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Well regulated irrigation – key to water control

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Controlling soil water content

Cocoa, Juazeiro, Northeastern Brazil

Farmer underestimate soil water content easily by 30 %
→ No efficient irrigation without soil water content control

Rio Sao Francisco Brazil

Abundant water is still available but first restrictions are in place

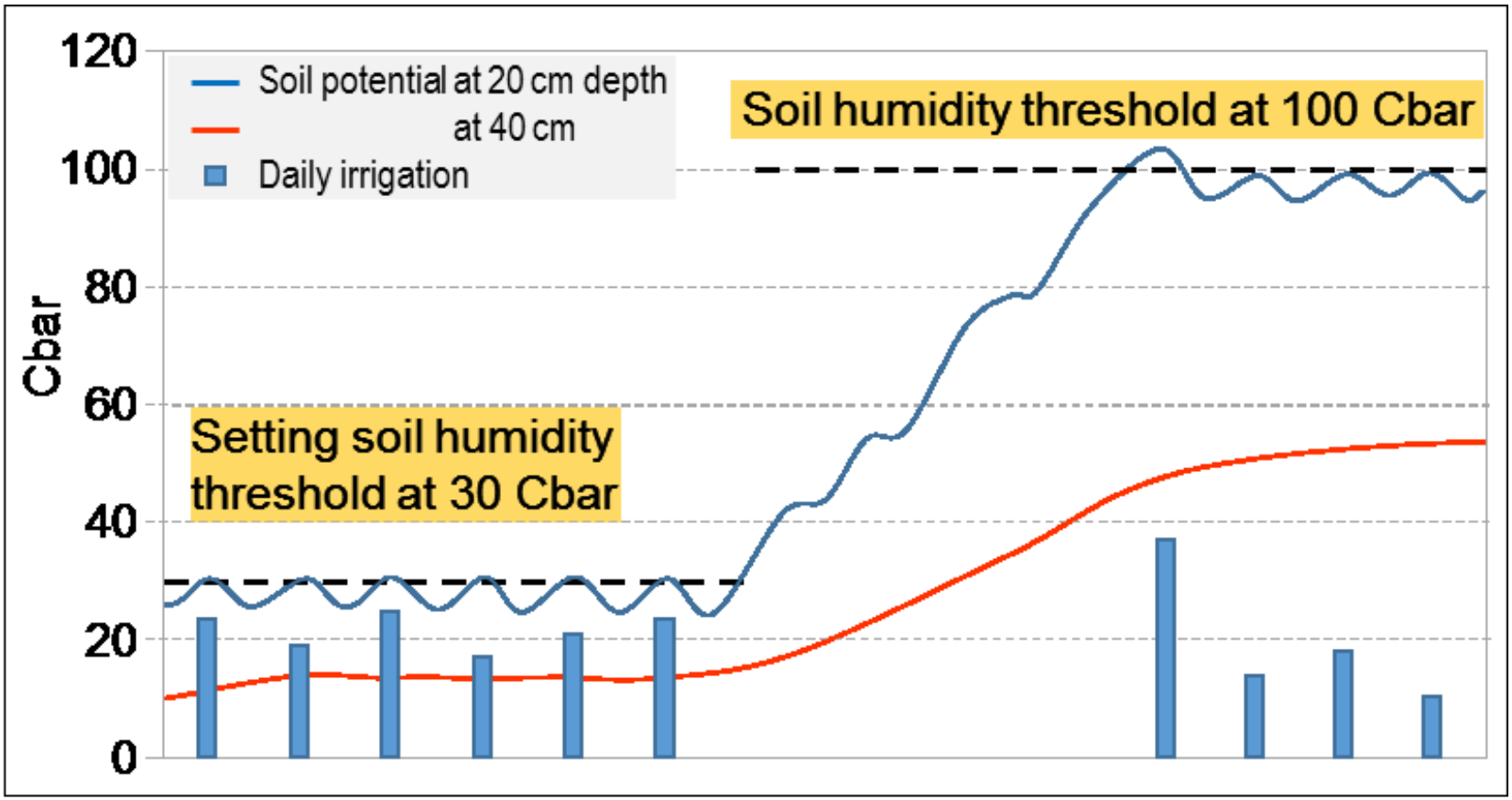
Soil water control

- no cabeling necessary
- easy to handle
- low cost

→ New soil moisture probes for LoRa are finding their way to the market

→ Smart phone application makes a difference!

