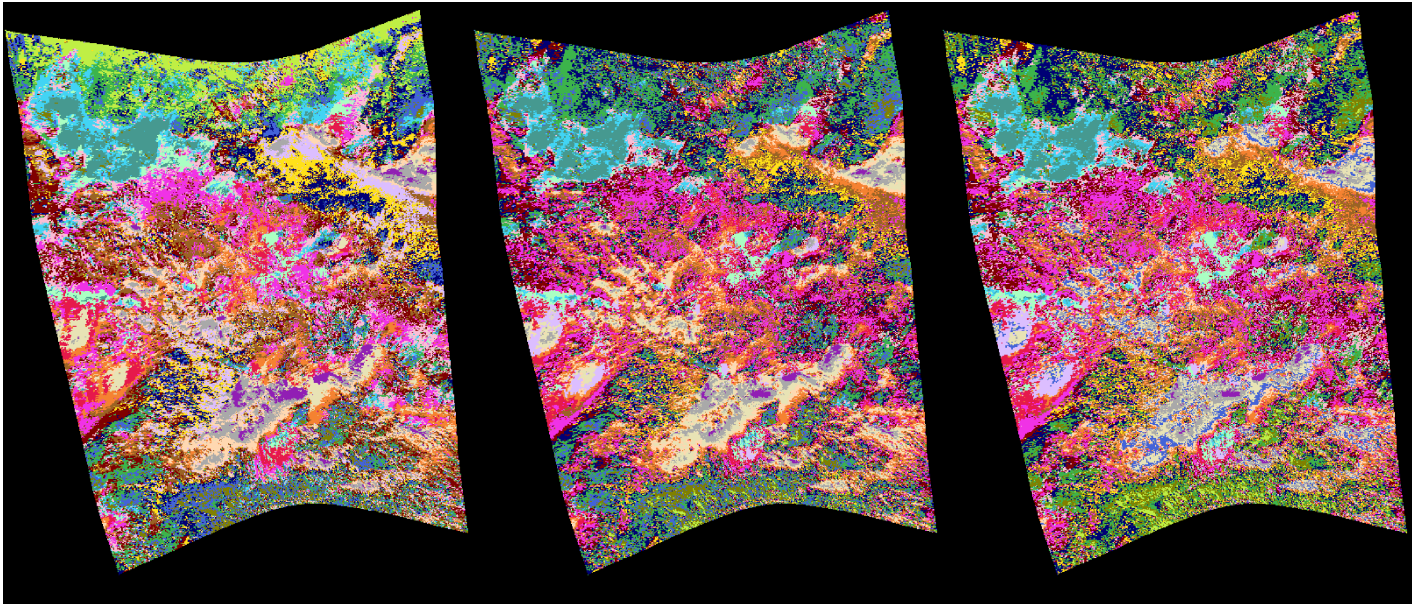


Supplementary Materials

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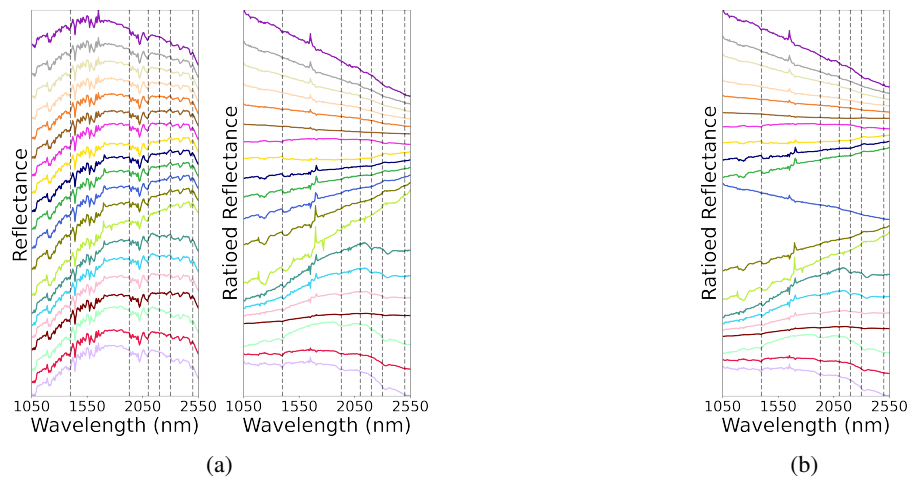


(a) PCA + K-Means

(b) Autoencoder + GMM on Unratioed Data

(c) Autoencoder + GMM on Ratioed Data

Figure 1: **Map projected Claritas rise (CRISM) clustering** Note that the lime-green class in (a) (which appears to be composed of cross-track dependent noise) is absent in both (b) and (c).



(a)

(b)

Figure 2: **Spectra comparison on Claritas rise (CRISM) image** Comparison of mean spectra for ratioed and unratioed clustering on Claritas Rise image (offset for clarity) (a) Cluster means on spectral data from Fig. 1b (left) with ratioed duplicate (right) (b) Cluster means of ratioed data from clusters in Fig. 1c. Key unique absorptions are at 1900 nm (water in minerals), 2300 nm, 2500 nm, and 2100 nm (serpentine), 2200 nm (Aluminum-rich phyllosilicates). Important features are correlated with the vertical dotted lines.

