

Color-albedo variation on Mercury: Observations and implications for composition and maturation state

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Methods to determine the abundances of iron and titanium from multispectral data of the Moon have been derived through the use of 415/750 nm and 950/750nm coloralbedo relationships and laboratory samples [3,4,5]. These methods were applied to telescopic observations of Mercury [1,2,9] to show that the elemental abundances of titanium and iron are substantially lower for the integral Mercury than for the Moon, consistent with the observed color-albedo relationships determined from Mariner 10 image data [6,7]. As the surface maturation processes may be assumed to operate similarly on the two bodies, a relative comparison is possible.

This paper investigates this topic further by presenting an analysis of high-resolution data of Mercury obtained with the 1-m Swedish Solar Telescope on La Palma in April 2003, at longitudes 90-180° on the hemisphere unimaged by Mariner 10. Images were obtained at six evenly spaced wavelengths (see [8]) and photometrically normalized to study the 750 nm bidirectional reactance versus 450/750nm and 940/750nm ratios. This enables a determination of the two-dimensional distribution of these properties for Mercury, a comparison with the Moon and an improved interpretation of the mercurian surface in terms of the general model of optical maturation of atmosphereless silicate bodies [6].

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