Non-restricted and regulated deficit



Automated control allows for driving different water regimes

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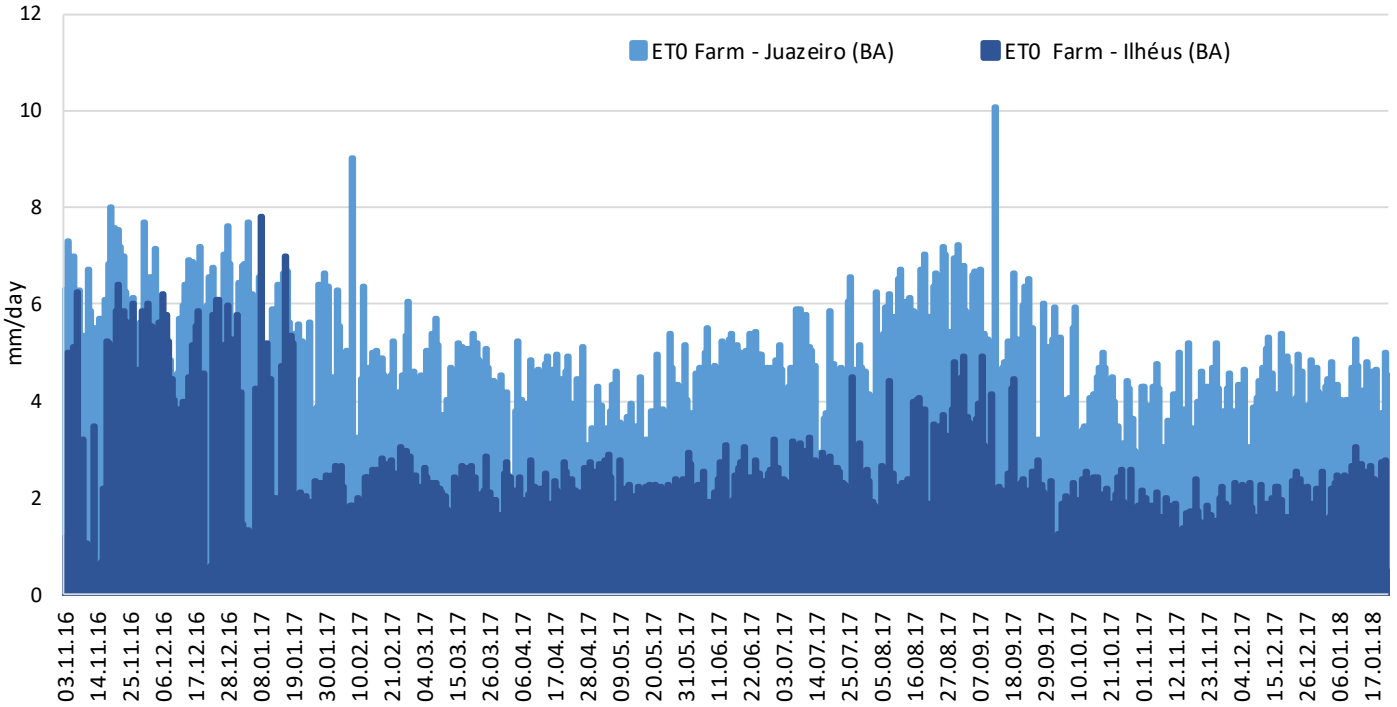
Meteo stations & sensors are getting much cheaper

