Geophysical Research Abstracts
Vol. 13, EGU2011-6168-1, 2011
EGU General Assembly 2011

Total ozone loss during the 2010/11 Arctic winter and comparison to previous years

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Though first signs of stratospheric chemical ozone losses in the Arctic have been reported since 1990, the large activity of planetary waves in the northern hemisphere, and thus transport related changes of ozone total column, makes the evaluation of photochemical destruction far more difficult than in the southern hemisphere. To overcome the difficulty, several methods for removing the contribution of transport have been suggested, among those is the transport model approach. With this method, chemical ozone reduction is deduced from a comparison between ground based total ozone measurements and a 3D model simulation in which ozone is considered as a passive tracer. Using this method, total ozone reduction in the Arctic vortex is derived each winter since 1993/94 by comparing the SAOZ measurements to two 3D CTM Reprobus and Slimcat. The method allows to determine the period of ozone destruction and the amplitude of the cumulative loss. The amplitude of the ozone loss is very sensitive to stratospheric temperature history during the winter and thus is highly variable from one winter to another. In general, strongest ozone losses are occurring during coldest winters while very little or no destruction could be observed during warmest. The cumulative loss is ranging from 5-13% during the warmest winters as in 2005/06, to a maximum of 30%-32% during coldest ones as in 1994/95 and 1995/96. An average total loss of 20-24 % is found during the other cold winters like 2009/10 starting generally in mid- or late January except during the winter of 2002/03, when it started very early in the season, in late December when the sun was low above the horizon. In this study, preliminary results for the winter 2010/11 will be presented. The focus will be put on the timing of the chemical ozone loss and on the ability of two 3D CTM (Reprobus and Slimcat) to reproduce the loss.