

The 2018 #DROUGHT in Switzerland

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WSL-Initiative
Trockenheit
Drought



Regional impact of the 2003, 2015 & 2018 droughts?

2018 drought similar to 2003 but more persistent.
2015 least severe.
North-East Switzerland most affected in 2018.

Methods

- Data for 1981-2018 (MeteoSwiss & others).
- PREVAH hydrological model at 200x200 m resolution.
- Interactive water balance adjustment and validation with FOEN data (71 stations).
- Comparison of actual year with climatology 1981-2010.

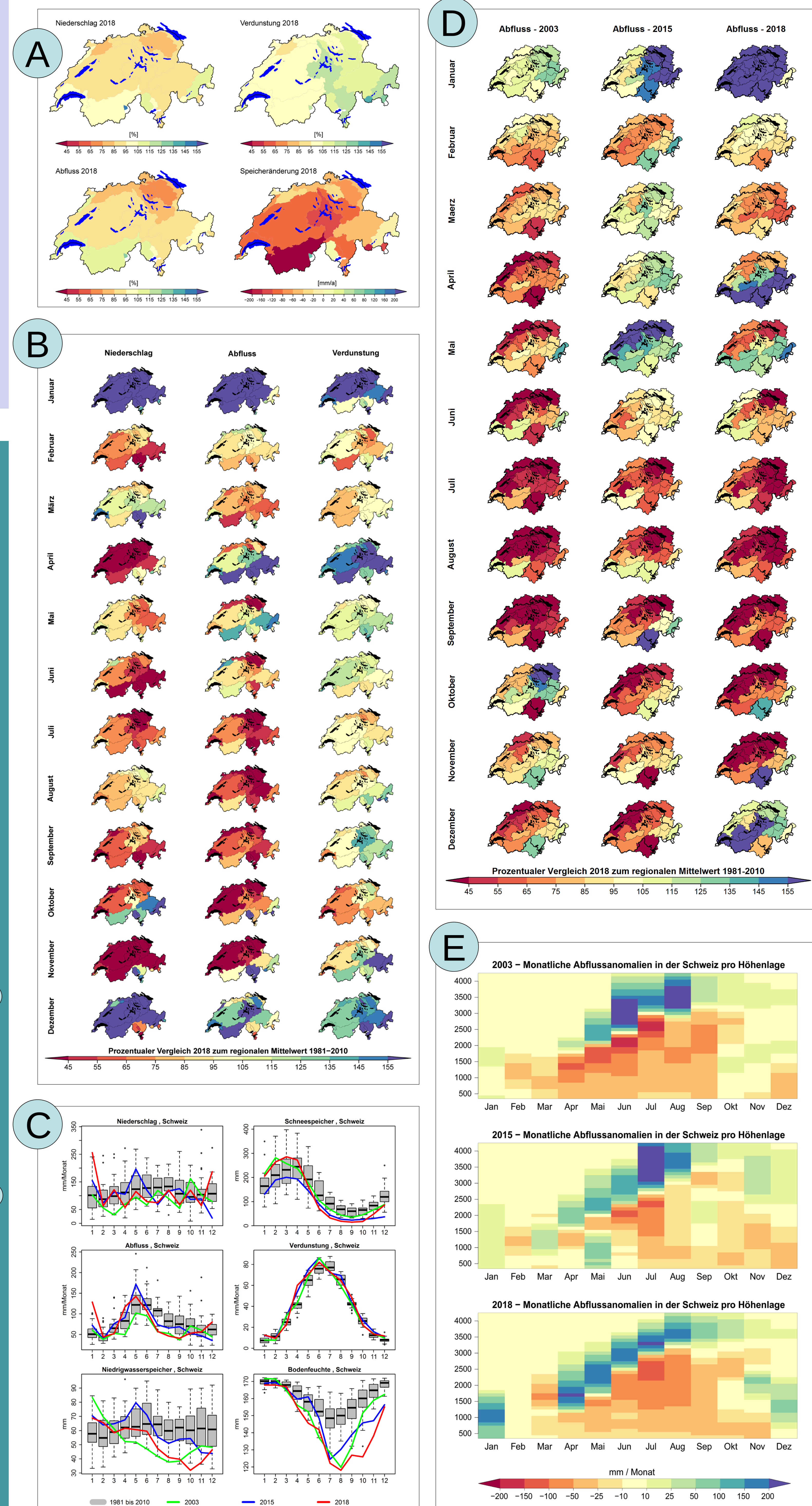
Results

Water balance 2018: A B

- Wet January and December alleviate the impact on an annual basis. A B
- Largest negative balance in regions where glacial melt strongly contributes to runoff generation. A
- Highest discharge anomaly in north-eastern Switzerland A
- Potential evapotranspiration strongly damped since no moisture available. B
- On set of drought in the north-east already in May, while the situation in the north-west was most severe in early-autumn. B
- Persistent hydrological drought from April to November. B

Comparison 2003, 2015, and 2018 droughts: C D E

- 2003 drought emerges in the north-west. The most severe phase ends in October. D
- 2018 drought emerges after dry April in the north-east and reaches the north-west later on. Relief occurs in early December. D
- 2015 drought only in July to September D
- Soil moisture deficit is most severe in 2018. C
- Analysis according to elevation bands highlights that during heatwaves large melts originates from regions above 3000 m asl. E
- In 2018 a warm spell in April triggered large snowmelt rates above 1300 m asl and first signs of drought below 1300 m asl. E



Literature

- Liechti, K.; Barben, M.; Zappa, M., 2019: Wasserhaushalt der Schweiz im Jahr 2018. Einordnung und Besonderheiten. Wasser, Energie, Luft, 111, 2: 93-94.
- Zappa, M.; Liechti, K.; Deller, M.; Barben, M., 2017: Wasserhaushalt der Schweiz 2.0. Eine validierte, modellgestützte Methode für die Bilanzierung der Wasserressourcen der Schweiz. Wasser, Energie, Luft, 109, 3: 203-212.
- Zappa, M.; Liechti, K.; Winstral, A.H.; Barben, M., 2019: Trockenheit in der Schweiz: Vergleich der Jahre 2003, 2015 und 2018. Wasser, Energie, Luft, 111, 2: 95-100.

Design inspired by #betterposter video of @mikemorison: <https://youtu.be/1RwJbhkCA58>