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Algorithm for drought risk calculation in DriDanube project

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One of the main aim of the DriDanube project is the drought risk estimation in the Danube watershed.
In the frame of the project a new mathematical statistical method was developed for drought risk estimation. On the base of this methodology an algorithm and a software were prepared to calculate the drought risk in the Danube region.

The main steps of the algorithm:
1. Selection of the relevant meteorological variables to create a simplified crop-weather model for yield loss estimation: Since we have to make a common method for the whole region, this model has to be as simple as possible. Therefore, monthly temperature and precipitation data are used.
2. Methodology for estimation of the loss function and its expected value i.e. the risk:
- Estimation of the yield function is a regression of the yield on the meteorological variables
- Estimation of the loss function is derived from the estimation of the yield function and some drought index (e.g. SPI)
- Estimation of the risk
3. Software for calculation of estimated loss function and risk
4. Applying software, risk calculations can be performed on station and gridded climate data series. Since the freely available CarpatClim and DanubeClim data series cover most part of the project region, we can use the gridded data series for the risk calculation only in this area. Mapping of risk outside this area is based on station data series and other gridded data series (e.g. E-OBS grids)

The first results are presented in this paper for Hungary, where we have access to detailed yield database on about 1900 pilot sites in the Farm Accountancy Data Network (FADN) for the five main plants in Hungary: maize, wheat, rape, sunflower, barley.

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