THE ICY GALILEAN SATELLITES AS MEASURED BY THE GALILEO UVS. Amanda. R. Hendrix[1] and Robert E. Johnson[2], , [1]Jet Propulsion Laboratory/California Institute of Technology, 4800 Oak Grove Dr., MS 230-250, Pasadena, CA, 91109, arh@jpl.nasa.gov, [2]University of Virginia, Thornton Hall B103, PO Box 400238, Charlottesville, VA 22904, rej@virginia.edu.

Introduction: We investigate the effects of exogenic processes on the icy Galilean satellites (Europa, Ganymede and Callisto), by analyzing Galileo UVS data to determine the spatial distribution of the UV absorption features. Ultraviolet wavelengths sense the topmost layers of the surface, and are therefore very sensitive to exogenic effects. A thorough analysis of Galileo UVS data can lead to a determination of the abundances and distribution of radiation products such as H_2O_2, O_3 and SO_2. Important connections with the external environment have been obtained for bands associated with H_2O_2 on all three icy Galilean satellites [1], for bands associated with SO_2 on Europa [2], and for bands associated with O_3 on Ganymede [3]. These studies were all performed before the Galileo mission was complete and therefore with incomplete data sets. Therefore, use the full UVS data set to determine the distribution and band depths of various features and then associate these when possible with abundances of radiation products, for all three icy moons.

Preliminary Results: We have investigated all spectra of Callisto and classified them by overall spectral shape in the NUV: some regions were found to be relatively spectrally red or blue over portions of the NUV wavelength range. We have found distinct trends in spectral shape across the surface. At high southern latitudes, the spectra tend to "roll over" at wavelengths >280 nm – suggesting the shoulder of an absorption feature with a band center ~350 nm (Fig. 1). At lower latitudes, in both the Asgard and Valhalla regions, such a spectral shape is not seen. We find that the Asgard region is spectrally red at wavelengths >280 nm while the spectra of the Valhalla region are spectrally flat at wavelengths >280 nm. The lower latitudes are generally darker and largely spectrally redder than the high southern latitude region. This suggests that an absorber is present at high latitudes, which is weathered away by charged particle or UV bombardment at low latitudes. We investigate possible sources for this absorption, and whether it could be due to an organic species.

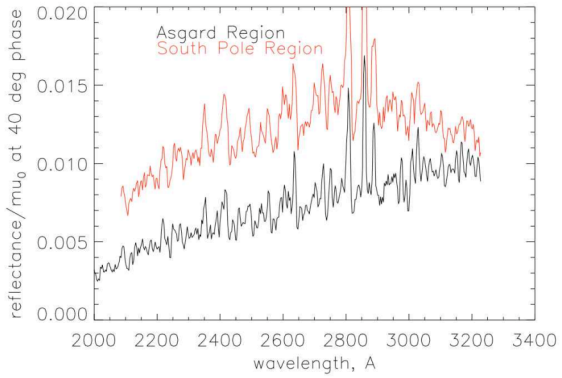

Fig. 1. Galileo UVS reflectance spectra of two regions on Callisto – the low latitude Asgard region and the high south pole region. The south pole region is somewhat brighter and the spectrum appears to show the shoulder of an absorption band. Scattered data points in the spectra are due to mismatches with the solar spectrum.

References: [1] Hendrix et al. (1999) *Lunar Planet. Sci., XXX* #2043 [2] Hendrix et al. (1998) *Icarus, 135*, 79-94 [3] Hendrix et al. (1999) *J. Geophys. Res*., *104*, 14169-14178.