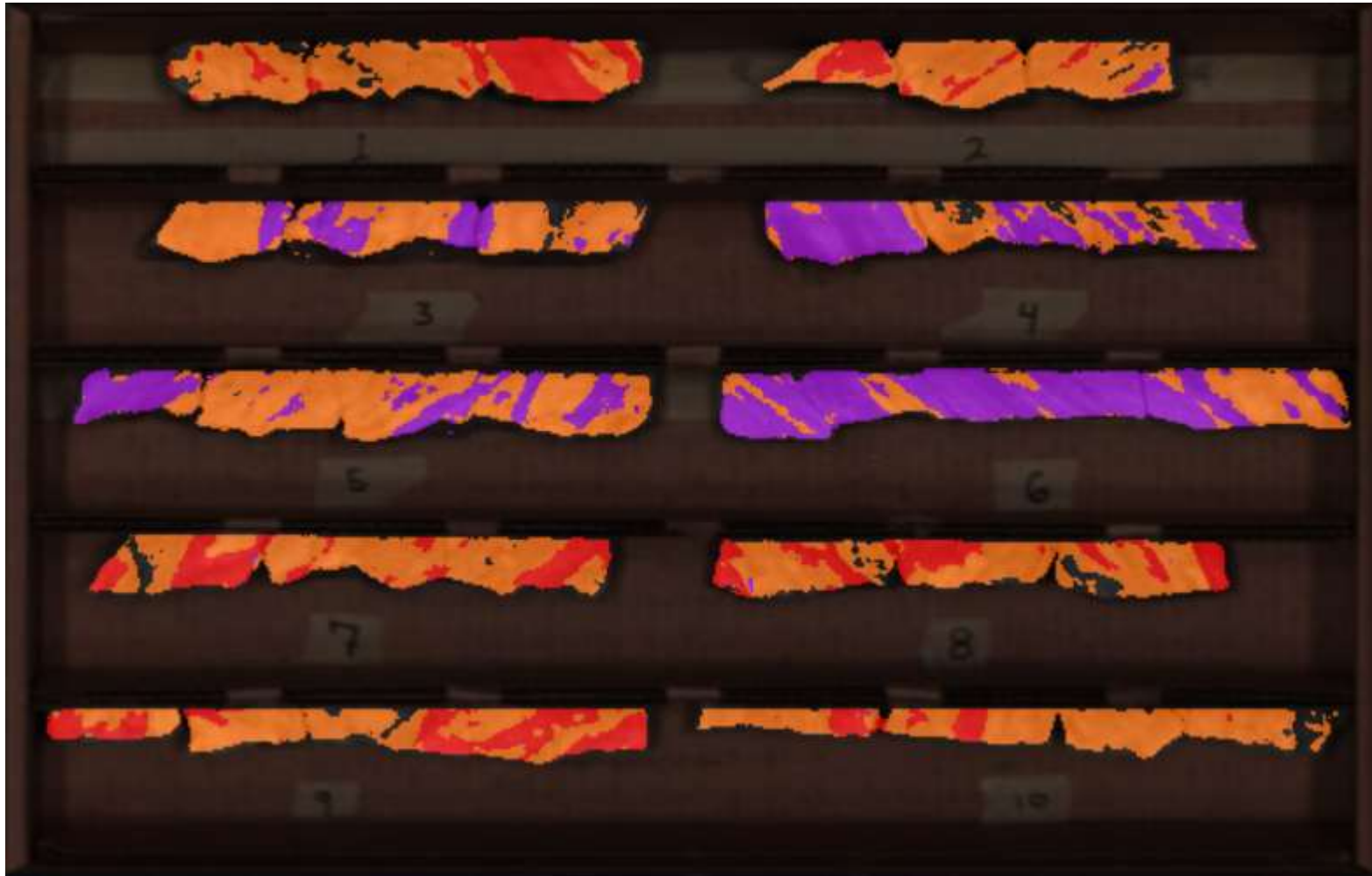


LWIR – Sulphide / Oxide

