SPECTRAL OBSERVATIONS FROM IMAGING INFRARED SPECTROMETER (IIRS) ONBOARD CHANDRAYAAN-2 ORBITER: RADIANCE DATA COMPARISONS. Deepak Dhingra[1], Prakash Chauhan[2], Megha Bhatt[3], Ankush Kumar[4], Guneshwar Thangjam[5], Abhishek Patil[4], Satadru Bhattacharya[4], Mamta Chauhan[2] and Aditya Dagar[4]. [1]Indian Institute of Technology Kanpur, India, [2]Indian Institute of Remote Sensing, ISRO, India, [3]Physical Research Laboratory, India, [4]Space Application Centre, ISRO, India, [5]National Institute of Science Education and Research, Bhubaneswar, India. (E-mail: deepdpes@gmail.com).

Introduction: Visible and Infrared datasets have been extensively used to map global surface composition of planetary bodies for understanding their geological evolution [e.g. 1, 2]. Recent high spatial and spectral resolution datasets for the Moon have led to rapid strides in the understanding of various geological processes, providing key insights into lunar geology [e.g. 3]. Here, we present preliminary results from Imaging Infrared Spectrometer (IIRS) onboard Chandrayaan-2 orbiter, which is currently placed in a 100 km polar, circular orbit and is acquiring global scientific data. IIRS dataset is approaching final calibration and is expected to be released to the scientific community in the coming months. The results presented here provide a preview of the data and its potential.

IIRS Instrument: IIRS is one of the payloads onboard Chandrayaan-2, India's second mission to the Moon [4]. IIRS is a hyperspectral imager operating between 800 – 5000 nm, at a spatial resolution of 80 m and spectral resolution of 20-25 nm across 256 bands [5]. The spectral data has 14 bit quantization.

Preliminary Results: We present spectral radiance comparisons between IIRS and Moon Mineralogy Mapper (M^3) level 1b datasets [6,7] for diversity of geological targets (Figure 1 and 2). The selected targets are located on the lunar far side within the following geographic coordinates: 0.5°S-28°N; 142.39°E-143.11°E. These correspond to the region located southwest of Mare Moscoviense. The results presented here are for the wavelength range 800 – 3000 nm, which is a spectral subset of IIRS data. The data has been scaled to unity at 810 nm for both the datasets to enable comparison of the spectral shape.

The two data sets are broadly consistent with respect to each other across the wavelength range and for a wide variety of targets including fresh craters, inter-crater plains, bright surfaces and dark targets. However, some deviations are observed at wavelengths in the

