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Comparison of ozone concentration variability in the troposphere as observed at elevated sites in the Alps and in Caucasus region and simulated by various chemistry transport models

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A comparison was performed between in situ long-term surface ozone measurements at two elevated sites with results of simulations by several global chemistry transport models. The choice of sites is connected to their position away from the primary pollution sources and hence representing the variability of the free troposphere composition in different geographical regions. Both considered sites (Kislovodsk High Mountain Station (KHMS) in Caucasus, Russia (43.7^0N, 42.7^0E, 2070m asl) and Jungfraujoch (JFJ) in Switzerland (46.5^0N, 7.9^0E, 3580m asl) have long-term record of the surface ozone concentration from 1990 onwards. The main feature of the ozone long-term variability is pronounced positive trend at JFJ ($+0.46 \pm 0.11$ ppb/year) and significant negative trend at KHMS (-0.65 ± 0.09 ppb/year) of the monthly mean concentrations during 1990-2005. Detailed comparison of the seasonal and long-term variability has been performed with several transport chemistry model, namely LMDz-INCA and ECHAM5-MOZ. It has been shown that seasonal variability in the models is overestimated, the seasonal maximum values are reproduces rather well while simulated seasonal minima are too low. The shape of the seasonal cycle in the models differs from observations. Long-term variability was estimated for several model levels and for stratospheric contribution separately on the monthly basis for different seasons

and time of the day. Negative trends are observed in the simulated concentrations for the most of subsets at selected grid boxes. The reasons for the discrepancy between the models and the measurements are discussed. The work is financially supported by the Swiss National Science Foundation (JRP IB7320-110831), European Commission (Marie-Curie IIF project N 039905 - FP6-2005-Mobility-7) and Russian Foundation for Basic Research (projects 06-05-64427 and 06-05-65308) and contributes to ACCENT TTP project.