Geophysical Research Abstracts
Vol. 12, EGU2010-10435, 2010
EGU General Assembly 2010

On the dynamical evolution of the polar stratosphere after the vortex breakdown

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The polar stratosphere remains largely unexplored in the summertime compared to polar winter ozone depletion issues. Several significant gaps remain regarding the knowledge of the dynamical state and of the chemical composition characterizing the polar summer stratosphere and the ability of models to simulate properly the involved mechanisms.
During spring after the vortex breakdown large scale transport seems to be responsible of mixing of poor ozone polar air masses and rich ozone air masses from lower latitudes. In addition previous studies based on satellite measurements revealed residual polar vortex air to be located in the arctic stratosphere until at least mid-July. It has been identified also structure named the"frozen-in" anticyclones (FrIAC's) in polar region coming from the tropics as well. However at the moment models are not able to reproduce until July such structures observed.
In the frame of the International Polar Year the STRAPOLETE protect has started on January 2009 to study the Arctic stratosphere in the summertime. In this context we study in detail past year 2005 from March (when the vortex breakdown) to July in order to evaluate the ability of dynamical model to represent large scale transport and mixing processes occurring during springtime.
We present a detailed study based on a contour advection model. Using potential vorticity (PV) we performed several tests to evaluate qualitatively its ability to represent such dynamical structures (vortex remnants, FrIAC's) until July. Then by a coupling with N2O measurements from MLS (Microwave limb sounder on AURA satellite) instrument we evaluate quantitatively the ability of the model to represent mixing processes. Several sensitivity tests will be presented on the grid resolution and on the diffusion coefficient used.
In addition, we performed climatology from year 2002 to 2009 based on PV and MLS measurements on the dynamical evolution of the stratosphere after the vortex breakdown. This climatology will be used to investigate the link between the dynamical structures observed occurrence and the atmospheric waves.