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A quantitative study of ozone losses in the polar vortex by assimilation of Odin/SMR data.

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Ozone observations made by the Sub Millimeter Radiometer (SMR) on the Odin satellite have been assimilated into a wind driven Eulerian transport model for the purpose of separating chemical ozone depletion in the polar vortex from large scale transport processes. The model makes it possible to follow air masses when they travel around in the polar regions so that they can be sampled at consecutive times. Thus quantitative estimates of polar ozone decay rates have been made for the northern winters of 2002/2003 and 2003/2004 and for the southern winters of 2003 and 2004.

Using the transport model it is also possible to keep track of the temperatures, levels of chlorine activation and numbers of sunlit hours that occur in air masses between consecutive observations. Thus, the observations made using Odin/SMR have been compared to the standard theoretical model for heterogeneous polar ozone depletion.