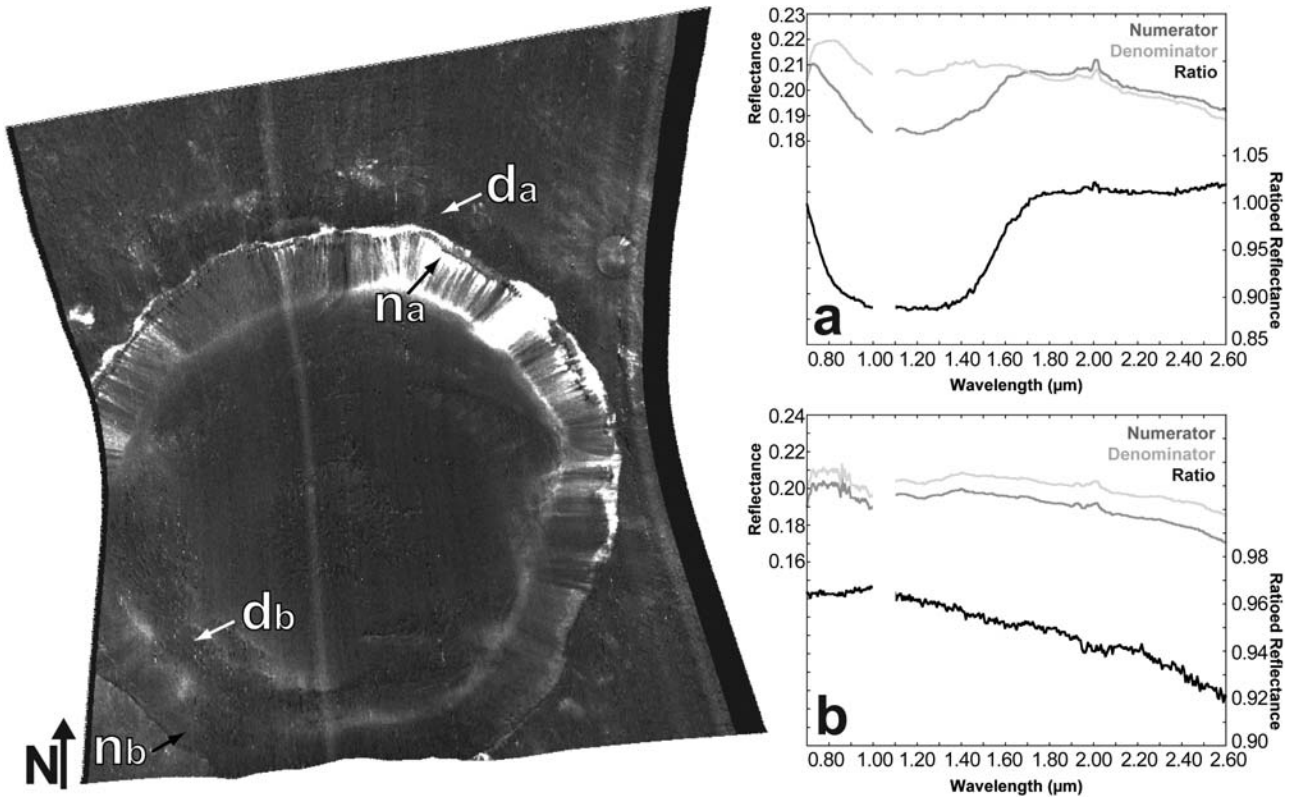

Figure 6. CRISM image FRT00009A9A OLINDEX2 parameter of Naar Crater in Chryse Planitia (22.87°N, 317.80°E) with its associated numerator, denominator (from sites n and d, respectively), and ratioed spectra. (a) The spectra from the equator-facing slope show a strong olivine absorption feature, while (b) the spectra from the pole-facing slope lack mafic absorption features.

shows evidence of both olivine and clinopyroxene in its spectrum. The structure of this sequence appears to be associated with both preimpact stratigraphy and the overturned flap of the crater ejecta as sketched in Figure 8. In this sketch, unit 1 is clinopyroxene-bearing and was originally located closest to the surface prior to crater formation. Unit 2 is olivine-bearing and is now the closest unit to the surface due to the development and preservation of an overturned flap during crater formation. The talus appears to be derived from both units, although the olivine signature appears to be the dominant spectral signature. We believe that the same stratigraphy is present along the pole-facing crater wall and slope, although no mafic signatures have been identified due to the presence of an obscuration layer (Figure 6). The abundance of mafic mineralogies evident in both shallow material (crater wall) and at depth (central peak) indicates that the majority of this region is dominated by olivine- and clinopyroxene-bearing materials.

[22] Lismore Crater in central Chryse Planitia (26.79°N, 318.38°E) is a relatively fresh impact crater with strong mafic signatures throughout its ejecta deposit and in portions of exposed bedrock on the crater floor (Figure 9). Olivine and lesser amounts of clinopyroxene are present in the majority of the ejecta deposit, while the surrounding plains and the majority of the crater interior do not show any mafic signatures. Alteration rinds and thin coatings derived from outflow channel sediments or the margin of the VBF may be responsible for the obscuration of mafic signatures in the plains material. Alternatively, the accumulation of aeolian material within the crater itself may account for the lack of mafic signatures seen within the crater. However, some mafic minerals are observed in talus material derived from the crater rim and along the equator-facing side of bedrock exposures along the crater floor.

[23] An obvious muting of mafic signatures is observed in the mid-latitudes of the study region, as is seen in CRISM image HRL00009801 of an unnamed crater located at 47.92°N, 323.68°E. While clinopyroxene was not detected in this crater, olivine was found to be widespread throughout both the crater wall and ejecta (Figure 10). The discontinuous and patchy appearance of olivine in the crater ejecta appears to be due to the presence of a mantling unit that obscures the exposed blocky ejecta material. Also evident is the orientation preference of the olivine signature. The majority of equator-facing slopes, including the exterior slope of the southern rim, show enrichments in olivine, while nearly all pole-facing slopes are deficient in olivine. In addition, the observed olivine enrichment cannot be associated with a distinct stratigraphic unit due to the presence of mantling material along the crater rim and wall. However, the presence of olivine within the crater ejecta and associated with talus slopes and gullies derived from the crater wall imply that olivine is present at relatively shallow depths.

[24] An unnamed crater located at 61.33°N, 311.44°E lacks mafic signatures associated with material along the wall and rim of the crater. However, olivine and, to a lesser