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Variability of droughts in the Czech Republic, 1881–2006

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Droughts in the Czech Republic in 1881–2006 are analysed, based on the Palmer Drought Severity Index (PDSI) and the Z-index, using averaged national temperature and precipitation series for the calculations. Fluctuations in PDSI and Z-index show an increasing tendency towards longer and more intensive dry episodes in which, for example, droughts that occurred in the mid-1930s, late 1940s–early 1950s, late 1980s–early 1990s and early 2000s were the most severe. Cycles at periods of 3.4–3.5, 4.2–4.3, 5.0–5.1 and 15.4 years exceeded 95% confidence levels in application of Maximum Entropy Spectral Analysis. These are expressed at different intensities throughout the period studied. The occurrence of extremely dry and severe dry months is associated with a higher frequency of anticyclonic situations, according the classification employed by the Czech Hydrometeorological Institute. Principal Component Analysis documents the importance of the ridge from the Siberian High over Central Europe when extreme and severe droughts in months of the winter half-year are considered in terms of sea level pressure. In the summer half-year, the ridge of the Azores High over Central Europe is the most important. Drought episodes have a profound effect on national and regional agricultural production, with yields being consistently lower than in normal years, as is documented through the example of spring barley, winter wheat, forage crops on arable land and hay from meadows. Seasons with pronounced drought during the April-June period (e.g. 1947 and 2000) show the most significant yield decreases. Forests appear to be very vulnerable to long-term drought

episodes, as it was the case during the dry years of 1992–1994. This study clearly confirms the statistically significant tendency to more intensive dry episodes in the region, driven by temperature increase and precipitation decrease, which has already been suggested in other studies.