ex. Agriscope

ex. Pessl is including weather forecast for irrigation steering

flowmeter & electric valve

ET0 as a base for the irrigation regulation



mm irrigation = ET0 * Leaf area index * crop constance

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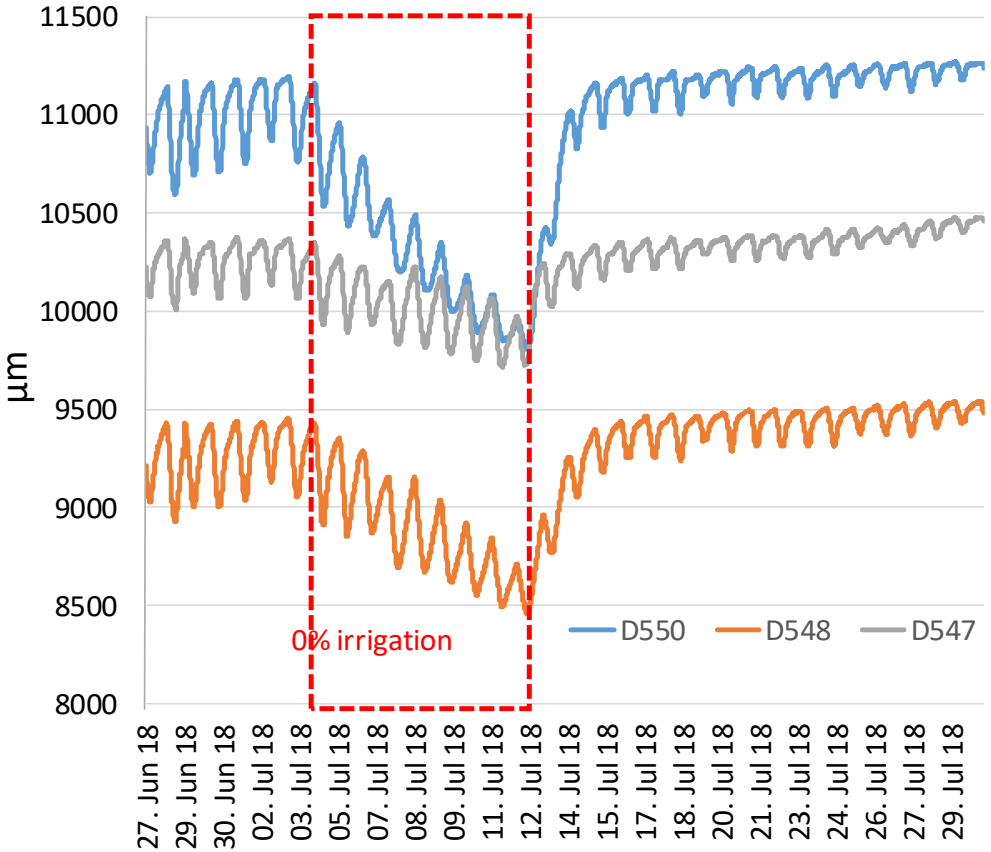
Cocoa tree adapt well to drip irrigation

