Project: **1230**

Project title: **SpreeWasser:N**

Principal investigator: **Uwe Ulbrich**

Report period: **2023-11-01 to 2024-10-31**

Report

A flexible tool able to detect, analyze and visualize drought periods adjustable to the user's needs and interests has been developed (see figure 1). The code is based on the marineHeatWaves python module written by Eric Oliver (Institute for Marine and Antarctic Studies, University of Tasmania, Feb-Mar 2015, available on Github: https://github.com/ecjoliver/marineHeatWaves). It has been adjusted to be able to detect drought periods, based on a percentile threshold of the climatological mean of the underlying climate budget data (precipitation *P* minus evapotranspiration *E*, in this case ERA5 data is used).

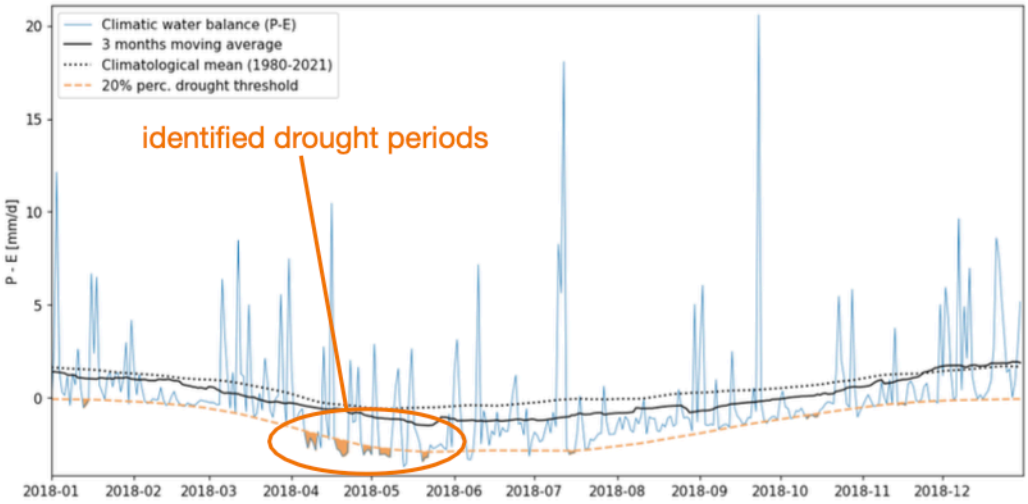

Figure 1: Exemplary visualization of detected drought periods in the drought detection and analysis tool

Yield data on administrative district resolution by the Leibniz Centre for Agricultural Landscape Research (ZALF) has been analyzed in relation to the Standardized Precipitation Evapotranspiration Index (SPEI) to find patterns in water demand during certain periods of the year (figure 2). The results are to be used in the drought tool mentioned above.

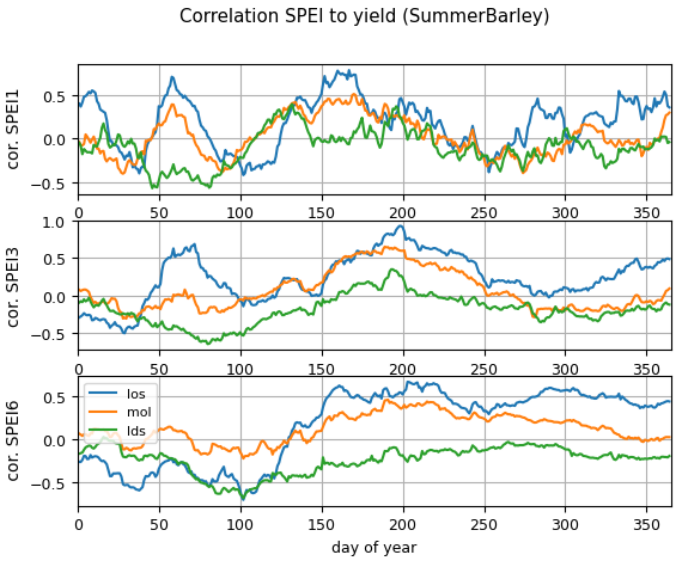

Figure 2: Correlation between yearly yield data for different administrative districts and SPEI on different time scales (1/3/6 months), example shown for summer barley

The analysis of regional drought in the large-scale weather context has been continued by analyzing the connection between dry periods (defined by less than 1 mm per day for a period of at least 14 days in a row) in the project region of SpreeWasser:N and the Objective Weather Types issued by the German Weather Service. Shown in figure 3 is an exemplary distribution of weather types during dry periods during the months of March-April-May (the higher the percentage anomaly, the more likely they are to appear during a dry period).

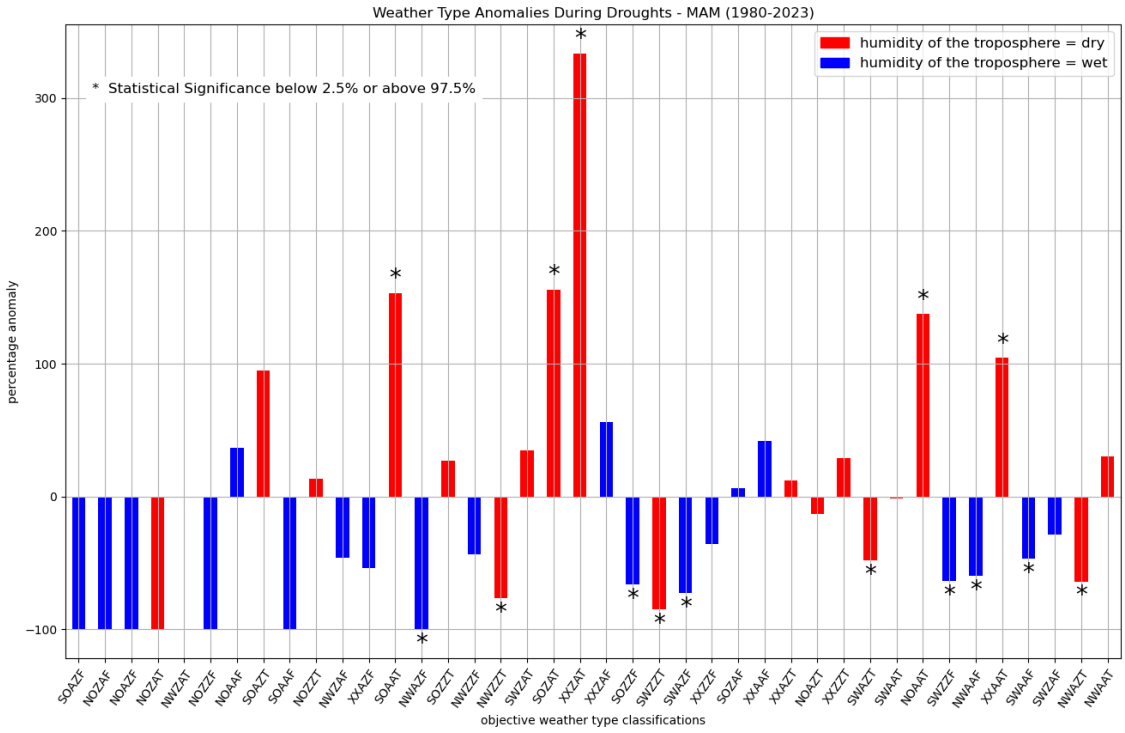

Figure 3: Percentage anomaly in relation to dry periods for Objective Weather Types

References

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Hauke, C., Ulbrich, U., Rust, H.: Prediction and predictability of drought events in the Spree region, European Geophysical Union General Assembly 2024 (EGU),
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