



Turbulent diffusion and dispersion in the lower stratosphere

Pisso I. and Legras B.

Laboratoire de Météorologie Dynamique (ipisso@lmd.ens.fr)

Estimation of dispersion and diffusion and understanding of mixing processes are relevant for meteorological and climate models. Balloon and airborne high resolution measures of chemical species concentration were performed in the UTLS region in the Arctic (SOLVE-2000), midlatitudes (SPIRALE-2002), and tropics (HIBISCUS-2004). Concentrations are reconstructed using ensemble Lagrangian backward trajectories, ECMWF winds and Reprobus-CTM concentration fields, and then compared with observations. This allows to estimate the vertical turbulent diffusivity coefficient, which is found to be bounded by $0.1 \text{ m}^2/\text{s}$ at mid-latitudes and lower values of the order of $0.01 \text{ m}^2/\text{s}$ inside the polar vortex with large variations in space and time. Lyapunov exponents are calculated on flight tracks to estimate Lagrangian dispersion, and show important variations that map the presence of dynamical structures. Prospective actions related with SCOUT-03 project will be discussed.