Disk-integrated hydrated mineral features on (101955) Bennu with OVIRS. Amy A. Simon[1], Dennis C. Reuter[1], Ellen S. Howell[2], Beth E. Clark[3], Victoria E. Hamilton[4], Hannah Kaplan[4], Dante S. Lauretta[2] and the OSIRIS-REx Team. [1]NASA Goddard Space Flight Center, Greenbelt, MD (amy.simon@nasa.gov), [2]University of Arizona, Tucson, AZ, [3]Ithaca College, Ithaca, NY, [4]Southwest Research Institute, Boulder, CO.

Introduction: The OSIRIS-REx OVIRS instrument acquired data of Bennu on approach (from 2 Nov. to 2 Dec. 2018) and in the preliminary survey phase (9 to 17 Dec. 2018) [1]. The initial observations occurred at a distance of 200 km, when Bennu only partially filled the OVIRS field of view, but were optimized for the OVIRS pointing. The remainder of the observations occurred as riders to OTES and OCAMS data collections. In these sequences, Bennu was observed over many full rotations, but in different modes; some as raster scans and some as mosaics. These observations also covered a range of phase angles from 3° to more than 90°. The highest spatial resolution was 36 m from a distance of 9 km. Thus, OVIRS obtained full disk light curves, as well as some partial-coverage high resolution regions. These data were used to search for global variations in the 0.7 and 2.7-µm hydrated mineral absorption band.

Data Reduction and Analysis: For each ~4.3 hour (1 Bennu rotation) observation, OVIRS acquires about 17,000 spectra. These data are ingested into an automatic calibration pipeline. In this process, the data are converted into radiance units, following the method described in Simon et al. 2018 [2]. The first full-disk approach data were used to confirm the radiometric coefficients derived from ground testing and Earth gravity assist observations. A few wavelength regions, particularly 1.5 to 2 µm, were adjusted based on the approach data (these area were not well constrained by the prior data sets) to produce a global spectrum (Figure 1). The 2.7-µm hydrated mineral band is apparent in every spectrum, while the 0.7-µm Fe^{2+}-Fe^{3+} charge transfer band [3,4] is not.

To determine band depth, the thermal contribution to the spectrum has been removed both by fitting a blackbody curve and by empirically by fitting the continuum on either side of the absorption band and then converting to reflectance. Several spatially-resolved fully resolved December spectra were used to search for local variations, but coverage is very limited.

Results: The 2.7-µm hydration band is observed in every spectrum, indicating the widespread presence of clay minerals. The band shape is consistent with CM or possibly CI meteorites (Figure 2) [5,6]. This presentation will include the latest results on the search for local variations in the 2.7 and 0.7-µm bands, as well as best matches to meteorite spectra.

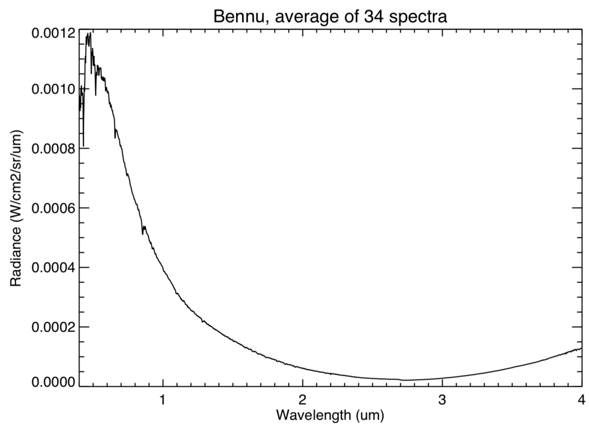

Figure 1. Full-disk spectrum of Bennu

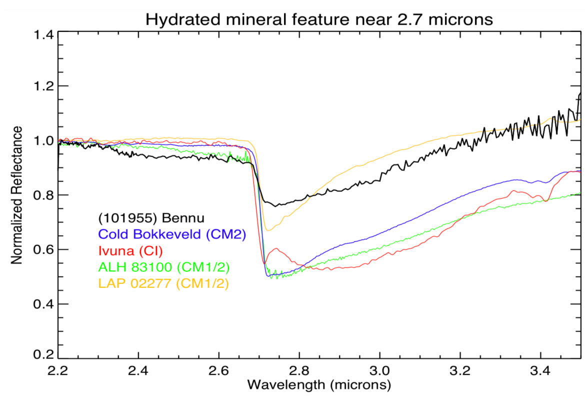

Figure 2. 2.7-µm absorption band

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