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# Elemental Distribution in Parts of Mare Tranquillitatis of Near Side of the Moon Using Hyperspectral Imager (Hysi) Data

**Henal V. Bhatt*, Paras Solanki**

M. G. Science Institute, Gujarat University, Ahmedabad, Gujarat, India

**ABSTRACT:**

To understand a planet it is essential to determine its chemistry. Major elements present on the Moon are Oxygen (O), Silicon (Si), Iron (Fe), Magnesium (Mg), Calcium (Ca), Aluminium (Al) and Titanium (Ti). The study of compositional variation using remote sensing data and reflectance spectroscopy is being done from five decades. In the reflectance spectra, wavelength position, shape and strength of the Fe2+ absorption features vary from mineral to mineral depending on the properties of the crystallographic sites they occupy and also on the basis of relative abundances and compositions of mafic minerals present. Based on absorption feature in the reflectance spectra we can identify particular mineral and the probable elements present in the area. For this work, we have used Hyperspectral Imager (HySI) data from India's first Moon Mission - Chandrayan-1, launched in October, 2008. Here, we have selected the western part of Tranquillitatis basin, situated on the near side of the Moon. Mare Tranquillitatis is of Pre-Nectarian age. It's a non-mascon basin, located at 7°N and 30°E and shows two prominent ring structures with 700 and 900 km diameters, respectively. Using the Band Parameter technique, we have analysed the area and identified the probable elements present in the area by generating Rock type colour composite image. Band Parameters comprises of band tilt (BT), band strength (BS), and band curvature (BC). By assigning Red, Green, Blue channel to corresponding BC, BT, BS parameter we have generated rock type colour composite image. Two different basaltic unit have been identified as ancient mature mare units, highland contaminated mare unit on the basis of spectral signature and spectral band parameters. Area shows absence of younger mare units. Pyroxenes are silicon-aluminum oxides with Ca, Na, Fe, Mg, Mn and Li. High Calcium Pyroxene rich fresh crater are present in various part within ancient mature mare units and in the highland area. Very small craters have been identified in the feldspathic (alumino silicate) highland terrain, compositionally rich in High Calcium Pyroxene and/Oilvine (Mg2+, Fe2+)2SiO4. However, presence of Low Calcium Pyroxene rich fresh crater in the highland contaminated mare is found in very less amount.