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Ozone loss derived from balloon-borne tracer measurements in the 1999/2000 Arctic winter

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Abstract. Balloon-borne measurements of CFC11 (from the DIRAC in situ gas chromatograph and the DESCARTES grab sampler), ClO and O₃ were made during the 1999/2000 Arctic winter as part of the SOLVE-THESEO 2000 campaign, based in Kiruna (Sweden). Here we present the CFC11 data from nine flights and compare them first with data from other instruments which flew during the campaign and then with the vertical distributions calculated by the SLIMCAT 3D CTM. We calculate ozone loss inside the Arctic vortex between late January and early March using the relation between CFC11 and O₃ measured on the flights. The peak ozone loss (~1200ppbv) occurs in the 440-470K region in early March in reasonable agreement with other published empirical estimates. There is also a good agreement between ozone losses derived from three balloon tracer data sets used here. The magnitude and vertical distribution of the loss derived from the measurements is in good agreement with the loss calculated from SLIMCAT over Kiruna for the same days.

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