

## Improved Mini-RF Monostatic S-band Radar Observations of the Moon

Orthorectifying the Mini-RF Data to the Lunar Reference Frame



(a) Raw Mini-RF radar (S<sub>1</sub>, power), (b) Orthorectified S<sub>1</sub>, (c) LOLA hillshade





 $\delta CPR$  of the lunar North and South Pole, compensating for i angle

We developed methods to create new seamless radar images that empirically account for incidence angle effects and orthorectify Mini-RF monostatic S-Band data (6,644 collects) to the LOLA lunar reference frame and topography.

- We characterized the observed radar behavior as a function of local incidence angle (*i*) variations due to topography.
- Based on the resulting characterization, we derived a correction for incidence angle to accentuate geologic variability.
- After incidence angle effects are taken into account, permanent shadowed regions (PSRs) at both poles show higher radar reflectivity than non-PSRs, though they are not clearly distinct in polarization (e.g. CPR).

Fassett, Bramson, Cahill, Harris, Morgan, Neish, Nypaver, Patterson, Rivera-Valentin, Taylor, Thomson, & the Mini-RF team (2024). *Planetary Science Journal, 5, 4 (LRO Special Issue)* <u>https://doi.org/10.3847/PSJ/ad0a61</u>