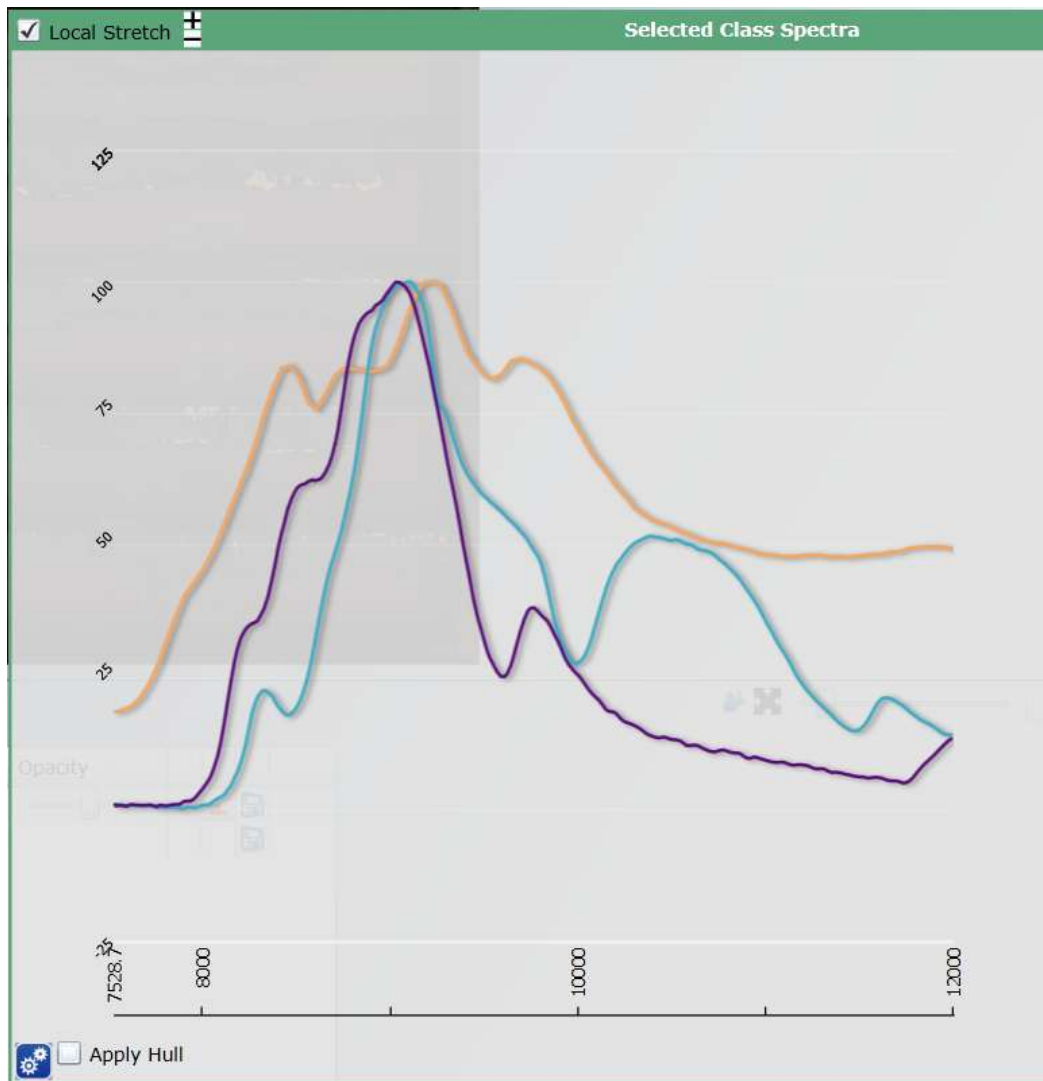


Platinum – Pyroxene Alteration





Lithium – Miccas

