

On the climate and magnetic evolution of Earth-like planets

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In order to reconcile co-evolution system of deep planetary interior and surface environment for geologic time-scale, heat and mass transport across the deep planetary interior is an essential process. Here we develop simplified planetary system evolution model in parameterized mantle convection model including global thermal and chemical energetics of metallic core for magnetic evolution and global carbon-silicate cycle for surface climate. A wide parameter survey of mass exchange of volatile elements across the surface plate is examined with efficiencies of heat and mass transport in deep planetary interior, which can check sensitivities to the surface temperature associated with variations of partial pressure of carbon dioxide and its feedback to the dynamics of deep planetary interior. In addition to those parameter study, we attempt to reveal the climate evolution with complicated radiative schemes in the atmosphere coupled with deep planetary evolution model.

Keywords: evolution of deep planetary interior , climate evolution