



Space weathering on dark asteroids

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Space weathering - bombardment of airless bodies with charged particles and micrometeorites - may significantly modify optical properties of the uppermost layers of airless bodies. Silicate rocks dominate the surfaces of planets and small bodies in the inner solar system. Space weathering of Fe-containing silicate targets causes darkening and spectral reddening of their surfaces, induced mostly by reduction of Fe. However, influence of space weathering on surface properties of low-albedo small bodies remains an open question. Such small bodies may contain organic materials which show very different space weathering trends. Recent experiments show that carbonization of complex organics induced by space weathering may neutralize initially reddish spectral slopes of hydrocarbon-bearing targets. These new findings may explain, for example, unusual colour-diameter trends observed within populations of low albedo outer belt asteroids (Cybeles, Hildas and Trojans). Furthermore, spectral differences between carbonaceous meteorites and the surfaces of dark main belt asteroids belonging to the C-complex were previously explained by extensive thermal metamorphism. Wide-spread metamorphism would imply the absence of soluble and insoluble organic materials on the surfaces and in the interiors of these common asteroids. Alternatively, the observed spectral differences between primitive meteorites and C-asteroids can be explained by space weathering of their surfaces. In this case only surface layers would be affected by carbonization.