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Association between Solar Proton Events and pressure decreases in the winter northern troposphere

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Veretenko and Thejll (JASTP 66 (2004), 393-405) studied relations between the increase of solar energetic proton flux and the change in tropospheric pressure and temperature of the winter Northern Hemisphere in the period 1980 – 1989 and have shown that increased SEP flux used to be associated, with delay 1-3 days, with the pressure decrease in the region between Greenland and Iceland, and that the core of the decrease moves eastward and fills in. Our contribution is extension of these studies over years 1990 – 2003 and is based on the daily grids ds195.1 (temperature, pressure and wind fields) produced by NCAR and on wind fields from CGER METEX. Good agreement with the results by Veretenko and Thejll confirms robustness of this phenomenon.

Lower atmosphere can be also affected by particles accelerated during strong geomagnetic storms. We show that the response is similar but the delay is between 5 and 8 days.