fine roots are concentrated below the dripperline

Dendrometers are usefull stress indicators for fruit trees



stop of irrigation → shrinkage of the stem → very strong stress

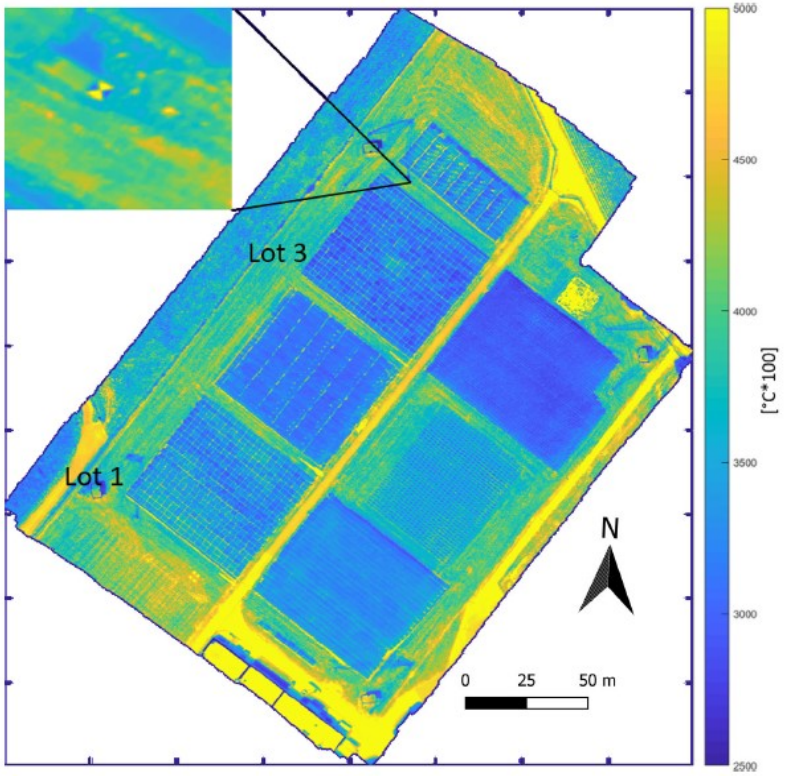
Cocoa: Shaded and wind protected trees have a better performance

- Shaded trees performed about 10-20 % better than unshaded ones
- Shading decreased the water need of about 30 %
- Is it worth to invest in shading nets or using other trees for shading?
- Good windbreaks are essential – cocoa is very sensitive against wind!

→ Details see “cocoa handbook” http://smartfarming.agroscope.ch/ (teleagronomy for apple and cocoa)

Thermal cameras for drones

- Interesting relative comparisons
- Not yet a standard tool for farmers



(Perich et al. 2020)

