Detection of Low-shield Volcano with Effusive Vent in Oceanus Procellarum on Moon, using Chandryaan-1 TMC Data

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The Chandrayaan-1, launched on October 22, 2009, carried a unique panchromatic sensor called Terrain Mapping Camera (TMC) , which viewed the surface of the Moon from 100 kms and returned unprecedented image quality due to its very high spatial resolution of 5 m. The imaging is done in strip mode of 20 km swath.

Impact craters are the dominant landforms on most of the solid surfaces in our solar system. These impact craters have accumulated on the surfaces over the age of our solar system. The number of craters on a surface increases with the length of time that surface has been exposed to space. These rather simple ideas are the basis for a very powerful tool, called crater counting, that planetary scientists use to unravel the history of a planetary surface. The basic idea is that an old surface will have more impact craters than a younger surface. The method has been calibrated using the ages of samples returned from the Moon.

As the Terrain Maping Camera of Chandrayaan-I provides high resolution images of 5m, which can be used for age determination of lunar surface. For this study, TMC Nadir images having orbit no. 760 and 722 (acquired image on 10^{th} and 7^{th} of January 2009) over area around Apollo 14 and Apollo-17 Landing sites respectively were used. The age of area surrounding Apollo-14 and Apollo-17 landing sites were determined using crater counting technique. The crater diameters were measured as precisely as possible from the TMC images.

For the selected area around Apollo-14 an age of 3.62 Ga was obtained, which falls in upper Imbrian system, which coincides approximately with the age of returned samples of about 3.8-3.9 Ga, and for the area around Apollo-17, an age of 3.69Ga was obtained, which also coincides approximately with the age of returned samples of 3.7-3.8 Ga. Age of Central cluster of Apollo-17 landing site is about 110 Ma

which coincides with Tycho event. Further detailed analysis of morphology around Apollo14 and 17 sites and Tycho area was in process.

In similar way we can calculate the ages of different lunar geological units from TMC high resolution images using crater counting technique.