Report on the 1st WG 1 Expert Meeting on the LAUTLOS Campaign at Lindenberg



Figure 1:

Simultaneous humidity measurements of the tropospheric water vapour content by 6 different instruments (NOAA/CMDL frostpoint hygrometer, DWD FN-method radiosonde, Vaisala RS-92, Vaisala RS-80 A-Humicap, Meteolabor Snow White chilled mirror hygrometer, and CAO Lyman-alpha FLASH-B hygrometer) during balloon ascent on 11 February 2004, Sodankylä, Finland, and the temperature profile measured by the Vaisala RS-80 temperature sensor (top axis).

Tropical Troposphere-to-Stratosphere Transport: A Lagrangian Perspective



Figure 1:

Schematic of tropical TST, modified after HY03. The figure emphasizes the convective transport into the TTL, the upper level anticyclones and the cold anomaly around the tropopause level over the western Pacific with low saturation mixing ratio (smr). Ш

Tropical Troposphere-to-Stratosphere Transport: A Lagrangian Perspective



Figure 2:

Temperature (colour-coded, in Kelvin) and horizontal wind field (arrows) at 90 hPa averaged over December/January/February for a (a) La-Nina situation; (b) El-Nino situation; and (c) the climatological mean state. Red contour lines show spatial density distribution where TST-trajectories irreversibly cross the 350 K isentrope (0.025%, 0.1%, 0.2% and 0.4% of the total TST flux per 5°/2° lon/lat grid cell); black contour lines show spatial density distribution (same intervals as red contours) of the Lagrangian cold point of TST (see text). Trajectory calculations for this figure were taken from FBHP05.

Temperatures, Transport, and Chemistry in the TTL



Figure 2:

The profiles shown in grey are ozone climatologies using data from SHADOZ ozonesonde stations between 20°S and 20°N. The dashed lines refer to ozone profiles generated by a one-dimensional model (Folkins and Martin, 2005) with different values of $O_{3,conv}$. $O_{3,conv}$ refers to the mean ozone mixing ratio of air parcles detraining from convective clouds.





Temperatures, Transport, and Chemistry in the TTL

Figure 4:

The vertical variation of seasonal temperature anomalies in the tropics. $\Delta T = T_{\text{DIF}} - \overline{T}_{\text{DIF}}$ where T_{DIF} is the December-January-February climatology at each radiosonde station, and $\overline{T}_{\text{DIF}}$ refers to the average of T_{DIF} over all 14 radiosonde stations.

Figure 5:

Vertical profiles of the difference between the mean JJA and DJF temperatures at various radiosonde locations. The temperature difference is defined as $\Delta T{=}T_{\rm JIA}$ – $T_{\rm DJF}$.

Assimilation of Stratospheric Meteorological and Constituent Observations: A Review



Figure 4:

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Three-dimensional trajectory calculations: The distribution of particles 50 days after the beginning of a back trajectory calculation of parcels initialized at 20 km and the equator. The lower (upper) thin white line shows the zonal mean tropopause (380 K isentrope). Zonal mean temperature is indicated by the colour contours and particles are shown as white dots. Results are from the Met. Office Data Assimilation System (UKMO), the NASA Data Assimilation Office (DAO) analysis, and a GCM. The Kinematic method shows considerable vertical and horizontal dispersion, while the Diabatic method (using smoothed heating rates) show reduced vertical dispersion. The GCM shows very little dispersion, regardless of method used, but the assimilated fields are excessively dispersive. From Schoeberl et al., (2003).



Figure 5:

Comparison of an individual ozonesonde profile (black line) with three assimilations using SBUV total column (green line), MIPAS profiles (red line), and both SBUV and MIPAS (blue line).