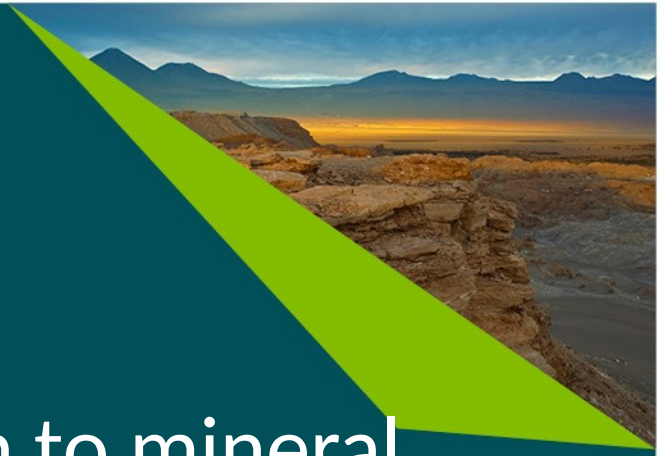

Procemin·GEOMET 2020

16th International Mineral Processing Conference
7th International Conference on Geometallurgy

Multi Pixel stochastic approach to mineral samples spectral analysis for geometallurgical modelling.

Cristian F. Jara*, Alejandro Ehrenfeld, Álvaro F. Egaña, Christian Vidal and Felipe A. Santibáñez-Leal

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The University Of Queensland AUSTRALIA
Sustainable Minerals Institute

