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# Spectral Modeling of the 0.4-2.5 $\mu$m Phobos CRISM dataset

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We present the spectral modeling of the 0.4-2.5 $\mu$m MRO/CRISM Phobos dataset. After applying a statistical clustering technique, based on a K-means partitioning algorithm, we identified eight separate clusters in the Phobos CRISM data, extending the surface coverage beyond the previous analyses of Fraeman et al. (2012, 2014). Each resulting cluster is characterized by an average and its associated variability. We modeled these different spectra using a radiative transfer code based on the approach of Shkuratov et al. (1999). We used the optical constants of the model proposed by Pajola et al. (2013) in our effort, i.e. the Tagish Lake meteorite (TL) and the Mg-rich pyroxene glass (PM80). The Shkuratov model is used in an algorithm that iteratively, and simultaneously changes the relative abundance and grain sizes of the selected components to minimize the differences between the model and observations using a chi-squared criterion. The best-fitting models were achieved with a simple intimate mixture showing that the relative percentages of TL and PM80 vary between 80-20% and 95-5%, respectively, and grain sizes for TL are 12-14 $\mu$m and 20-22 $\mu$m for PM80.

This work aims to return a detailed picture of the surface properties of Phobos identifying specific areas that may be of interest for future planetary exploration, as the proposed Japanese Mars Moon eXploration (MMX) sample return mission.

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