

Initial Results of the Mini-SAR radar instrument on the Chandrayaan-1 mission to the Moon

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The Mini-SAR (synthetic aperture radar) instrument is a low mass, low power instrument that flew onboard the successful Chandrayaan-1 mission. Using a unique hybrid dual-polarization architecture [1-2], the Mini-SAR instrument collected radar measurements of both polar regions of the Moon down to about 80° N and S latitude in the first imaging season from mid-February to mid-April, 2009. Measurements were made in the S-band (2380 MHz, 12.6 cm wavelength) with a nominal incidence angle of 33.5°, resulting in a ground sample distance of 75 m/pixel.

Measured backscatter values of lunar polar terrain are largely consistent with values determined from Earth-based radar, with circular polarization ratios (CPR) values in the range of 0.1 to 0.3. Two populations of features with enhanced CPR values are observed [3]. The first population consists of fresh-appearing impact craters (Fig. 1). CPR values are elevated throughout the crater interiors and exteriors (typical values >1.0), consistent with rough ejecta. A second population of older, more degraded craters exhibits enhanced CPR values in their interiors only, a signature which is consistent with water ice (Fig. 1).

Keywords: Moon; polar volatiles; ice; radar; CPR; circular polarization ratio.

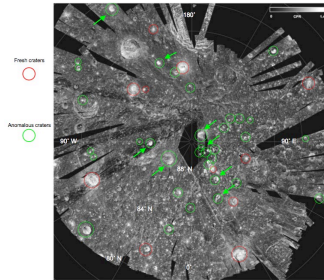


Fig. 1. CPR map of lunar north pole with fresh craters (red) and anomalous craters (green). Fig. from [3].

References

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