

# Citizen observers in hydrology - Experiences from the CrowdWater project

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On the following slides we compiled information about CrowdWater activities, but you can also skip the slides and jump directly to the action points below:

- Go and get the app 😊 (Search for CrowdWater, Spotteron in your app store)
- Play the CrowdWater game: <https://crowdwater.ch/en/crowdwater-game/>
- Watch the PhD seminars by Barbara Strobl and Simon Etter on our Youtube channel, <https://www.youtube.com/channel/UC088v9paXZyJ9TcRFh7oNYg>)
- Sign up for our Open Online Course about CrowdWater (in German, [https://edu-exchange.uzh.ch/courses/course-v1:UZH+Crowdwater+2019\\_T1/about](https://edu-exchange.uzh.ch/courses/course-v1:UZH+Crowdwater+2019_T1/about))
- Spread the word about our two new PhD positions, applications still welcome ([https://crowdwater.ch/wp-content/uploads/2020/04/PhD\\_announcement\\_CrowdWater2020\\_DE.pdf](https://crowdwater.ch/wp-content/uploads/2020/04/PhD_announcement_CrowdWater2020_DE.pdf))

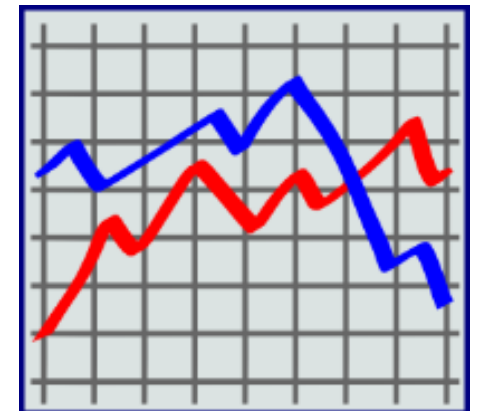
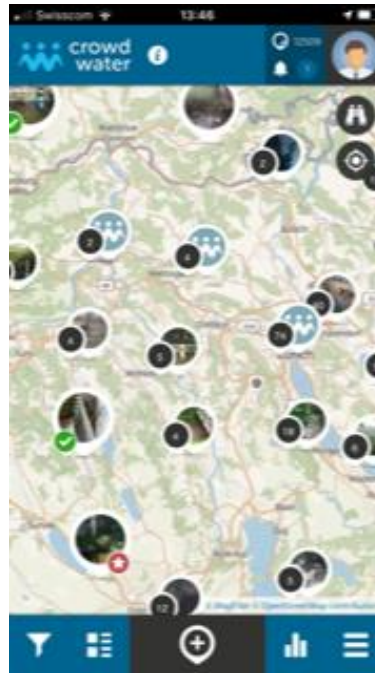
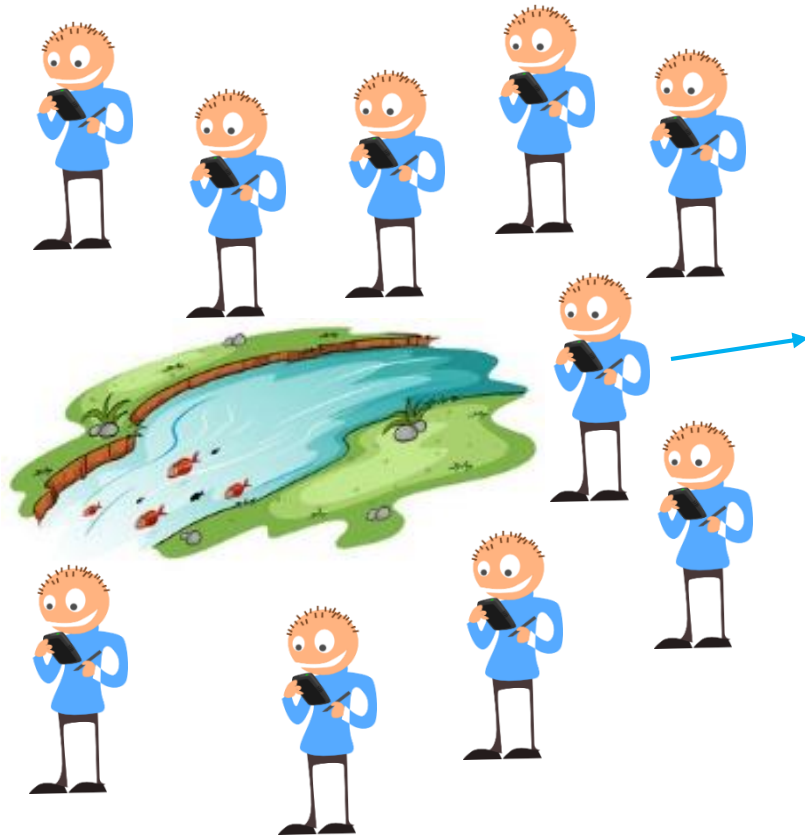
<http://www.crowdwater.ch>





