

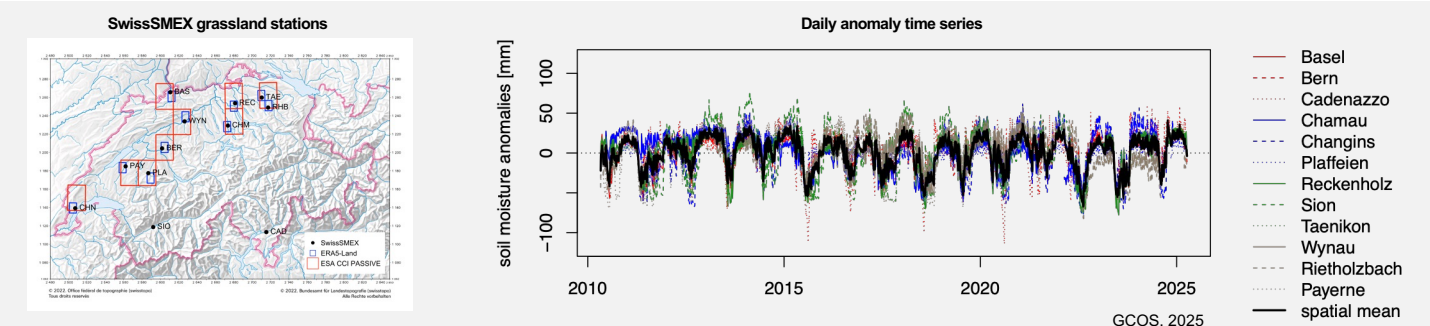
Assessment of summer drying in Switzerland – with focus on observational soil moisture and runoff data

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Introduction

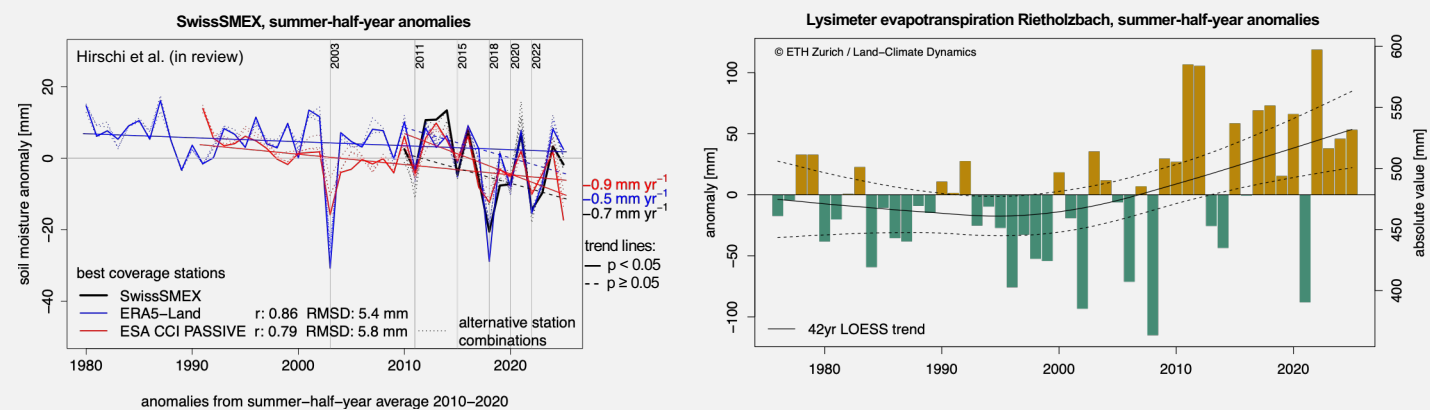
- Climate scenarios project an increasing risk for summer drying in Switzerland (CH2025).
- Do observational accounts of water resources indicators show drying in recent decades?
- Maturing in-situ observation networks and recent advances in machine-learning based runoff estimators provide an unprecedented opportunity to assess recent summer drying in Switzerland.

