



## **Is ENSO an internal mode of variability of systems in radiative-convective equilibrium?**

D. Coppin and S. Bony

Sorbonne University, CNRS, LMD/IPSL, Paris, France (bony@lmd.jussieu.fr)

Numerical models run in non-rotating Radiative-Convective Equilibrium (RCE) using prescribed sea surface temperatures (SSTs) show that convection can spontaneously aggregate into dry and moist areas, and that convective aggregation tends to increase with temperature. Using a general circulation model coupled to an ocean mixed layer, we show that in RCE the coupled ocean-atmosphere system exhibits some internal variability. This variability arises from the interplay between mean surface temperature, SST gradients and convective aggregation, and its timescale is proportional to the depth of the ocean mixed layer. For an ocean layer deeper than 10 m, the variability occurs at the inter-annual timescale, and variations of convective aggregation are almost out of phase with those of surface temperature. The coupled RCE framework might be relevant to understand some internal modes of variability of the tropical ocean-atmosphere system such as El-Nino Southern Oscillation (ENSO).