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Meteorological drought trends in Europe for the period 1950-2012

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Drought is one of the most important climate/weather-induced phenomena with severe impacts on different areas such as agriculture, energy production, society, forestry, and so on. From a meteorological point of view, drought can be induced and/or reinforced by a lack of precipitation and a reduced evapotranspiration due to hot temperatures. We present pan-European meteorological drought trends for the period 1950-2012 based on a multi-indicator approach. As input data, we used monthly precipitation and temperature from the E-OBS (v10, spatial resolution: 0.5°x0.5°) gridded dataset of the European Climate Assessment and Dataset (ECA&D) of the Royal Netherlands Meteorological Institute (KNMI). Precipitation, temperature, and the derived potential evapotranspiration (PET) data have been used to compute the Standardized Precipitation Index (SPI), the Standardized Precipitation Evapotranspiration Index (SPEI), and the Reconnaissance Drought Index (RDI). SPI, SPEI, and RDI, calculated at a monthly scale and for two accumulation periods (3 and 12 months), have been merged into a combined indicator used as the basis for drought frequency, duration, and severity. Such quantities have been computed at regional and country level, together with areas "prone" to drought conditions. A linear trend analysis shows that drought frequency, duration, and severity. Such quantities have been Europe, in particular in the Iberian Peninsula, Southern France, Albania, Greece, and the Caucasus. Conversely, drought variables show a relevant decrease in Scandinavia, Belarus, Ukraine and Russia.