Geophysical Research Abstracts
Vol. 19, EGU2017-3512, 2017
EGU General Assembly 2017

Is solar correction for long-term trend studies stable?

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When calculating long-term trends in the ionosphere, the effect of the 11-year solar cycle (i.e. of solar activity) must be removed from data, because it is much stronger than the long-term trend. When a data series is analyzed for trend, usual approach is first to calculate from all data their dependence on solar activity and create an observational model of dependence on solar activity. Then the model data are subtracted from observations and trend is computed from residuals. This means that it is assumed that the solar activity dependence is stable over the whole data series period of time. But what happens if it is not the case?
As an ionospheric parameter we consider foE from two European stations with the best long data series of parameters of the ionospheric E layer, Slough/Chilton and Juliusruh over 1975-2014 (40 years). Noon-time medians (10-14 LT) are analyzed. The trend pattern after removing solar influence with one correction for the whole period is complex. For yearly average values for both stations first foE is slightly decreasing in 1975-1990, then the trend levels off or a very little increase occurs in 1990-2005, and finally in 2006-2014 a remarkable decrease is observed. This does not seem to be physically plausible. However, when the solar correction is calculated separately for the three above periods, we obtain a smooth slightly negative trend which changes after the mid-1990 into no trend in coincidence with change of ozone trend. While solar corrections for the first two periods are similar (even though not equal), the solar activity dependence of foE in the third period (lower solar activity) is clearly different. Also foF2 trend revealed some effect of unstable solar correction. Thus the stability of solar correction should be carefully tested when calculating ionospheric trends. This could perhaps explain some of differences between the past published trend results.