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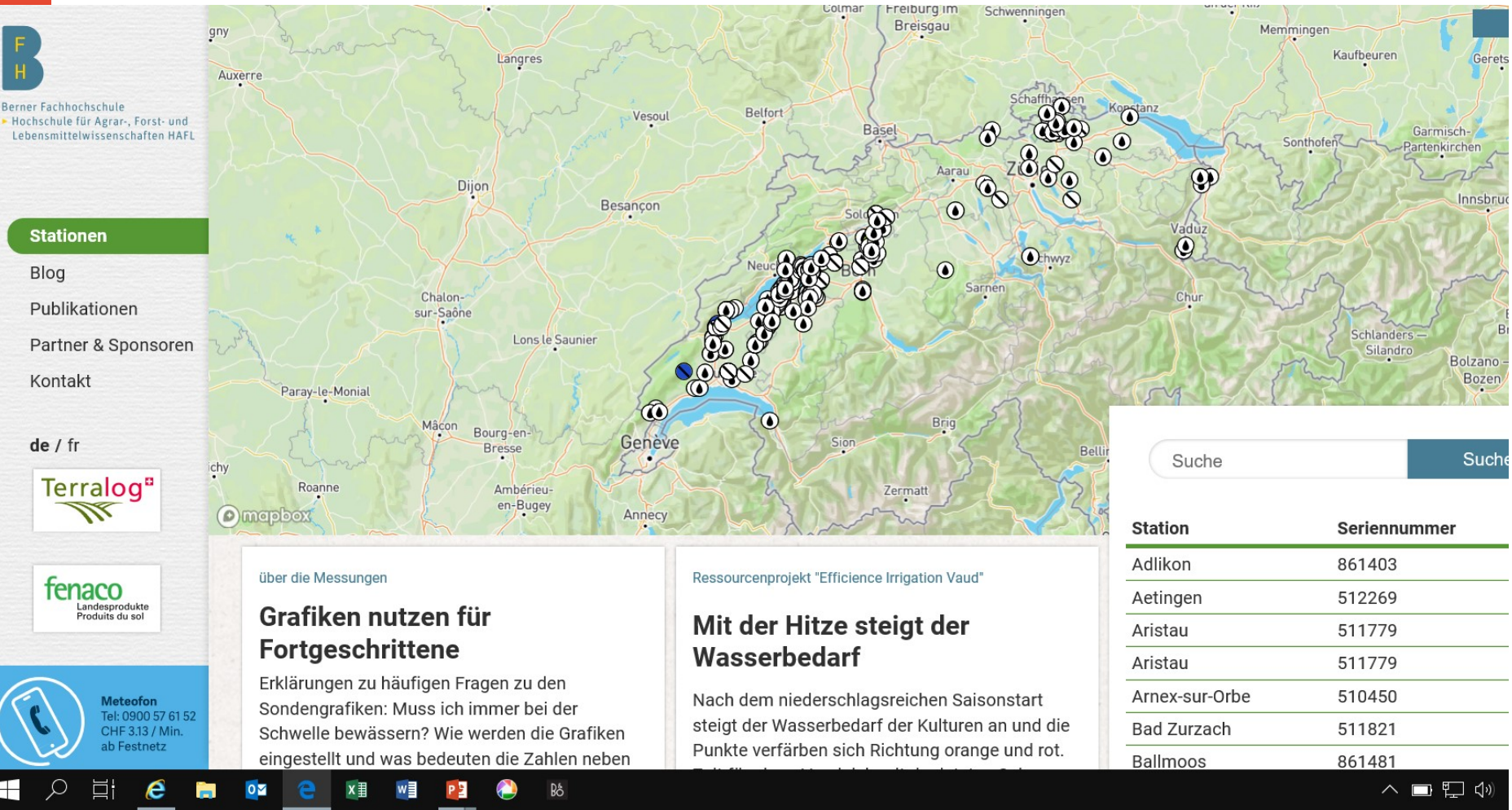
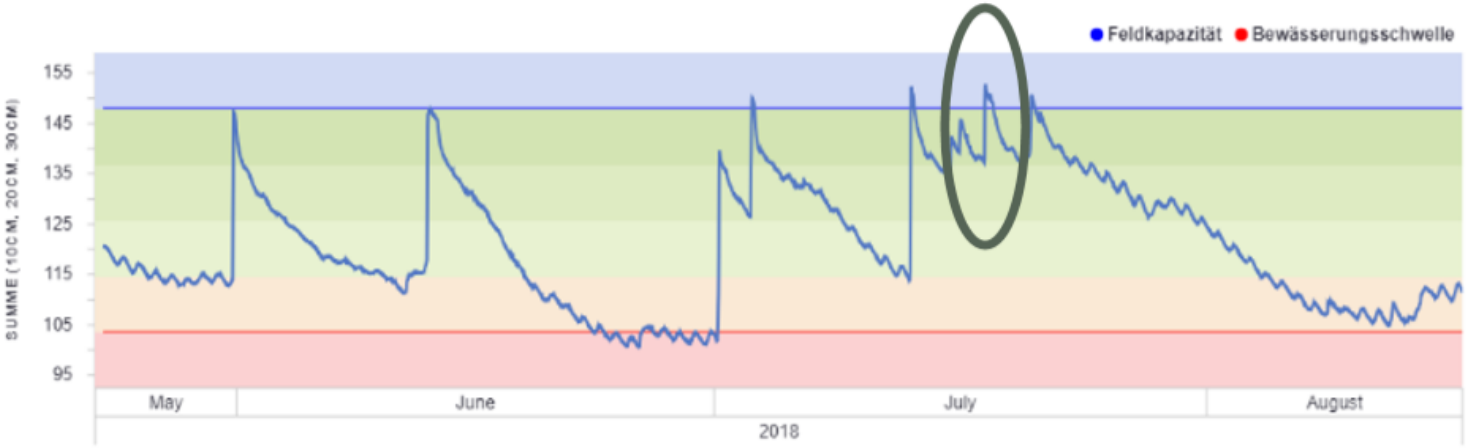