In situ soil moisture and evapotranspiration



SwissSMEEX soil moisture network:

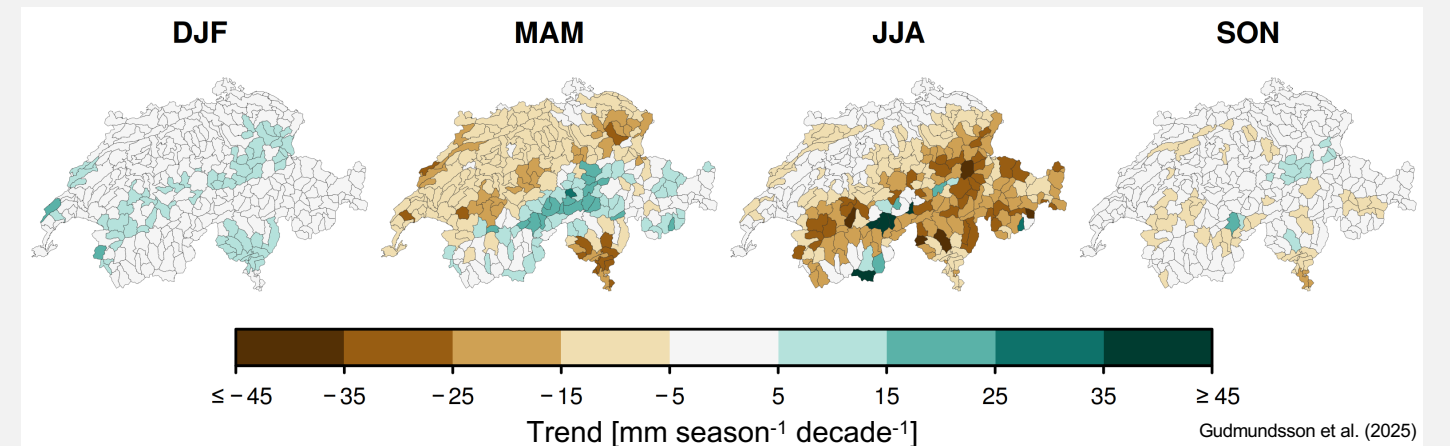
- Vertically integrated soil water content (top 50 cm of soil) at 12 grassland stations.



Summer half-year soil moisture and evapotranspiration trends:

- Long-term and (non-significant) short-term soil moisture drying; intensification over last 16 years.
- Consistent temporal evolution of in situ, land reanalysis and remote-sensing data.
- 50-year lysimeter timeseries indicates strong contribution of ET to recent soil drying.

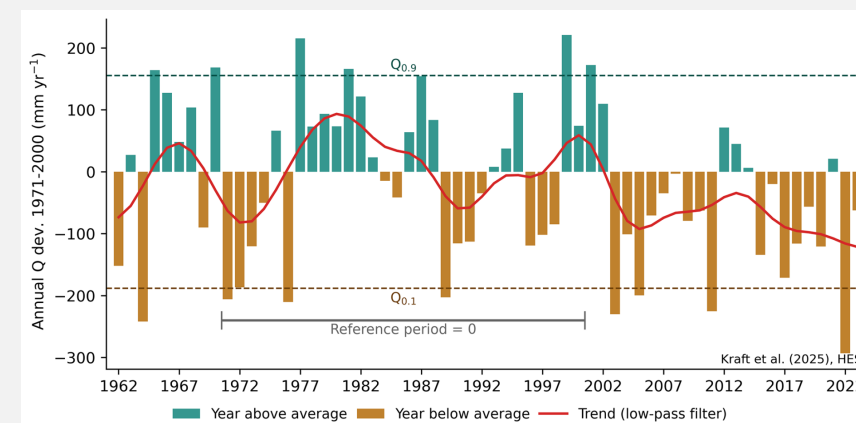
National runoff and water balance



Seasonal runoff trends (1961–2023):

- **Warm season:** Large-scale drying tendency & MAM increase in high altitudes.
- **Cold season:** No or only weak trends.

Likely drivers: Increasing evapotranspiration and earlier snow melt as dominating factors.



National mean annual runoff:

- Large year-to-year variability.
- Dominance of dry anomalies since early 2000s.

Runoff reconstruction:

- Machine-learning enabled observational reconstruction of Swiss runoff (Kraft et al., 2025).

References

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