Geophysical Research Abstracts, Vol. 9, 05196, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05196

Meteorological drought events in the Czech Republic during 1875-2005 according to Palmer's drought indices .

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The main aim of the study was to analyze drought events in the Czech Republic during period 1875-2005 using previously unavailable data. The daily mean temperature and precipitation sums were homogenized by the Czech Hydrometeorological Institute for 8 sites where measurements have started between 1875 and 1912 and continued up to 2005. The episodes of drought occurrence within these time series were assessed by standard methodology employing monthly Palmer Z-index (ZIND) and Palmer drought severity index (PDSI). This approach was combined with calculation of PDSI and ZIND in weekly time step that has been recently developed. The long-term secular series were complemented by database of 233 sites with monthly values of ZIND and PDSI for the period 1961-2000 that allowed detail comparison of some drought parameters (e.g. trends and drought frequencies) in sufficient resolution. The study also included analysis relating the drought patterns with the frequency of the basic synoptical situations.

We have found statistically significant trend of the PDSI values in at least one month at 7 out of 8 secular series. The results also seem to suggest that drought events have been growing in their number and/or intensity through out the last 130 years at majority of the sites despite notable fluctuations. The period 1985-2005 (particularly 1990´s and 2003-2005) proved to be exceptionally dry compared to 1875-1930 or even 1961-1990

time frames. There has been steady increase of the drought intensity and proportion of months/weeks in the drought episode with the time also in case of ZIND. It is clear that these trends in drought indices are driven by increased ambient temperatures as there has been no significant change in the precipitation patterns. Thorough analysis of 233 stations (1961-2000) demonstrated that according to the ZIND (serving as a short-term drought indicator), 98 stations showed statistically significant negative trends in at least one month of the year compared to 26 having a positive trend. In case of PDSI the statistically significant trend toward negative PDSI was found at 133 stations with 59 of them having a significant decrease of PDSI in six or more months. Interestingly, only 31 stations showed the opposite tendency. The stations with positive trends of PDSI values are found almost exclusively in mountainous areas (e.g. northern border with Poland). The interpolation of the trend patterns indicates that these trends tend to be stronger in the eastern part of the country, which corresponds with the findings of related global and regional drought studies.

Acknowledgement : *This study was conducted with support of the* 6^{th} *FP EU research project CECILIA (no GOCE 037005) and Czech National Agency for the Agricultural Research (project QG60051).The weekly drought indicators were parameterized with the help of KONTAKT project no. ME 844.*