Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11812, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11812
EGU General Assembly 2008

Internal heat transport in gaseous exo-planets

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About half of the transiting exoplanets discovered so far have a radius significantly larger than the one predicted by regular structure and evolution models, even when the effect of the incident flux from the parent star is included. All these models, however, assume that heat is transported by large-scale adiabatic thermal convection in the planet's interior. In this talk, I will explore the possibility that convection in some exoplanets, and possibly in our own jovian planets, is hampered by compositional gradients inherited from the formation history or the evolution. This gradient may lead to the onset of small-scale double-diffusive layered convection, as observed in some parts of the Earth's ocean, decreasing significantly the efficiency of heat transport. This yields a lower heat flux output and thus radii in agreement with the otherwise unexplained observed large values. I will mention the possibility to explore such an issue with modern 2D or 3D numerical simulations.