Spatially Mapping the Spectral Evolution of Imaging Spectrometer Data

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Abstract
The high number of contiguous spectral bands provided by todays imaging spectrometers is necessary to capture the spectral variability of ground scenes. The fine spectral resolution allows materials to be identified based on their spectral signatures and is the driving force behind current information extraction techniques. Traditional multi-spectral classification routines do not operate well with this data even after reducing the spectral dimensionality. Current classification routines require the identification of spectral end-members, the extreme pixels of the N-dimensional spectral scatter. Recent experiments have shown that spectral end-members change with changes in spatial location and/or extent within a given scene which can affect pixel un-mixing techniques. On the other hand, understanding how end-members change based on their location and spatial association within a scene can also provide valuable information on the interaction and mixing of imaging spectrometer data pixels. Airborne Visible and InfraRed Imaging Spectrometer (AVIRIS) data from Cuprite, NV, USA, were used to shave the N-dimensional scatter and map their geographic locations.