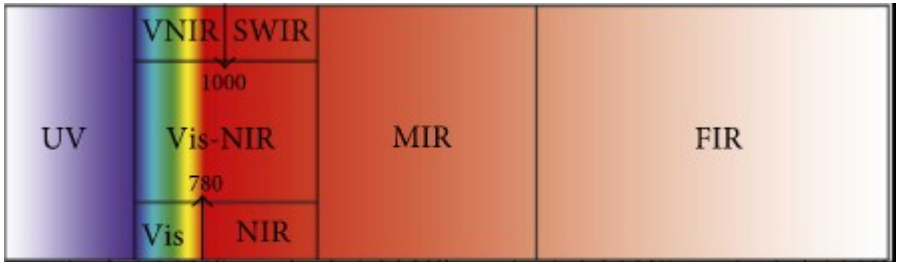
Universidad de Concepción

fcfm

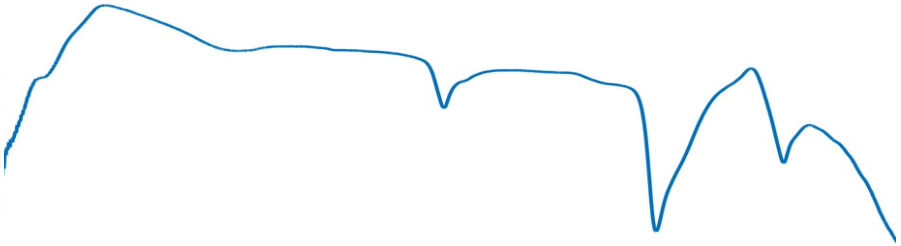
UA Universidad de Antofagasta

GECAMIN

VIS-NIR Technology

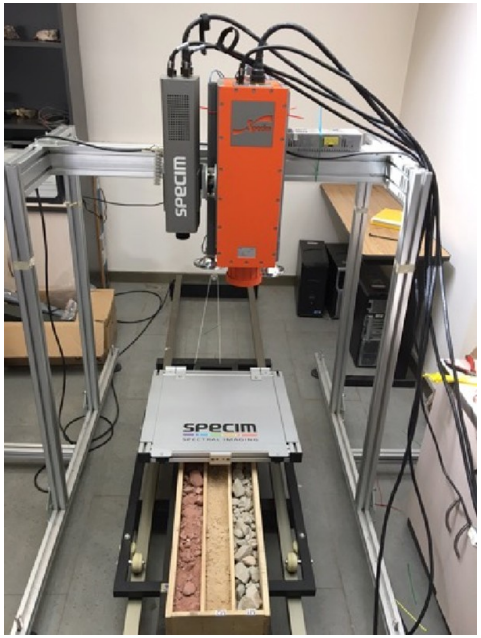


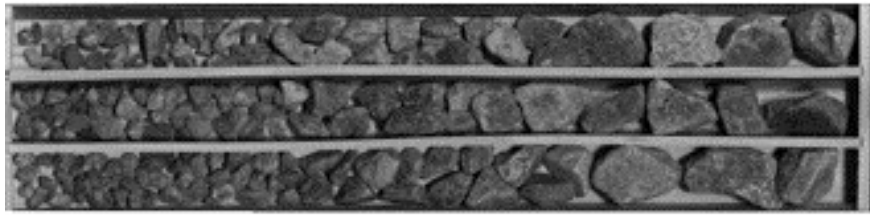
Wavelenth range:
VIS: 350 to 1000 nm
NIR: 1000 to 2500 nm