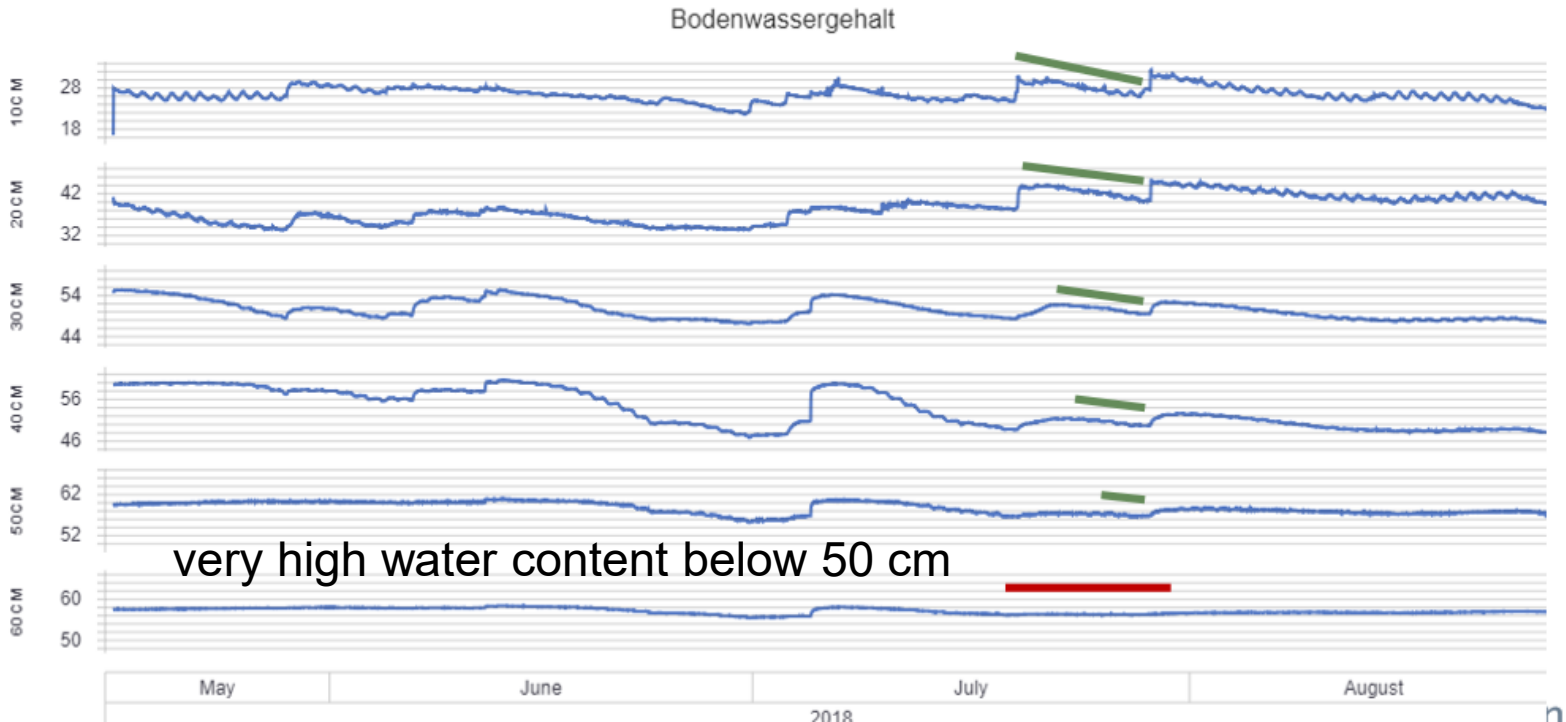
Switzerland: Irrigation of potatoes (A. Keiser, HAFL)

