TITLE: SWIR spectral mapping of the Martian South Polar Residual Cap using CRISM

ABSTRACT BODY:
Abstract (2,250 Maximum Characters): The Martian South Polar Residual Cap (SPRC) exhibits unique CO_2 ice sublimation features that cover the surface. These flat floored, circular depressions are highly dynamic, with scarp retreat rates of up to 8m per Martian Year. As the scarps sublimate in Martian Southern Hemisphere spring, they expose dust particles previously trapped within the ice during winter. This allows a window of opportunity to analyse the dust for fragile organic molecules that might otherwise be rapidly destroyed when subjected to ultraviolet radiation at the Martian surface. Polycyclic aromatic hydrocarbons (PAHs) are one such type of organic compound that have not yet been reported as detected on Mars. PAHs are considered to be important in astrobiology as they potentially play a role in abiogenesis, and are a biomarker for extant life. PAHs are abundant on Earth, in deep space and in recent years have been identified on the Saturnian moons Iapetus and Phoebe.
Utilising data from the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on board NASA's Mars Reconnaissance Orbiter (MRO), SPRC features have been spectrally mapped, the effects of H_2O and CO_2 ice on infrared spectra eliminated, and regions with obvious dust particles analysed to establish their mineral composition, and signatures indicative of PAHs compared to Mars data.
Spectral mapping has identified compositional differences between depression rims and the majority of the SPRC, allowing regions of spectral interest to be selected for in-depth analysis. CRISM spectra have been compared with known Martian mineralogy and PAH laboratory data, with results suggesting Magnesium Carbonate dust content in depression rims, and rims have been found to have higher water content than regions of featureless ice. CO_2 ice has been found to be the most limiting factor in looking for PAH diagnostic signatures on the SPRC. Further work is being undertaken with more detailed results to be presented in the future.
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