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Thermal evolution models of the Moon

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The thermal conductivity of the Moon's crust is significantly reduced in comparison to the conductivity of the mantle due to its composition and porosity. Early thermal evolution models of the Moon have usually neglected the influence of the crustal thermal conductivity and simply used an average value of 4 W/mK for both the mantle and the crust. Parameterized convection models show that the cooling history differs significantly if the lower conductivity of the crust is taken into account. Higher interior temperatures for the Moon can be expected. Depending on the depletion of the mantle in radioactive elements, a partial melt zone can be present in the deep mantle during most of the Moon's evolution, even at the present time. We present technical aspects and first results of 3-d spherical convection models of the Moon's mantle that include variable viscosity and thermal conductivity, an evolving core as boundary condition at the inner shell, radiogenic heating, partial melting and melt extraction.