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Mineralogical Study of Lunar South Pole Region Using Chandrayaan-1 Hyperspectral (HySI) Data

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Abstract

The main focus of the presented work was to better predict the surface mineralogy from the Chandrayaan-1 hyperspectral data set covering the area from South Pole region. To address the space weathering effect and to quantify mineralogy the Bi-directional reflectance function have been implemented. The implemented model was tested against two standard lunar laboratory mixtures and with the Apollo 10084 bulk soil sample. About 85 spectra were initially selected from varying locations and only active spectra with significant absorption were used for modeling. The minerals like plagioclase and Clinopyroxene were identified. Many spectra exhibits more iron content simulating mature area. Model result show no olivine content and very low Orthopyroxene content may be because of more crustal thickness, no impact would have penetrated to the lower mantle. Study reveals the potential of hyperspectral data multiplexed with mathematical model for not only mineral