



Early degassing of the mantle: what is the role of convection?

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The Earth's mantle experienced an extensive degassing very early in its history. Various phenomena can be invoked and two end-members are (a) a large-scale catastrophic melting and degassing and (b) a continuous degassing of an extremely vigorous solid-state convective mantle. We study the physics of model (b) through 2D and 3D convection simulations with passive tracers and show that mantle temperature and heating mode have a drastic influence on mixing and degassing. In a mantle 300 K hotter than today, convection is able to remove more than 90% of its initial noble gas content in less than 100 Myrs, especially if internal heating is dominant.