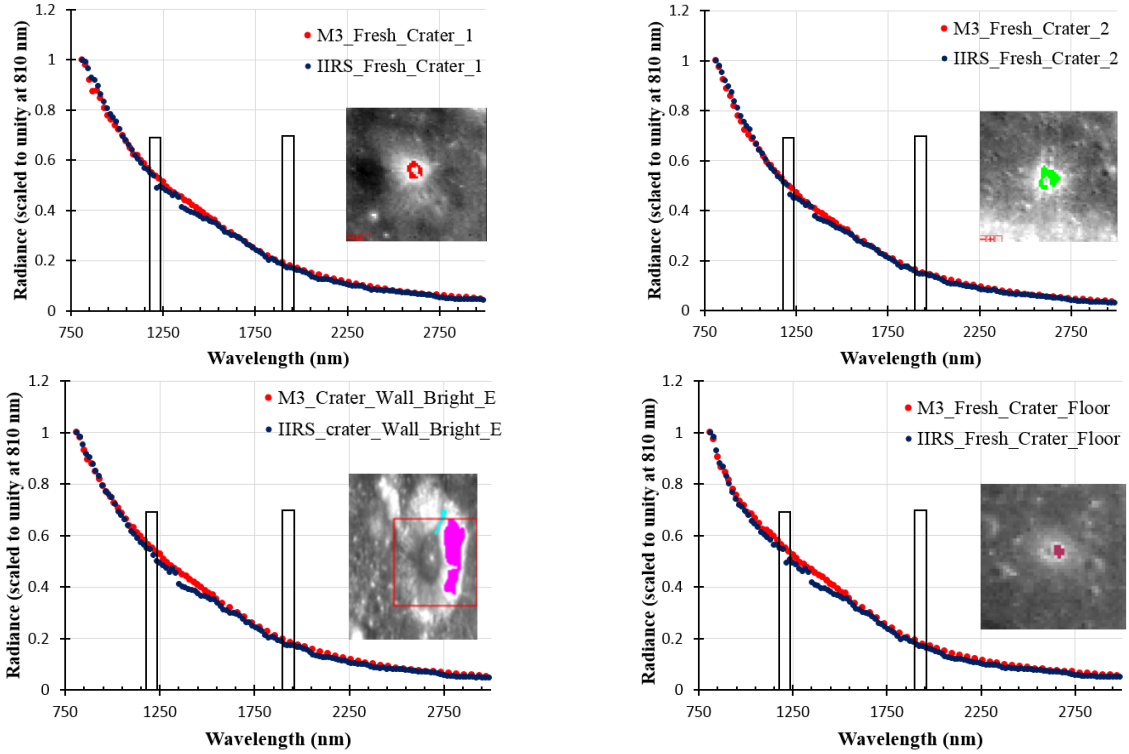

Figure 1 Scaled radiance comparisons between IIRS and M^3 data for the *high albedo locations*. Radiances have been scaled to unity at 810 nm to enable comparisons of the shape of the radiance curve. The boxes represent order sorting filter regions where the measurements have higher uncertainties. The images correspond to the source region locations.

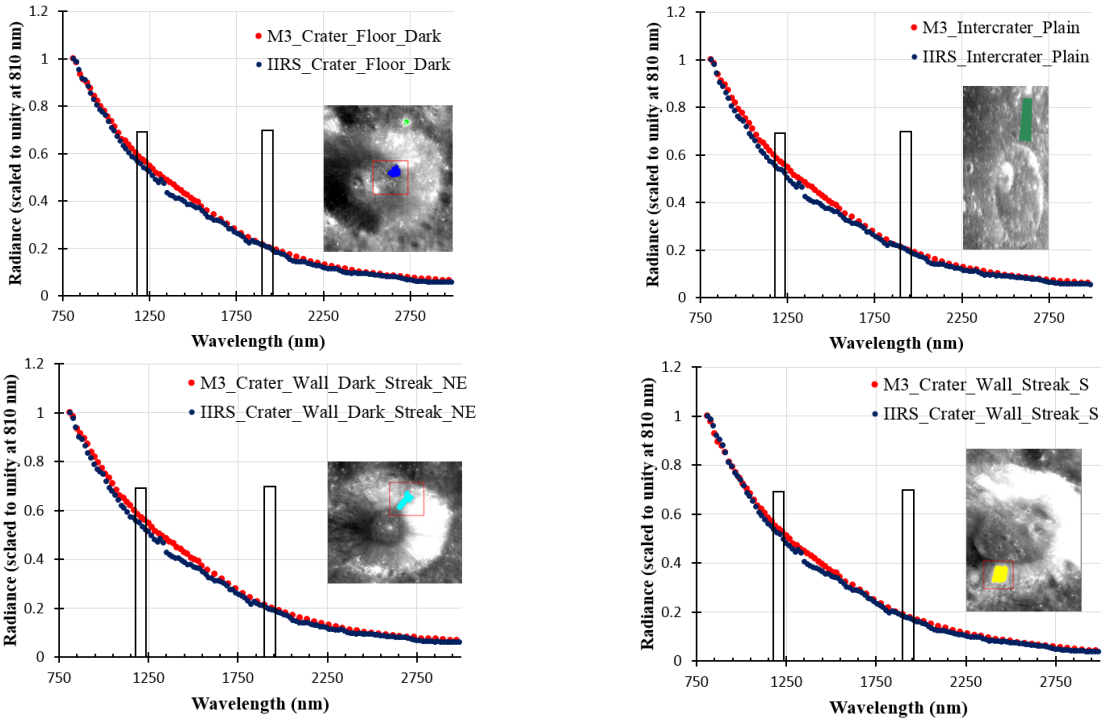

Figure 2 Scaled radiance comparisons between IIRS and M^3 data for the *low albedo locations*. Radiances have been scaled to unity at 810 nm to enable comparisons of the shape of the radiance curve. The boxes represent order sorting filter regions where the measurements have higher uncertainties. The images correspond to the source region locations.

vicinity of the two order sorting filter locations (~1200 nm and ~1900 nm). Small scale differences between the two datasets are observed throughout the wavelength range and are expected owing to various factors including (but not limited to) differences in illumination geometry, spectral resolution and spatial resolution.

Such comparisons are providing valuable insights towards improving the final calibration of the IIRS dataset. Additional comparisons are planned to further augment the understanding of the spectral response of the IIRS instrument. It includes expanding the types of geological targets, comparison with other sensors, evaluation with different modes of observation, and extending the comparisons to the entire spectral range (800-5000 nm).

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