# Vision:

Scalable approach based on smartphone app





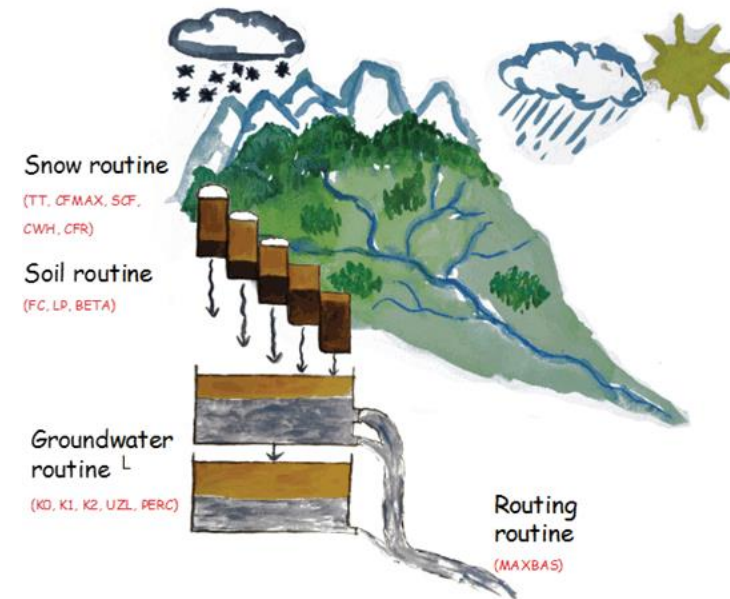
# CrowdWater :

Evaluate the potential of crowd-based data for hydrological modelling



What can be observed by the  
'crowd' (citizen scientists)?

At which accuracy?

