ANALYSIS OF VERTICAL WIND VELOCITY MEASURED BY WIND PROFILERS DURING POSSIBLE STRATOSPHERE-TROPOSPHERE EXCHANGE EVENTS

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At midlatitudes tropopause folds and cut-off lows are considered to be important mechanisms of stratosphere-troposphere exchange (STE). The case studies of tropopause fold and a cut-off low observed during summer 2002 are presented. The potential vorticity data from NCAR (National Center for Atmospheric Research) mesoscale MM5 model, satellite total ozone, water vapor, and upper air data are used to identify the cases of possible STE. The wind profiler measurements yielded the fine structure of the 3-dimensional wind velocity during the events, which is presented and discussed.

Wind profiler’s vertical wind data together with potential vorticity data were used to obtain the estimates of cross-tropopause ozone flux. Ozone transport values were found to be about 5*10^32 molecules per day for the cut-off low and 3*10^33 molecules/day for the tropopause fold. The quantities obtained are comparable to other estimates, proving the plausibility of the approach used. Suggestions are made about refinement of the method.