A Preliminary Analysis of the Mariner 10 Color Ratio Map of Mercury

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A preliminary geological analysis of the Mariner 10 orange/UV color ratio map of Mercury is given. assuming a basaltic crust. Certain errors in the map are pointed out. The relationships between color and terrain are distinctly non-lunar. Rays and ejecta are bluer than average on Mercury, whereas they are redder on the moon. This fact. along with the lack of the ferrous band in Mercury's spectrral reflectance and smaller albedo contrasts, implies that the crust is low in Fe and Ti. There is no correlation between color boundaries and the smooth plains on Mercury, in contrast the strong correlation between color and maria-highlands contacts on the moon. The smooth plains are not Mercurian analogs of lunar maria, and a lunar-type of second wave of melting did not occur. Ambiguous correlations between color and topography indicate that older, redder materials underlie younger, bluer rocks in many places on the planet, implying that the last stages of volcanism involved low-Fe lavas covering higher-Fe rocks. There is some evidence of late Fe-rich pyroclastic activity.