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Modelling heat conductivity of chondritic media.

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A critical parameter in thermal evolution models of asteroids is the heat conductivity, which is unfortunately not well constrained by measurements of chondrites. Therefore, it is necessary to calculate chondritic heat conductivities from their mineral composition. For that, we solved the heat conduction equation for a cube consisting of a mixture of chondritic minerals, including porosity. We find the porosity dependence of heat conductivity is different than that of chondrites, but agrees with data for sandstone. We conclude that the measured porosity effects are shock induced and do not represent those present during the early evolution of asteroids.

Usually we fit our thermal models to chondritic closure ages by varying the model parameters formation time, radius, surface temperature, and heat conductivity using a genetic algorithm. We present first results of a study, where we demonstrate how well the resulting best fit models are constrained by these parameters. The strength of constraint on model quality is shown by varying two model parameters around the best fit value.

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