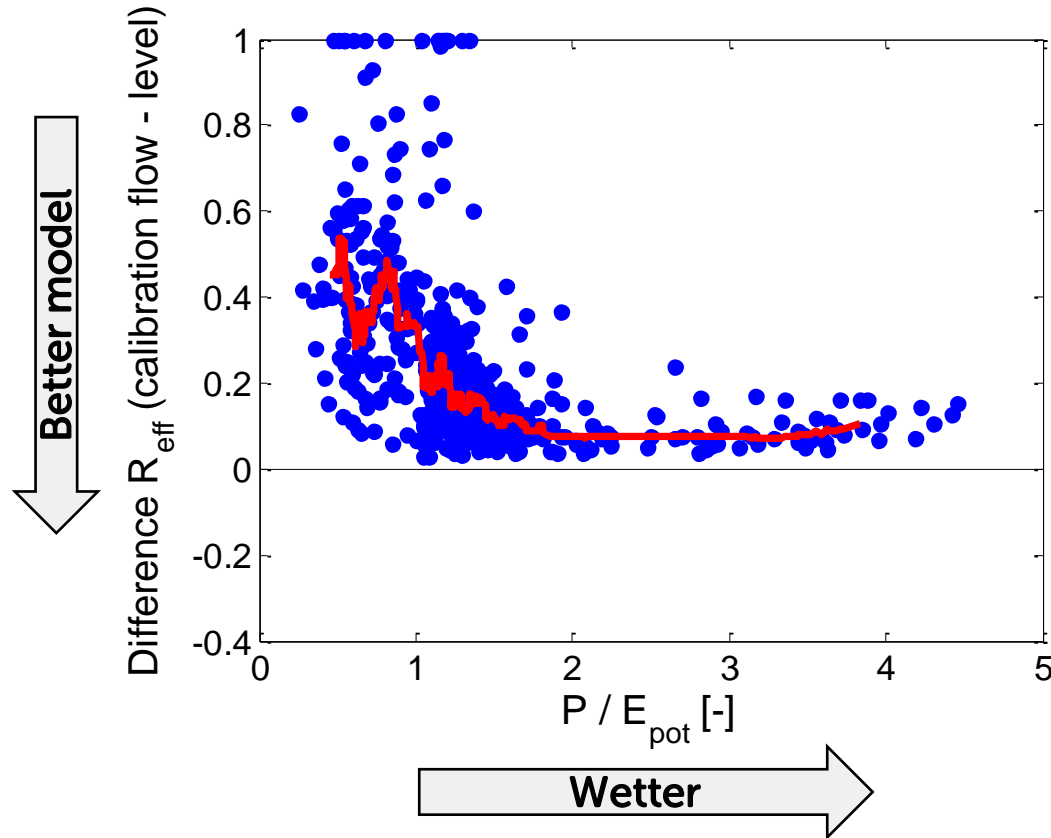


Which data would be most  
informative?

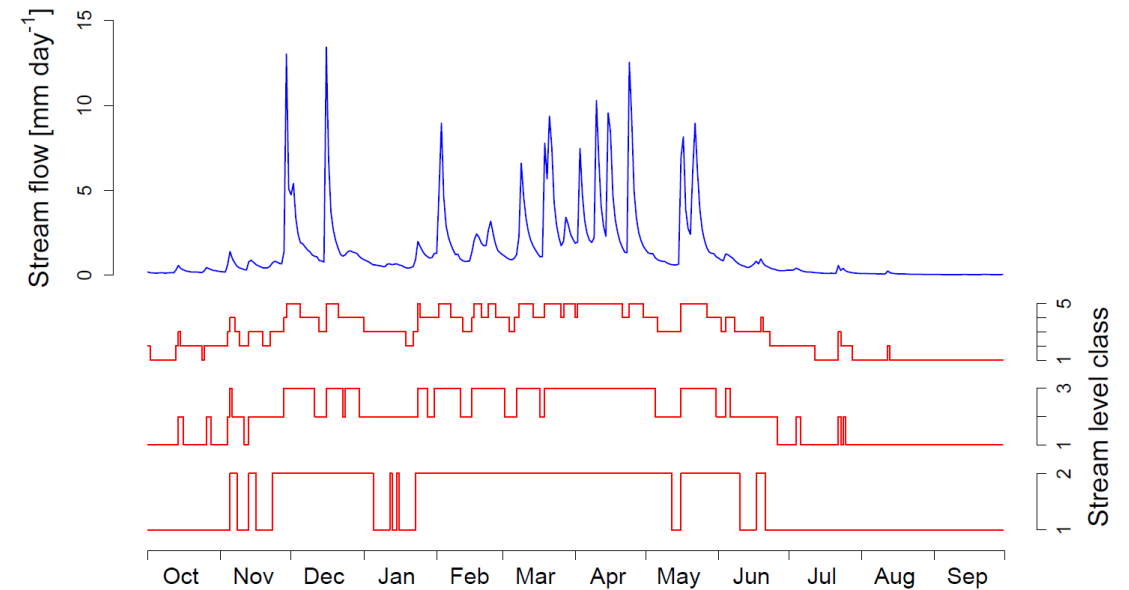
Value of data for modelling?



As shown at previous EGU meetings, water level (classes) are surprisingly informative, especially for humid catchments. Two plots as a reminder, for details please see the two papers.

