



The relationship between the state of the stratosphere and the occurrence of meteorological drought in Poland.

K. Pianko-Kluczynska

Institute of Meteorology and Water Management -National Research Institute, Department of Climate Modeling and Seasonal Forecasting, Warsaw, Poland (Krystyna.Pianko@imgw.pl)

Meteorological drought has a strong impact on many areas of life. Its effects can be observed long after its occurrence. So the ability to determine the risk is very important.

The drought type is specified by the value of the standardized precipitation index, SPI.

This index defined five classes:

- 0 - no drought ($SPI > 0$);
- 1 - mild (SPI from -0.99 to 0);
- 2 - moderate (SPI from -1.49 to -1.00);
- 3 - severe (SPI from -1.99 to -1.50);
- 4 - extreme ($SPI \leq -2.00$);

Tests have been performed for the warm (April-September) and cold (October-March) half of the period 10.1948-09.2011, for 11 selected Polish synoptic stations. Included two approaches: synchronous (data for the stratosphere and weather come from the same half a year) and asynchronous (half a year time lag between the state of the stratosphere and weather conditions in Poland).

State of the stratosphere were analyzed for two domains: large ($90N - 60N, 40W - 80E$) and local ($45N - 55N; 10E - 25E$), using describing variables: temperature, geopotential height and zonal wind component at levels from 10 hPa to 250 hPa.

Data comes from the reanalysis NCEP / NCAR 4 times a day.

Stratospheric patterns were defined for each type of drought. These patterns allowed to determine the probability of different types of drought for whole historical material. The correctness of the reconstructed types of drought was analyzed according to the choice of domain, a variable describing the state of the stratosphere and time lag.

The results can be applied in further work on the use of statistical-empirical downscaling particularly for the future occurrence of extreme events, after replacing the reanalysis by the simulations of climate models.