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Chemical ozone loss in the Arctic winter 2002/2003 determined with Match

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Abstract. The Match technique was used to determine chemically induced ozone loss inside the stratospheric vortex during the Arctic winter 2002/2003. From end of November 2002, which is the earliest start of a Match campaign ever, until end of March 2003 approximately 800 ozonesondes were launched from 34 stations in the Arctic and mid latitudes. Ozone loss rates were quantified from the beginning of December until mid-March in the vertical region of 400–550 K potential

temperature. In accordance with the occurrence of a large area of conditions favourable for the formation of polar stratospheric clouds in December ozone destruction rates varied between 10–15 ppbv/day depending on height. Maximum loss rates around 35 ppbv/day were reached during late January. Afterwards ozone loss rates decreased until mid-March when the final warming of the vortex began. In the period from 2 December 2002 to 16 March 2003 the accumulated ozone loss reduced the partial ozone column of 400–500 K potential temperature by 56±4 DU. This value is in good agreement with that inferred from the empirical relation of ozone loss against the volume of potential polar stratospheric clouds within the northern hemisphere. The sensitivity of the results on recent improvements of the approach has been tested.

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