Raw Spectra of mineral

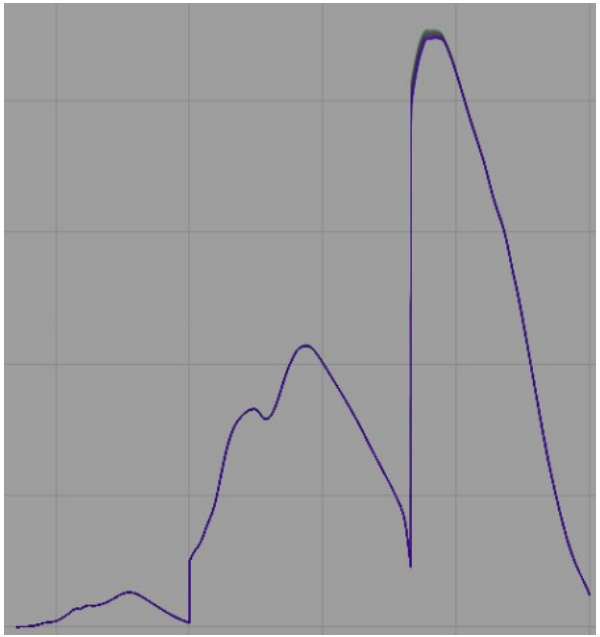
Laboratory Setup

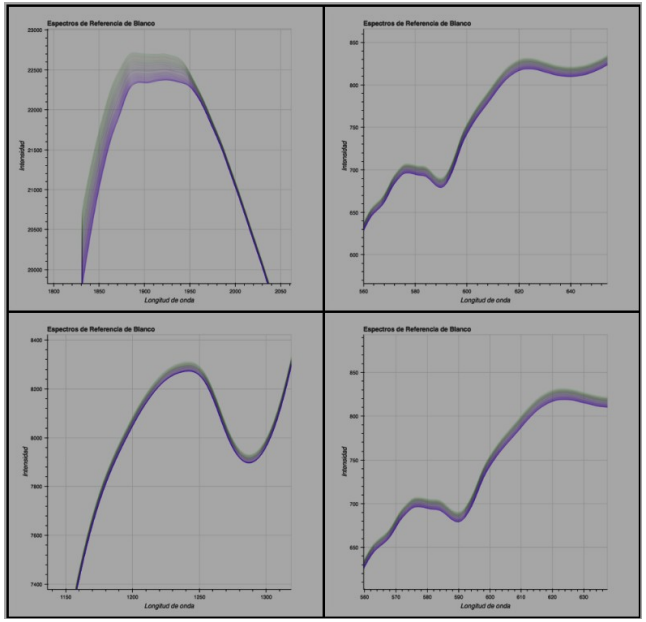




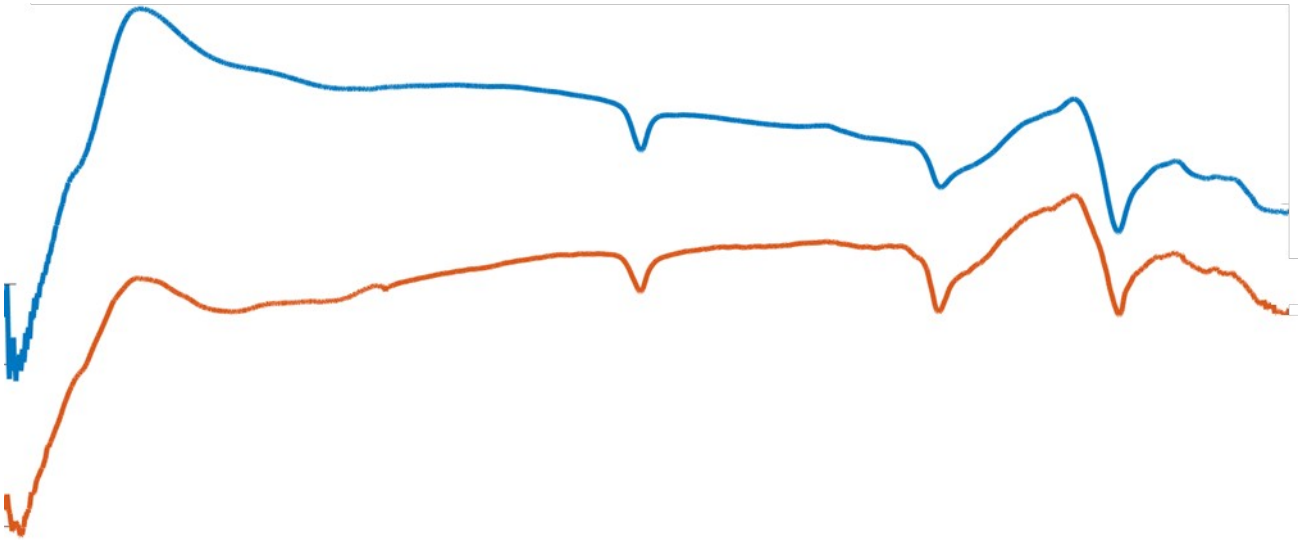
2D VIS-NIR Image

Typical Issue – Lamp Stability

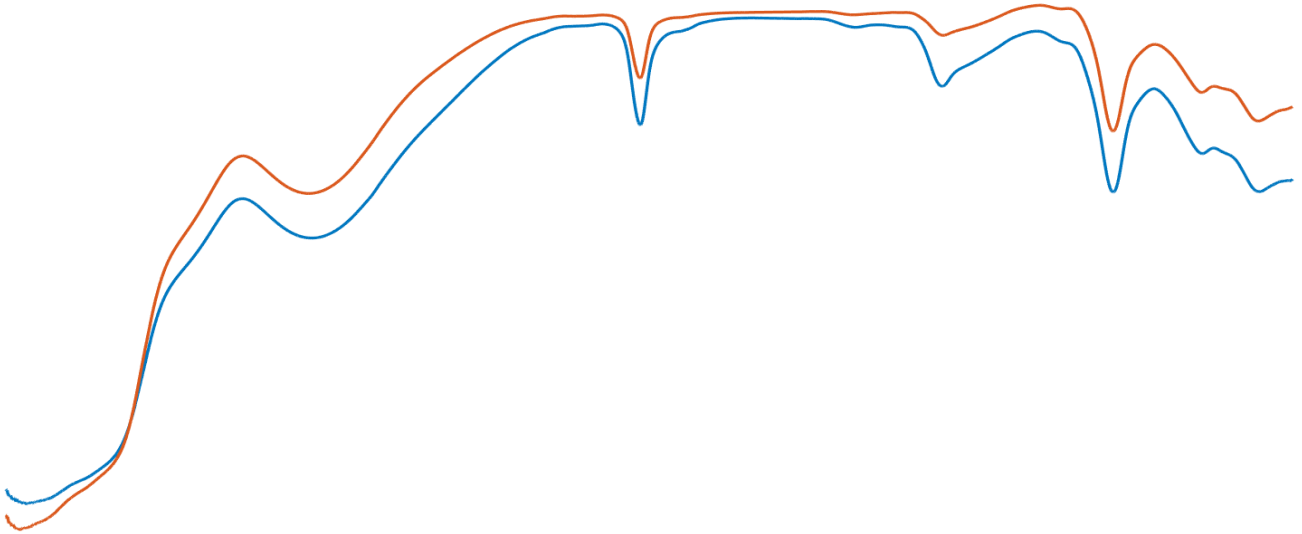




Typical Issue – White Reference Calibration



Typical Issue – Grain Size

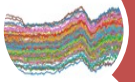


Why 2D Image?

