AGU FALL MEETING
San Francisco | 12–16 December 2016

P43C-2122: The nature of Ceres' bluish material.

Thursday, 15 December 2016
13:40 - 18:00
Moscone South - Poster Hall

Ceres' surface exhibits extended regions of bluish material (negative spectral slope from ~0.5µm to ~2.5µm). By combining compositional information derived from the Dawn-VIR instrument [1] with geological and topographical information provided by the FC images [2] we use the unique opportunity to investigate the nature of the bluish material on Ceres in order to solve its origin and to further our understanding of Ceres' formation and geological evolution. The bluish material generally appears to be associated with morphologically fresh impact craters and their ejecta. Either the blue material has been excavated due to the impact process or is a product of the impact event. Type localities include the impact craters Oxo (42.2°N/359.6°E), Haulani (5.8°N/10.8°E), and Tawals (39.1°S/238°E). Most bluish areas are characterized by a higher visual albedo (except Tawals) and a lower reflectance behind 3µm including a weaker OH-absorption at 2.7µm and NH_4 signature at 3.1µm. Chemical as well as physical surface properties have been discussed to explain a bluing effect in the spectra of other planetary bodies. Blue slopes in the spectra of B-class asteroids as well as CI meteorites have been interpreted to be caused by a higher contribution of magnetite and/or increasing grain size [3]. Also thermally metamorphosed CCs can exhibit blue slopes [3]. Fresh H_2O ice with relatively large grains is also known to cause a spectral blue slope [4,5]. Although, the bluest spectral slope has been measured in the vicinity of Oxo, where H_2O-ice has been detected [6], most blue regions do not show any evidence of H_2O ice. Possibly, the blue slope remains after the sublimation of H_2O ice [7]. However, grain size effects and shock metamorphism in phyllosilicates and/or carbonates can also cause a bluing effect [8,9], which goes along with a decreasing strength of the OH-signatures including the absorption at 2.7µm [9] and could explain the morphology of the blue material as well as its association to impact processes. References: [1] De Sanctis et al. SSR, 2011; [2] Sierks et al., SSR, 2011; [3] Cloutis et al., LPSC 2013, #1550; [4] Jaumann et al., Icarus, 2008; [5] Stephan et al., Diss, 2006; [6] Combe et al. LPSC 2016, #1820; [7] Schröder et al. 2016, submitted; [8] Bishop et al. 2003, #3008; [9] Cloutis et al. PSS, 2010; [10] Ammannito et al. LPSC 2016, # 3020.

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