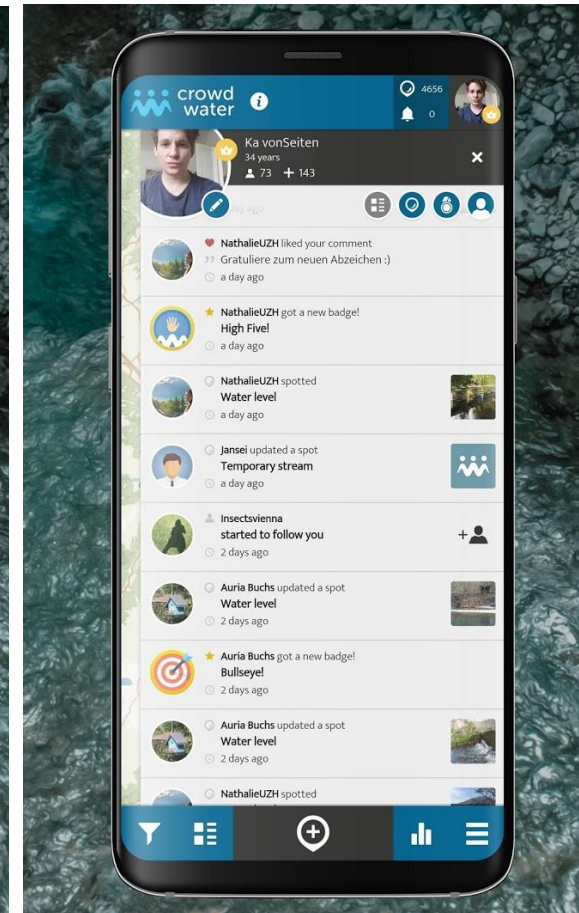
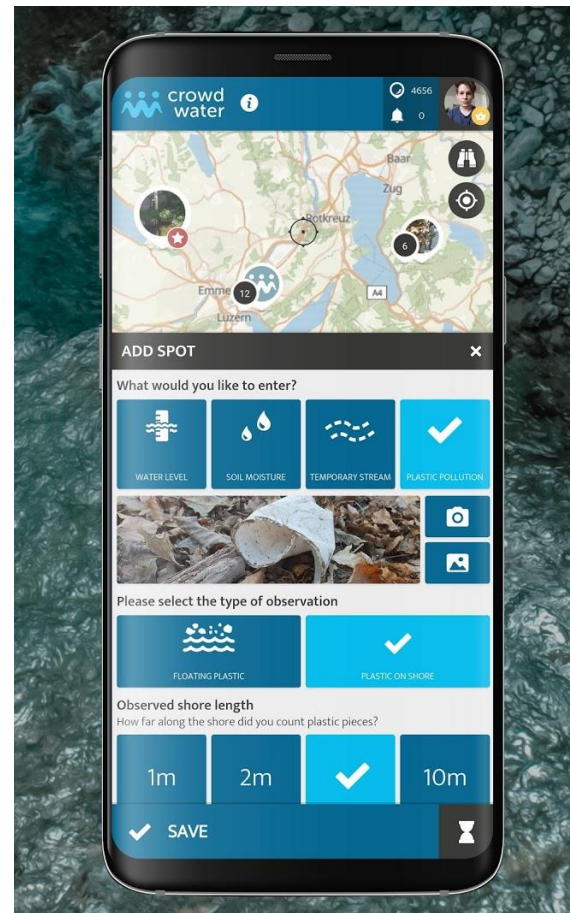
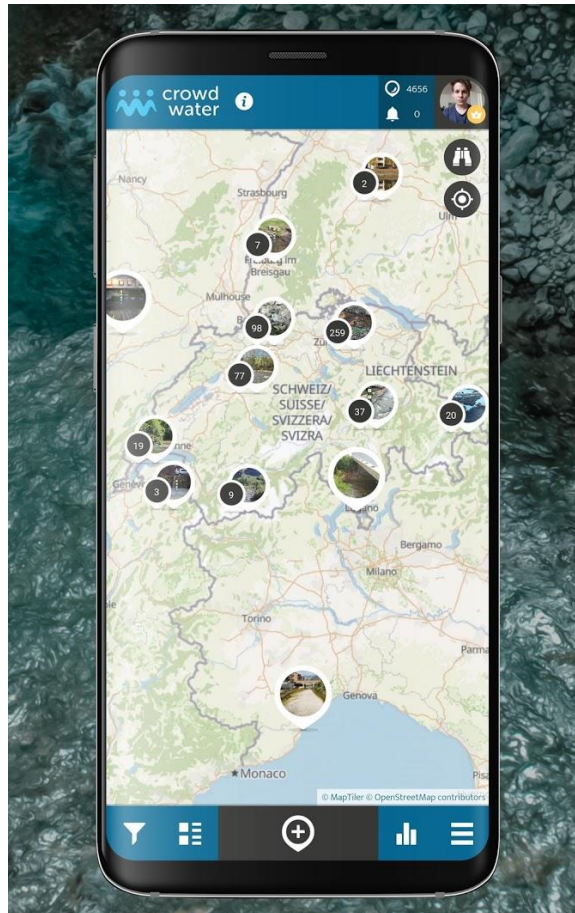


[Seibert and Vis, 2016,](#)  
[Hydrological Processes](#)

