



Developing an exascale model for mantle convection

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Mantle convection is governed by the conservation of mass, momentum and energy. This leads to a system of coupled equations that need to be solved in order to model the physical processes governing the convection of the Earth's mantle. Characteristic for the mantle convection problem is the disparity of scale lengths from global to microscopic. To resolve them adequately one needs very high computational resolution. Current global simulations employ meshes with a grid point resolution of a few tens of kilometers, with some models that can refine the mesh locally to about one kilometer. To obtain these high resolutions globally, we need fast computers and efficient ways of programming them. In this context we present simulations performed with a new high performance code that is currently developed in the context of the Terra-neo project. We will present some early results for high resolution mantle convection modelling.