



Observation of large decadal scale changes of polar stratospheric ozone suggest solar influence through energetic electron precipitation

B.-M. Sinnhuber (1), M. Sinnhuber (1), and P. von der Gathen (2)

(1) Institute of Environmental Physics, University of Bremen
(bms@iup.physik.uni-bremen.de), (2) Alfred-Wegener-Institute for Polar and Marine
Research, Research Unit Potsdam

In a recent paper (Sinnhuber et al., Large decadal scale changes of polar ozone suggest solar influence, *Atmos. Chem. Phys. Discuss.*, 2005) we have presented evidence for a large solar influence on polar stratospheric ozone. Ozone sonde measurements at Ny-Aalesund, Spitsbergen (79N) over the past 17 years show an unexpectedly large decadal scale variability of mid-stratospheric ozone during winter. We find that the negative ozone anomalies are strongly correlated with the flux of energetic electrons in the radiation belt, which is modulated by the 11-year solar cycle. This suggests precipitation of energetic electrons from the radiation belt as a likely mechanism for the observed ozone changes. The magnitude of the observed decadal ozone changes (~20%) is much larger than any previously reported solar cycle effect in the atmosphere up to this altitude. Ozone sonde measurements from two Antarctic stations together with satellite observations provide further evidence for a solar influence.

Here we will discuss further the possible mechanisms and implications of the observed ozone changes.