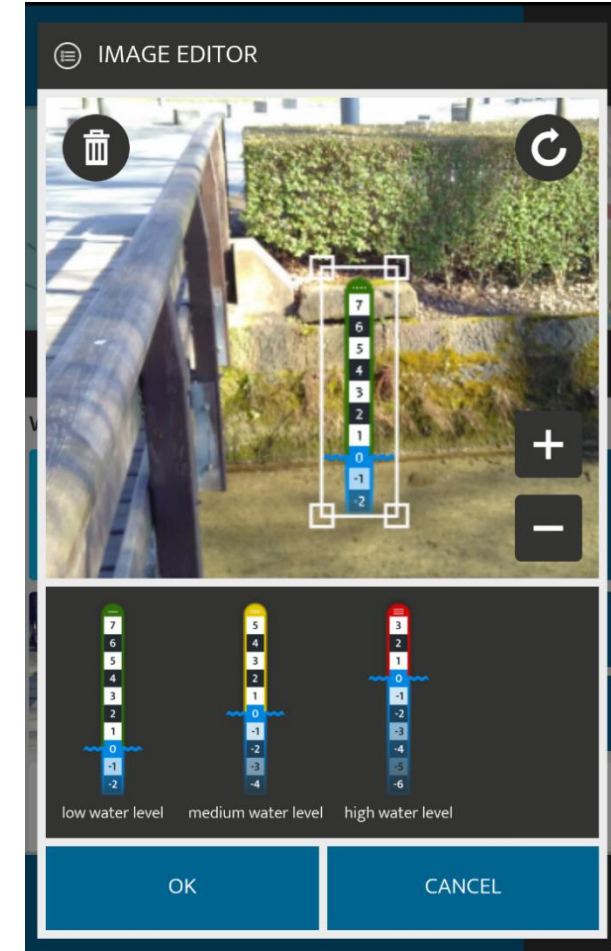


[van Meerveld et al.,](#)  
[2017, HESS](#)

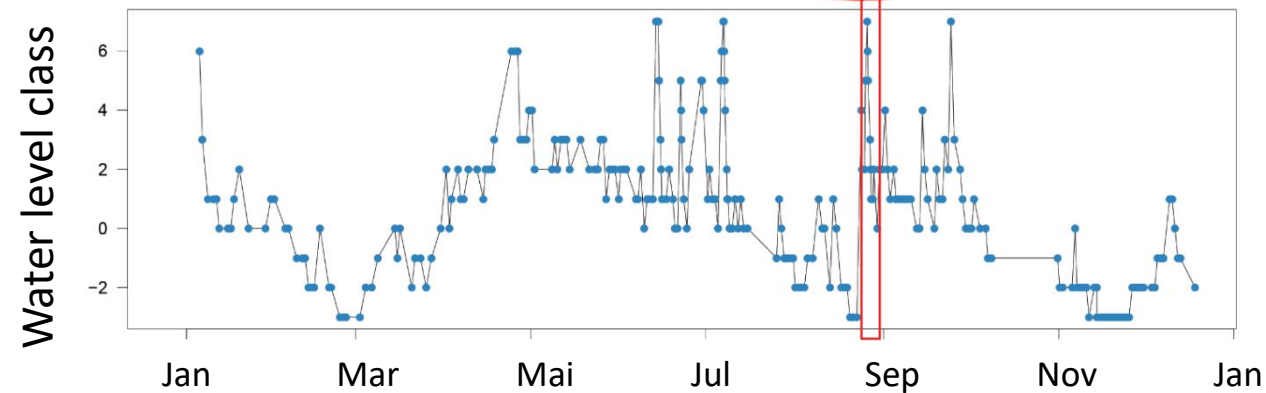
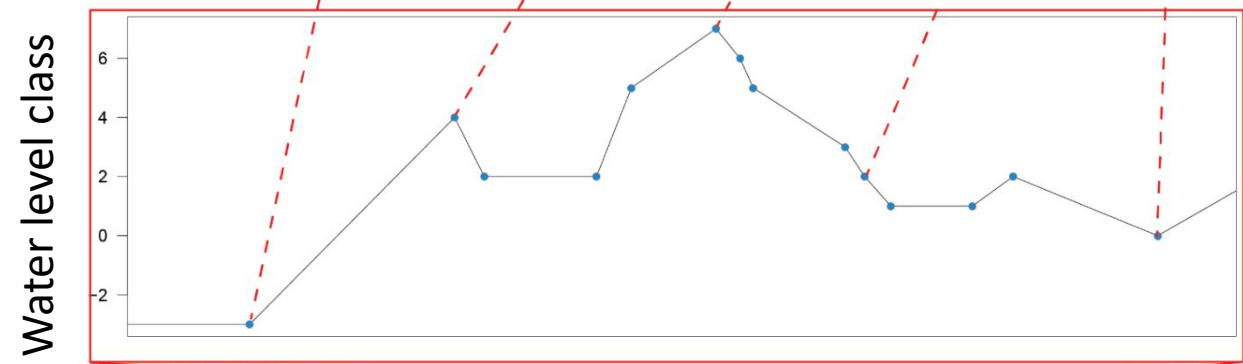
# The CrowdWater | SPOTTERON App



