FeO and TiO2 Abundance Analysis Using Reflectance Spectra Measured by HySI Sensor Onboard Chandrayaan-1 around Apollo-17 Landing Site

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One of the scientific instruments onboard Chandrayaan-1, Hyperspectral Imager (HySI) is meant for topographic and mineralogical mapping in the visible and near infrared spectral range with 64 contiguous bands of 15 nm bandwidth. It operates in the Visible-Near Infrared region of the Electromagnetic (EM) spectrum ranging from 420 – 960 nm. The objective of the present study was to investigate the Lunar surface composition of the Apollo-17 Landing site using Hyperspectral Imager Sensor (HySI) onboard Chandrayaan-1. The *Apollo 17* lunar module landed in a deep narrow valley called Taurus-Littrow. This valley is located in the mountainous highlands at the eastern rim of the Serenitatis basin. The *Apollo 17* site is in a dark deposit between massifs of the southwestern Taurus Mountains and south of the crater Littrow. The lunar soil can be differentiated on the basis of proportion and type of magnesoferrous minerals. The return samples from the Apollo –17 mission and the results of investigation of those samples had shown a wide range of variability in composition. The Lunar surface units selected for the present study, are the areas around Apollo-17 sampling stations for which the detailed compositional data were available. The spectra for these Apollo-17 sampling stations were obtained from the hyper spectral data as measured by HySI and analysis for the preliminary FeO and TiO2 concentration in the Lunar surface was done. Spectral ratios (R950/R750)/R750 and (R450/R750)/R750 were used to evaluate the FeO and TiO2 content respectively for the study area and were correlated with the compositional details obtained from the return samples for each sampling stations. A regression equation was generated and used for further quantification of FeO and TiO2 content. This paper describes the initial result for the elemental abundances in the Study area. An attempt is made to develop a methodology for estimating the FeO and TiO2 content in the lunar surface for the study area and an abundance map of FeO and TiO2 for the Apollo-17 landing site is generated.