



## **Impact of geomagnetic super-storms and total ozone at higher middle latitudes**

**P. Krizan**, T. Balcar, J. Lastovicka,

Institute of Atmospheric Physics, 14131 Prague, Czech Republic; (jla@ufa.cas.cz / Phone: +420-267103055)

Lastovicka and Krizan (JASTP 67, 119, 2005) showed that large and statistically significant effects of strong geomagnetic storms and Forbush decreases of cosmic rays on total ozone at northern middle latitudes occurred only in the winter part of the year, under high solar activity and the E-phase of the QBO (E-max) conditions. Around the 50°N latitudinal circle a redistribution of ozone was observed with substantial diminishing of strong winter longitudinal variation, which resulted in a large increase of total ozone in North Atlantic-European sector. Here we test these results with geomagnetic super-storms from non-favorable periods: (a) October-November 2003, (b) July 2004 and (c) November 2004, (d) August 2005, and (e) September 2005. All these events had Dst around or lower than -200 nT. Satellite data along latitudinal circles 40°, 50° and 60°N are analyzed. These events exhibited some changes in ozone distribution, but rather non-systematic random changes of meteorological origin, not those observed under the E-max conditions (diminishing of longitudinal variation, ozone enhancement in the Euro-Atlantic sector). Therefore we may conclude that atmospheric preconditioning, given by the winter E-max conditions, is more important than the strength of geomagnetic storms for the occurrence of systematic and large enough effects of storms on total ozone at northern higher middle latitudes. This supports our explanation of the observed effects of strong geomagnetic storms on ozone as an indirect effect, response to storm-related changes in circulation.