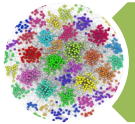
One pixel information

2D Image

Proposed Algorithm

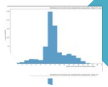


Data preprocessing



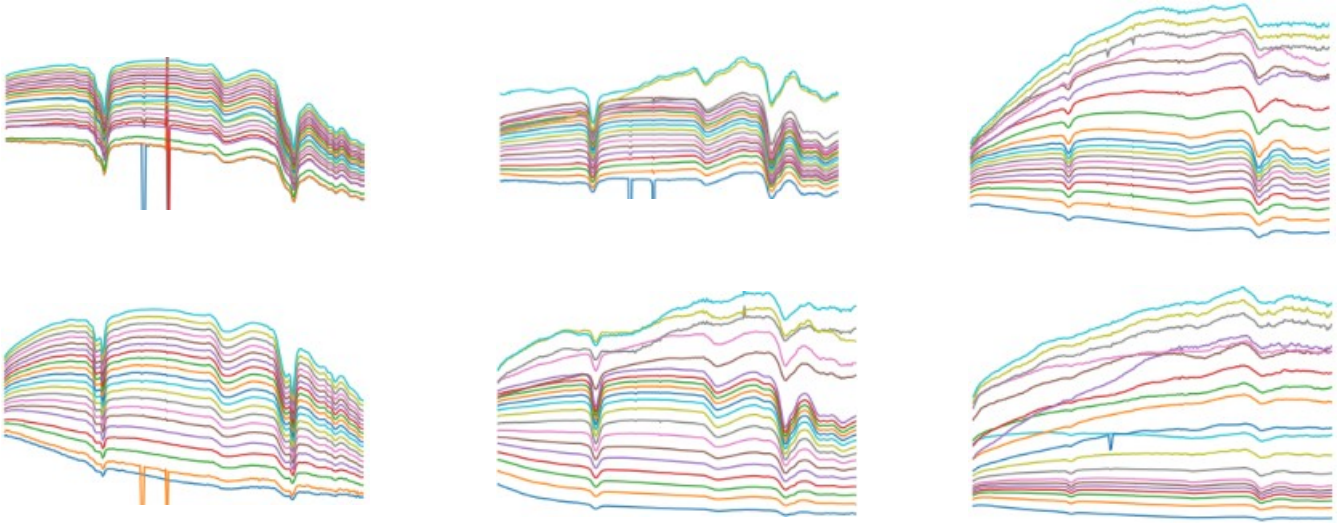
Clustering algorithm

Cluster regression



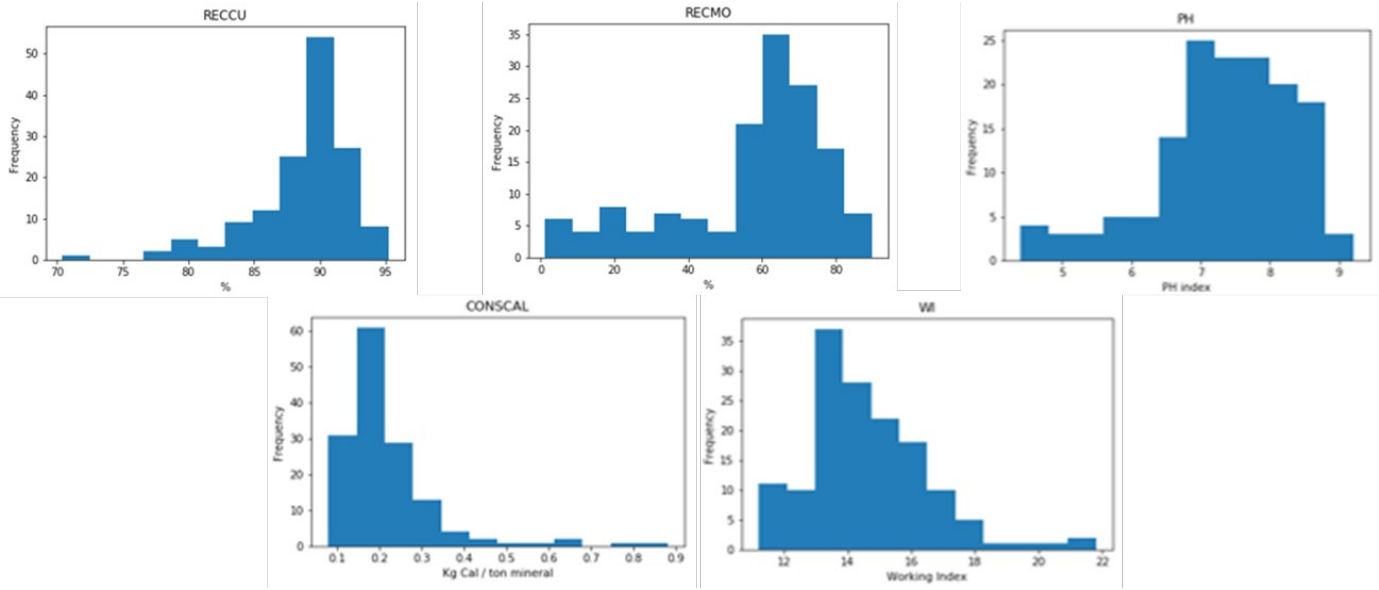
Prediction Distribution

Clustering Examples

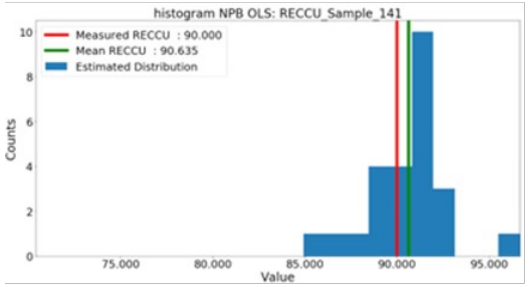


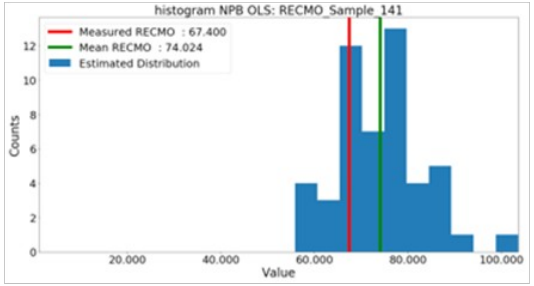
Mineral variability of samples is relevant for geometallurgical characterization

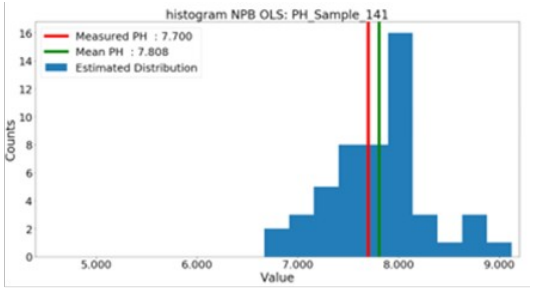
