A NEAR-INFRARED IMAGING SURVEY OF THE MOON; Paul G. Lucey, David Blewett, and Charles Budney, Planetary Geosciences, Department of Geology and Geophysics, University of Hawaii at Manoa, 2525 Correa Rd., Honolulu HI 96822

Recent advances in IR detector technology has made relatively large IR imaging arrays available at major observatories. We performed a survey of the Moon at four wavelengths in the near-infrared using a 256x256 element NICMOS HgCdTe array at the 2.24-m University of Hawaii telescope at Mauna Kea Observatory. About 80% of the angular extent of the Moon was covered in this survey which obtained four wavelengths, 1.28 μm, 1.45 μm, 1.55 μm, and 1.99 μm, with 20 nm band widths. Reduction of this data set is proceeding and thus far we have used it, in conjunction with visible imaging, to map the distribution of olivine in the crater Copernicus. In that study we found that, in addition to the central peaks, portions of the northern wall also have exposures of olivine-rich, pyroxene-poor, material.

Below we show an image obtained at 1.55 μm, and a ratio of 1.99 to 1.55 μm. The image is oriented roughly east-west and passes through Humorum Basin and includes the crater Bullialdus to the right of center. To first order the ratio behaves similarly to visible-near-IR ratios (e.g. 0.95/0.56 μm) which ratio the peak shortward of the absorption due to mafic minerals near one micron to the band center; fresh craters and surfaces appear bright due to shallow continuum slopes and deep pyroxene absorptions. Mature mare exhibits overall higher ratio values than mature highlands consistent with higher abundance of pyroxene. A few anomalous locations have been identified which show extreme ratio values but do not exhibit obvious albedo features.

Figure 1. 1.55 μm albedo.

Figure 2. 1.99 / 1.55 μm ratio.