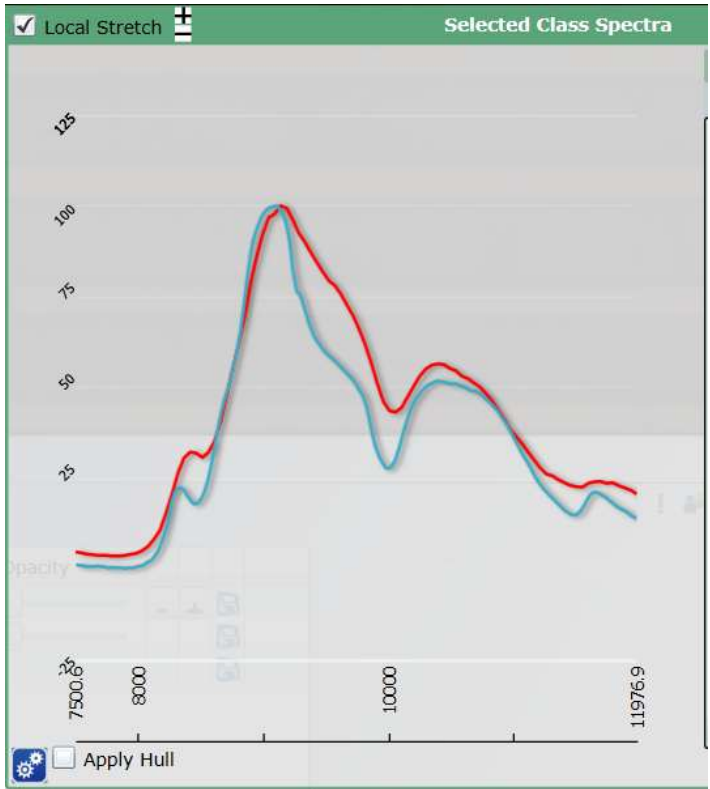
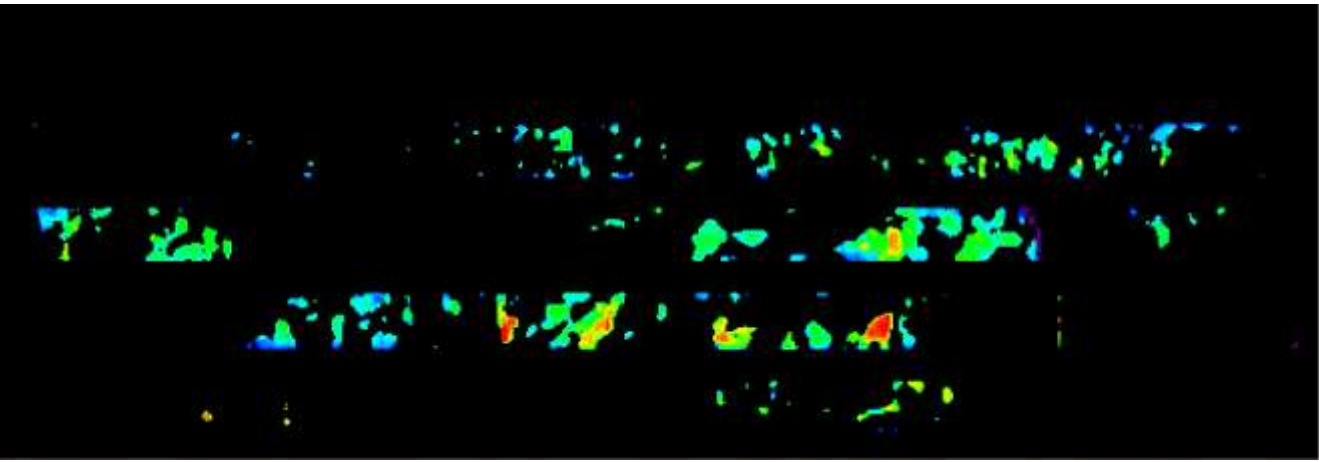


