Evaluation of the effects of continuum removal on the accuracy of mineral spectral unmixing models

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ABSTRACT: Precise abundance estimation of mineral composition is a tough problem, and spectral unmixing is no doubt one of the possible solutions to it. Spectral mixing model for minerals could be complex, and proper choice of unmixing model is essential for improvement of spectral unmixing accuracy. Continuum Removal (CR) is a commonly used spectroscopy analysis method, but also has been used in non-linear spectral unmixing applications. However, there has been little research on the effects of continuum removal on spectral unmixing models. Hapke Model is the most commonly used physical model for geology remote sensing, and its simplified version has been widely applied in outer space exploration. In this paper, Linear Model, CR Model, and Hapke Model are applied in laboratory mineral powder spectra, which is a classic simulation of intimate mineral mixtures. Results show that for mineral powder mixture, the unmixing accuracy of CR Model is much higher than that of Linear Model, and even better than that of the simplified version of Hapke Model. In conclusion, CR Model could have great potenial for outer space exploration, especially for dust covered surface of Moon or Mars.

Suggested topics: 5 Data Processing   (Hyperspectral Data Processing)

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