- network of Sentek probes for potatoe production in CH
- accurate irrigation is important for quality & yield
- 200 locations are online
- www.bewaesserungsnetz.ch



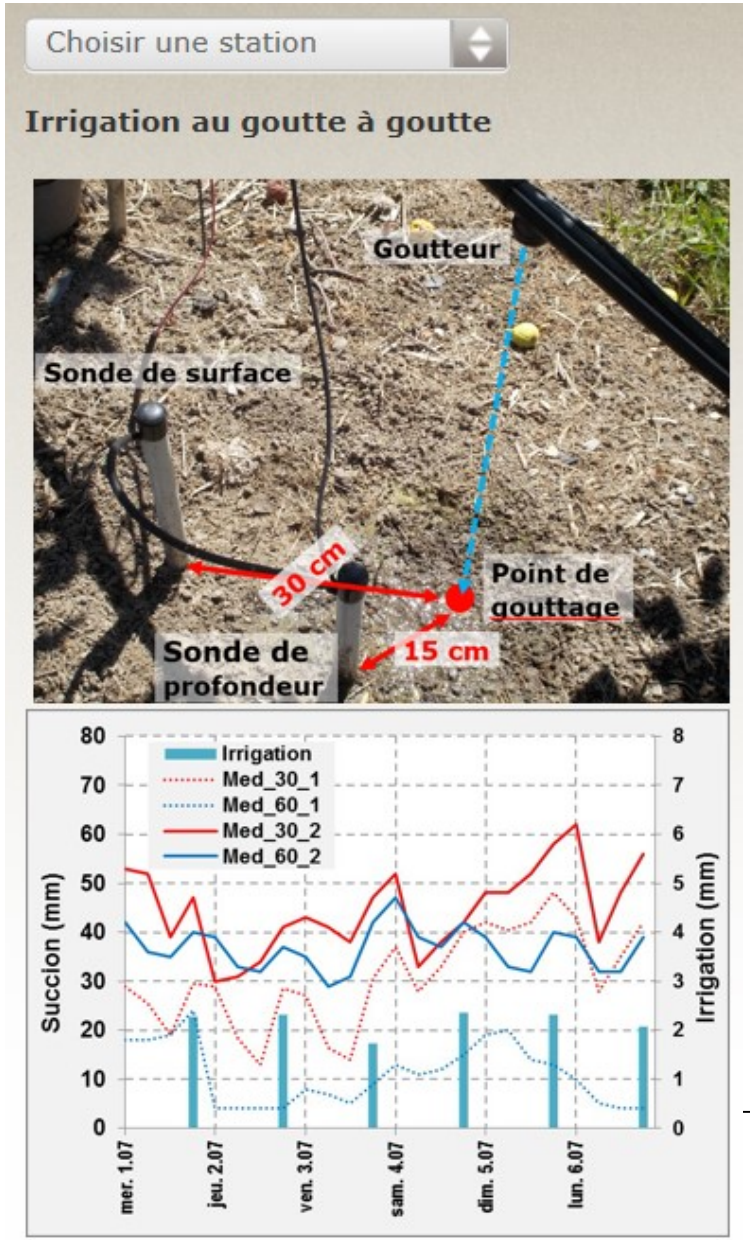
Potatoe have shallow roots (A. Keiser, HAFL)





