Evapotranspiration and the link to plant phenological data

Motivation

Different processes lead to low flows, which occur in different seasons and show different characteristics. For instance, higher interception and evaporation during the vegetation season due to increased canopy surface and active transpiration of plants, which speeds streamflow recession.

Traditionally, hydrological models are designed to simulate peak flows as good as possible - often at the cost of the quality of low flow simulations. Only more recently, there have been specific efforts to improve the simulation of low flows. In general, a better model representation of the hydrological processes is particularly important for models that are meant to be applied under conditions that are different from the ones during model calibration, for example due to climate or land use change.

Processes such as interception and evaporation might be better described in the model with the help of phenological data, e.g. by indicating beginning and end of the growing season. Ultimately, such an improved model would lead to more reliable low flow simulations.

Contents of the Master's thesis

In this thesis, you will investigate the value of plant phenological data (synoptic and remote sensing products), particularly regarding the link to evapotranspiration. The focus will be on two Swiss catchments with long meteorological, streamflow and phenological records as well as prominent differences between summer and winter recessions.

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Key references

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