Geophysical Research Abstracts, Vol. 8, 06119, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06119

Thermal Conductivity Measurements of Analogs of consolidated Martian Soil

K. Seiferlin (1), M. Heimberg (1), N. Thomas (1), N. Kömle (2), G. Kargl (2)

(1) Physikalisches Institut, Universität Bern, Switzerland, (2) Space Research Institute, Austrian Academy of Sciences, Graz, Austria (karsten.seiferlin@phim.unibe.ch)

Thermal inertia data, derived from MGS TES measurements, show extended regions on Mars with an intermediate thermal inertia, that does not fit to bedrock or to loose, fine dry dust. This is often explained by a mixture of large rocks and fine dust within TES "pixels" - a valid but in many cases not convincing explanation. The thermal conductivity of porous materials is a function of many parameters, e.g. composition and the density or porosity. Numerous authors and groups try to associate the thermal conductivity empirically or by analytical models with porosity. These attempts are often successful for a narrow range of materials, and fail when extrapolated or generalized. The key parameter is the size of the contacts between adjacent grains. A small fraction of a cementing agent, e.g. salts or ices, is sufficient to increase the thermal conductivity dramatically, while it hardly affects porosity and density. We report on thermal conductivity measurements of samples with systematically increased cementation, and apply the results to Mars and comets. Consolidated soils are rather common on Mars. On comets, sintering may increase the size of bond and thus the thermal conductivity in certain layers.