very high water content below 50 cm

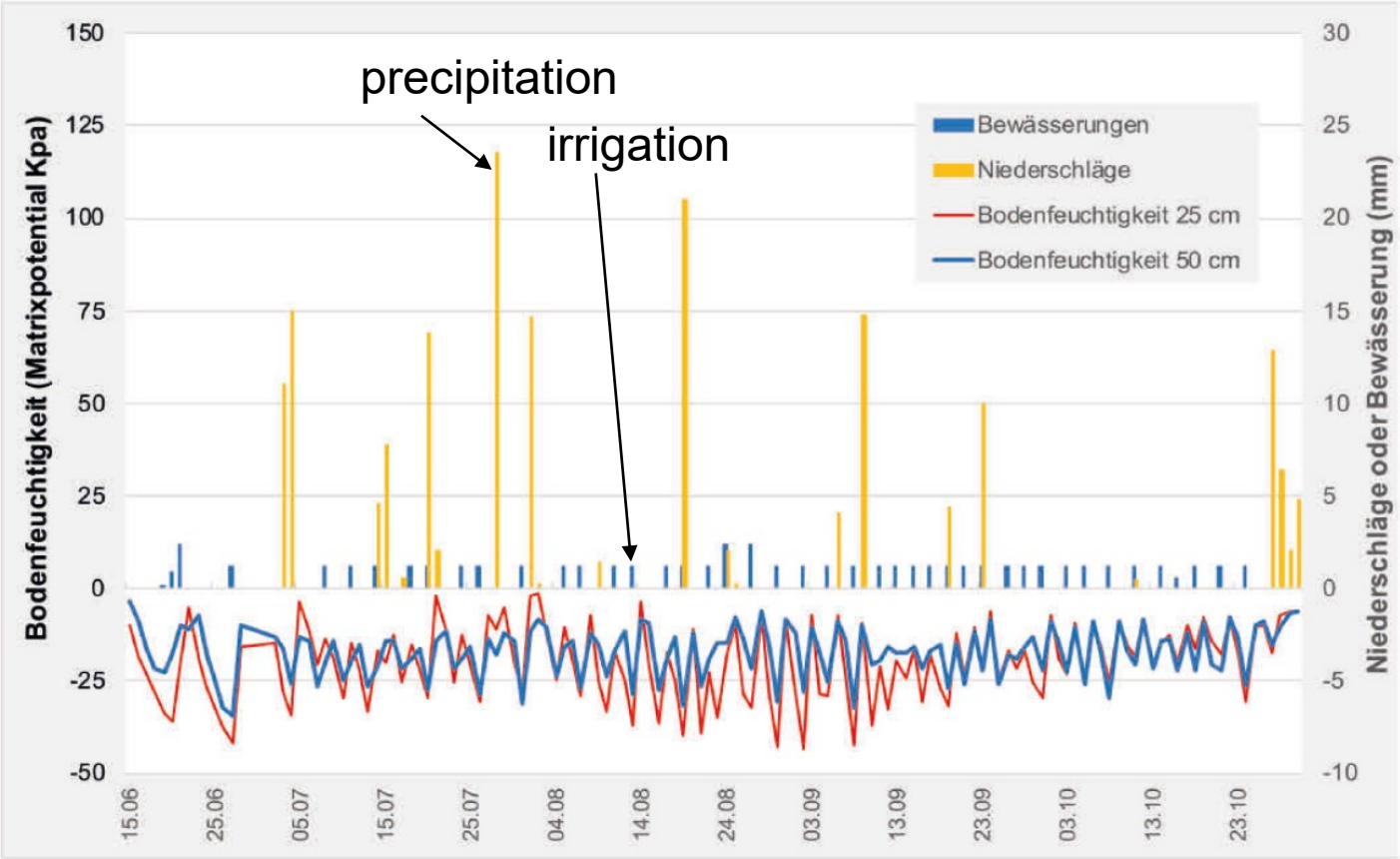
www.agrometeo.ch – irrigation network for fruit trees in CH



- watermark probes are installed in about 10 orchards (at least 6 probes per orchard) in 30 and 60 cm depth
- some farmers have an automated irrigation system installed

(Ph. Monney, Agroscope, Conthey)

Switzerland: automated control of soil moisture in apple orchards



(Ph. Monney, Agroscope, Conthey)

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Monitoring fruit growth is demanded by farmers

(Monney & Anken 2019)

- irrigation: main driver for fruit growth
- quality payment depend on fruit sizes

Thank you!