

Characterization of Kopff Crater Using Remote Sensing Data

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Abstract : Moon Mineralogy Mapper (M3), Miniature Radio Frequency (Mini-RF), Kaguya Terrain Camera images, Lunar Orbiter Laser Altimeter (LOLA) digital elevation model (DEM) and Lunar Reconnaissance Orbiter Camera (LROC)- Narrow angle camera (NAC) and Wide angle camera (WAC) images were used to study mineralogy, surface physical properties, and age of the 42 km diameter Kopff crater. M3 indicates the low albedo crater floor to be high-Ca pyroxene dominated associated with floor fracture suggesting the igneous activity of the gabbroic material. Signature of anorthositic material is sampled on the eastern edge as target material is excavated from ~3 km diameter impact crater providing access to the crustal composition. Several occurrences of spinel were detected in northwestern rugged terrain. Our observation can be explained by exposure of spinel by this crater that impacted onto the inner rings of Orientale basin. Spinel was part of the pre-impact target, an intrinsic unit of basin ring. Crater floor was dated by crater counts performed on Kaguya TC images. Nature of surface was studied in detail with LROC NAC and Mini-RF. Freshly exposed surface and boulder or debris seen in LROC NAC images have enhanced radar signal in comparison to mature terrain of Kopff crater. This multidisciplinary analysis of remote sensing data helps to assess lunar surface in detail.

Keywords : crater, mineralogy, moon, radar observations

Conference Title : ICGGS 2019 : International Conference on Geoscience and Geological Surveys

Conference Location : Mumbai, India

Conference Dates : February 07-08, 2019