



Modulation of the polar vortex by energetic particle precipitation and Quasi-Biennial Oscillation via ozone loss

Antti Salminen, Timo Asikainen, Ville Maliniemi, and Kalevi Mursula

Space Climate Research Unit, ReSoLVE Centre of Excellence, University of Oulu, Oulu, Finland (antti.salminen@oulu.fi)

Energetic particle precipitation (EPP) has been shown to cause ozone loss in the stratosphere during polar winter. This has been suggested to enhance polar vortex with the effect propagating even to ground level, where it is observed as a more positive phase of the Northern Annular Mode (NAM), the dominant ground circulation pattern in the winter time at high latitudes. Recent research has also shown that the quasi-biennial oscillation (QBO) modulates the relationship between the ground NAM and EPP so that the positive correlation between the two is more clearly seen in the easterly phase of QBO measured at 30 hPa height especially during the late winter season. Here we elaborate the QBO modulated connection between EPP and NAM by studying how the EPP affects the stratospheric polar vortex in the two phases of the QBO. Since the EPP presumably affects the polar stratosphere via indirect ozone loss we will study how the EPP modulates the amount of ozone, the stratospheric temperatures and zonal winds in the two QBO phases.