



## **The enhancement of clear sky greenhouse effect in HIRS**

Guillaume Gastineau (1), Brian Soden (2), Darren Jackson (3), Chris O'Dell (4), and Graeme Stephens (4)

(1) LOCEAN/IPSL, University Pierre et Marie Curie, Paris, France (ggalod@locean-ipsl.upmc.fr/+331 44 27 38 05), (2) RSMAS/MPO, University of Miami, Florida, USA, (3) University of Colorado, Boulder, Colorado, USA, (4) Colorado State University, Fort Collins, Colorado, USA

The High-resolution Infrared Radiation Sounder (HIRS) observations are used to understand the atmospheric response at the top of the atmosphere, induced by the anthropogenic emission of greenhouse gases. The HIRS brightness temperature channels are used to regress the Outgoing Longwave Radiation (OLR), and the greenhouse effect, in clear sky conditions, over the period 1981-2004. Here, we find that since 1981, the OLR remains relatively stable, compared to the greenhouse effect that has significantly increased, because of the surface temperature changes. With a multi-model ensemble of coupled model simulations, we show that the greenhouse gases emissions, and the water vapor feedback, account for this observed enhancement of the greenhouse effect. This study further reinforces our confidence that anthropogenic greenhouse gas emissions are causing a large part of the recent climate changes.