Mapping thermal inertia from PFS on MarsExpress data

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The long wavelength channel (LWC) Planetary Fourier Spectrometer (PFS) on MarsExpress has been collecting data in the spectral range from 5-40µm for large parts of the surface of Mars. We have been using this extensive dataset already to study the surface composition of Mars, complementary to the investigations done by OMEGA on MarsExpress. Now we focus on the thermal physical properties of the surface. As we have shown before [2], the PFS LWC dataset allows retrieving and mapping the surface temperatures of Mars. While coverage is not as complete as it is for the TES instrument on Mars Global Surveyor, the PFS dataset has the huge advantage of covering various local times. TES data is restricted to 2am or 2PM local time.

We have developed a thermal model for the surface and near-subsurface of Mars and used this to fit the observed temperature by varying the thermal inertia as a parameter. This way we have retrieved a map of the thermal inertia of Mars. We have also studied the sensitivity of the retrieved data to the various components of the model, to get an understanding of the reliability of the data.

We will discuss the procedure and the results in comparison to the mapping done by TES on Mars Global Surveyor.

References

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