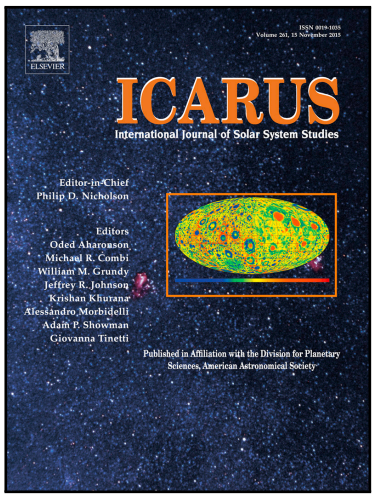

Radar images of the Moon at 6-meter Wavelength

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PII: S0019-1035(16)30832-6
DOI: 10.1016/j.icarus.2017.06.035
Reference: YICAR 12519

To appear in: *Icarus*

Received date: 13 December 2016
Revised date: 20 June 2017
Accepted date: 29 June 2017

Please cite this article as: Juha Vierinen, Torbjørn Tveito, Björn Gustavsson, Saiveena Kesaraju, Marco Milla, Radar images of the Moon at 6-meter Wavelength, *Icarus* (2017), doi: 10.1016/j.icarus.2017.06.035

Radar images of the Moon at 6-meter Wavelength

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Abstract

We present new range-Doppler images of the Moon using 6-meter wavelength. The radar images were obtained using the Jicamarca Radio Observatory 49.92 MHz radar. The observations were performed using circular polarization on transmit and two orthogonal linear polarizations on receive, allowing scattering images to be obtained with the polarization matched to the transmitted wave (polarized), and at a polarization orthogonal to the transmitted wave (depolarized). Due to the long wavelength that penetrates efficiently into the subsurface of the Moon, the radar images are especially useful for studies of subsurface composition. Two antenna interferometry on receive was used to remove the Doppler north-south ambiguity. The images have approximately 10 km resolution in range 20 km resolution in Doppler, allowing many large scale features, including maria, terrae, and impact craters to be identified. Strong depolarized return is observed from relatively new larger impact craters with large breccia and shallow regolith. Terrae regions with less lossy surface material also appear brighter in both depolarized and polarized images. A large region in the area near the Mare Orientale impact basin has overall higher than mean radar backscatter in both polarized and depolaried returns, indicating higher than average presence of relatively newly formed large breccia in this region. Mare