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Vortex-averaged Arctic ozone depletion in the winter 2002/2003

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Abstract. A total ozone depletion of 68±7 Dobson units between 380 and 525K from 10 December 2002 to 10 March 2003 is derived from ozone sonde data by the vortex-average method, taking into account both diabatic descent of the air masses and transport of air into the vortex. When the vortex is divided into three equal-area regions, the results are 85±9DU for the collar region (closest to the edge), 52±5DU for the vortex centre and 68±7DU for the middle region in between centre and collar. Our results compare well with other studies: We find good agreement with ozone loss deduced from SAOZ data, with results inferred from POAM III observations and with results from tracer-tracer correlations using HF as the long-lived tracer. We find a higher ozone loss than that deduced by tracer-tracer correlations using CH_4.

We have made a careful comparison with Match results: The results were recalculated using a common time period, vortex edge definition and height interval. The two methods generally compare very well, except at the 475K level which exhibits an unexplained discrepancy.

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