Experiment – Data Variability

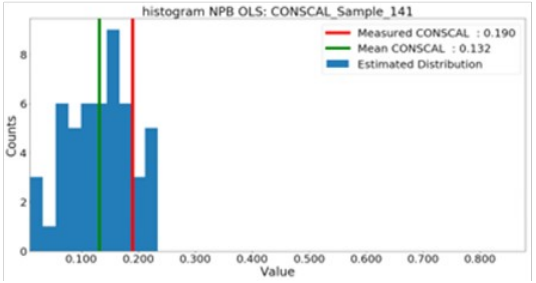


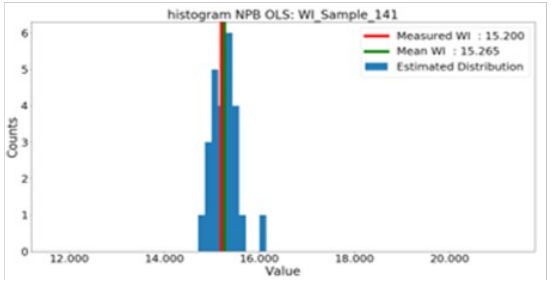
Experiment – Prediction Example











Experiment – Results

Model Regression		RECCU	RECMO	PH	CONSCAL	WI
	Dynamic Range	24.799	88.500	4.799	0.800	10.600
Naive individual Spectra based classification	**MAE**	4.568	18.639	0.810	0.095	1.594
	RMSE	5.192	23.387	1.061	0.125	2.077
Proposed Approach	**MAE**	**0.680**	2.871	**0.151**	**0.036**	**0.350**
	RMSE	0.804	**2.679**	0.178	0.053	0.441