Petalite

Spodumene

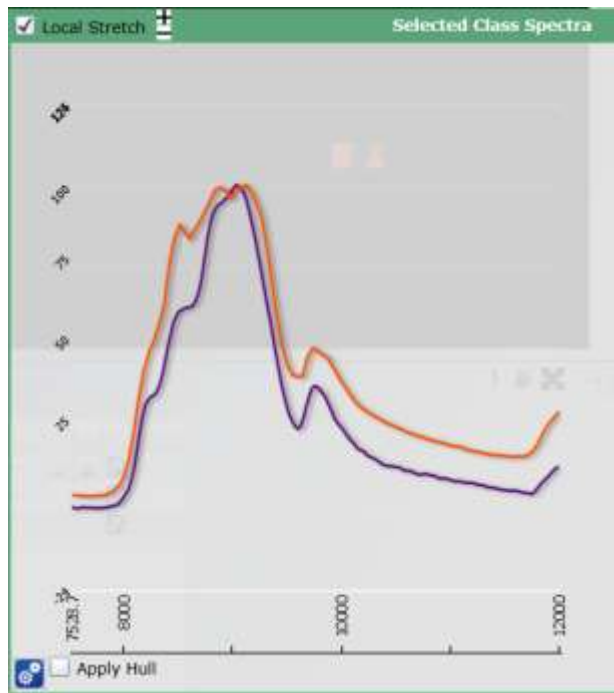
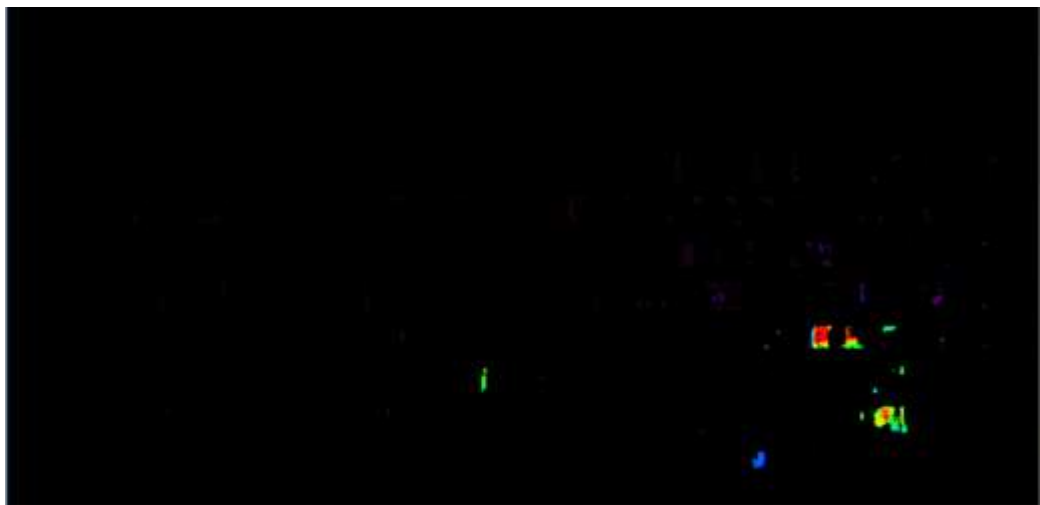
Amblygonite

Lithium – Ore Minerals



Spodumene core
Spodumene library

Lithium – Spodumene Intensity



Amblygonite core
Amblygonite JHU library

Lithium – Amblygonite Intensity

An aerial photograph of a tropical island, likely in the Philippines, featuring a prominent waterfall cascading down a steep, forested cliff. The island is surrounded by clear, turquoise water, and the dense green vegetation is visible on the land. The text "Thank You" is overlaid in a red, italicized font.

Thank You

Bringing the Rock to the