CERES AND LOW-ALBEDO ASTEROIDS: AN ULTRAVIOLET PERSPECTIVE. A. R. Hendrix[1] and F. Vilas[2], [1]Jet Propulsion Laboratory/California Institute of Technology, 4800 Oak Grove Dr., MS 230-250, Pasadena, CA, 91109, arh@jpl.nasa.gov. [2]Planetary Science Instiute, Tucson, AZ 85721.

Introduction: Space weathering effects on S-class asteroids are fairly well understood, both at visible-near infrared (VNIR) (e.g. [1]) and ultraviolet (UV) [2] wavelengths. The effects of weathering among the low albedo classes are less studied and less well understood. We utilize UV spectra of low-albedo asteroids (C, B, G and F class) to investigate effects of weathering. Ultraviolet wavelengths can be more sensitive to weathering effects, because just the uppermost layers of the grains (often vapor deposition-produced rims) are sensed. Thermal processing and aqueous alteration effects are also considered, as these processes produce some of the only spectral features observed on these dark bodies.

UV-Visible Data Sets: We utilize data from the International Ultraviolet Explorer (IUE) in the ~210-320 nm region. This is a continuation of some of our earlier work [3]; we now combine these data with new UV/blue wavelength data from MMT 6.5-m telescope Blue Channel spectrograph, as well as from other asteroid data sets, to understand trends into the visible.

We pay special attention here to Ceres, the next target of the Dawn misson. Several IUE observations exist in the archives and we can study longitudinal variations in the UV spectrum. We also look for longitudinal variations in UV spectrum on Pallas and compare these with HST results [4]. These data were averaged in earlier analyses [5]; this is the first effort to look for UV variability with longitude on these dark asteroids.

Spectral Characteristics of the Low-Albedo Class Asteroids: Low albedo asteroids are typically rather bland spectrally at VNIR wavelengths. Many of these objects exhibit an absorption near 3 µm, indicative of some type of hydration (OH and/or H_2O). A subset of the asteroids with the 3-µm features also exhibit an absorption near 0.7 µm, due to a ferrous-ferric charge transfer transition likely resulting from aqueous alteration (the interaction of material with liquid water formed by melting of water upon a heating event). Some asteroids likely do not exhibit these features due to a history of heating that has been experienced at some point in the asteroid's evolution. Despite having little spectral activity in the VNIR, all low-albedo asteroids absorb at wavelengths shorter than ~500 nm due to a strong ferric oxide IVCT transition.

Investigation of the UV Effects of Thermal Processing and Weathering. The wavelength at which the UV absorption occurs and the slope of the UV portion of the spectrum has been linked to heating [6] and weathering. In terrestrial phyllosilicates, both the 0.7 µm and the UV features are very strong and steep [7]. Laboratory research shows that the UV downturn changes with heating of the Murchison meteorite [8], linking the UV slope to heating – however the 0.7 µm feature disappears immediately with heating.

Comparisons with Carbonaceous Chondrites. The low albedo asteroids are most similar to carbonaceous chondrite meteorites at VNIR wavelengths. A strong difference between the C-class asteroids and the carbonaceous chondrite meteorites is the strength of the UV absorption. The UV dropoff is quite subdued for CI1 and CM2 types; the CI and CM chondrites have been naturally heated and some show evidence of thermal metamorphism. Many asteroids in our dataset have UV slopes (300-400 nm) more similar to CI and CM meteorites than to CO and CV meteorites. At VNIR wavelengths, it has been found [9] that the C-class asteroids can be spectrally bluer than CC meteorites.

Questions: We are interested in understanding what spatial variation exists in UV reflectance data on these asteroids. These asteroid surfaces likely contain iron. Can we distinguish potential effects of space weathering from metamorphic differences due to heating and/or mixing of other materials on these bodies by studying the UV slope and wavelength of the UV dropoff? We will compare the UV data with available laboratory spectra of meteorites (e.g. [10]) and phyllosilicates.

References: [1] Hapke, B. (2001) *JGR, 106,* 10039. [2] Hendrix, A. and Vilas, F. (2006) *AJ, 132*, 1396. [3] Hendrix A. R. and Vilas F. (2008) *ACM, abstract #8361*. [4] Schmidt, B. et al. (2009) *Science, 326,* 275-277. [5] Roettger, E. and Buratti, B. (1994) *Icarus, 112,* 496-512. [6] Hiroi, T. et al. (1996) *Met. & Planet. Sci, 31,* 321-327. [7] Vilas, F. et al. (1997) *Icarus, 129,* 440-449. [8] Hiroi T. et al. (1993) *Science, 261,* 1016-1018. [9] Nesvorny, D. et al. (2005) *Icarus, 177,* 291 [10] Wagner J. K. (1987) *Icarus, 69,* 14–28.