Introduction and Background

As a result of weathering and aeolian processes a fine-grained dark material is often found in Martian craters. This material is deposited by a much lower albedo (\(> 0.15\)) than the surrounding terrain and accumulates in patches and dune fields. Infrared range contrasts such as wind regime, sand supply and climate cause different morphologies and particle sizes of the materials. Analysis of near infrared spectra from the OMEGA spectrometer [2] yields a higher content of mafic unoxidised minerals such as pyroxene and olivine in unconsolidated dunes and the southern highlands and consolidated dunes and lower elevations, respectively. Furthermore there seems to be a certain concentration of consolidated dunes in the area of Memnonia Planum and Chryse Patera.

Some craters have layered deposits in the crater walls which have the same albedo and the same false colour as the material inside (Fig. 2a, 2b). These dark layers could have been cut by the impact. The dark materials have a mafic composition and are chemically unaltered. Thus, the material is probably the result of mechanical erosion only. Therefore it has either a relative young age or it was accumulated in patches and dune fields. Infrared spectra from the OMEGA spectrometer [2] yields a higher content of mafic unoxidised minerals such as pyroxene and olivine in unconsolidated dunes and the southern highlands and consolidated dunes and lower elevations, respectively.

The result of the analysis is shown in Figure 9. There seems to be a slightly correlation between unconsolidated dunes and the southern highlands and consolidated dunes and lower elevations, respectively. Furthermore there seems to be a certain concentration of consolidated dunes in the area of Memnonia Planum and Chryse Patera.

Results and Discussion

As a result of weathering and aeolian processes a fine-grained dark material is often found in Martian craters. This material is deposited by a much lower albedo (\(> 0.15\)) than the surrounding terrain and accumulates in patches and dune fields. Infrared range contrasts such as wind regime, sand supply and climate cause different morphologies and particle sizes of the materials. Analysis of near infrared spectra from the OMEGA spectrometer [2] yields a higher content of mafic unoxidised minerals such as pyroxene and olivine in unconsolidated dunes and the southern highlands and consolidated dunes and lower elevations, respectively.

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The physical weathering of the dark layers exposed at the crater walls could be an additional source for the dark material inside the crater.

Dark Dunes in Martian Craters

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