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Precursors of Heat Summers in Central Europe

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Droughts and heat waves during summer in mid-latitudes are a serious threat to human health and agriculture and have negative impacts on the infrastructure, such as problems in energy supply. In addition the appearance of such extreme events is expected to increase with the progress of global warming. An early warning prior to such events would allow to install precautionary measures to prevent and mitigate the worst impacts.

The time period 1958 – 2011 is analysed with respect to extremely hot and dry summers in Germany and adjacent areas. For the years in which extreme summers are identified the previous late winter / early spring conditions of global irradiation, soil moisture and precipitation in the study area are analysed as well as the large scale atmospheric circulation over the north Atlantic.
For the analysis global radiation data derived from geostationary satellite observations, provided by CM SAF, were supplemented with data from the European Center of Medium Range Weather Forecasting reanalysis (ERA). Also data on soil moisture and the geopotential were taken from the ERA dataset. The precipitation data were taken from the Global Precipitation Climatology Center (GPCC).
It has been found that during late winter / early spring prior to most of the extremely hot and dry summers in central Europe, there was not only a clear anomaly in global radiation, soil moisture, and precipitation, but also interesting features in the atmospheric circulation over the north Atlantic have been identified.