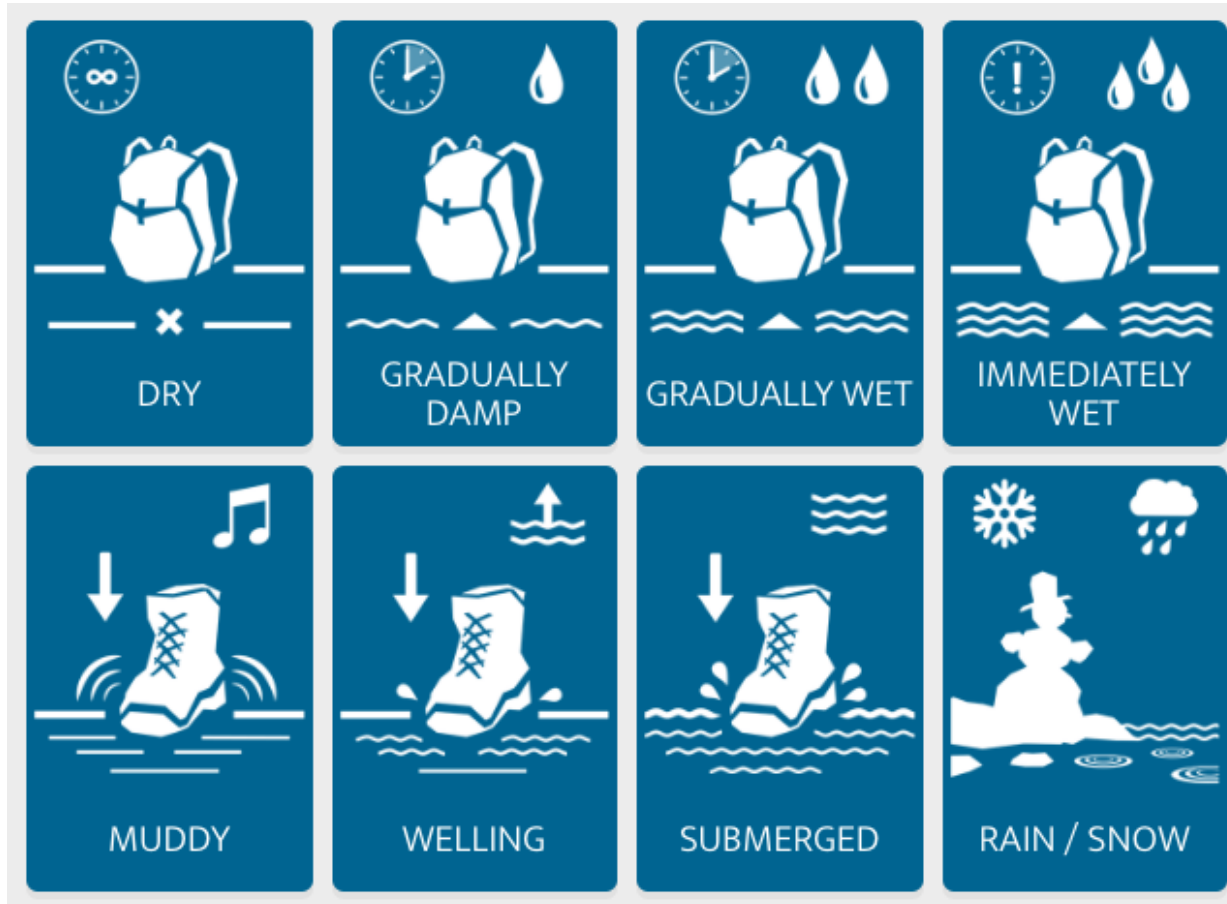
# CrowdWater app: Water levels classes



# Example time series



# App: Soil moisture



[Rinderer et al., 2012,](#)  
[Hydrological Processes](#)

# App: Temporary streams

## What do you observe?

Estimate the current flow condition of the temporary stream:



DRY STREAMBED



DAMP / WET  
STREAMBED



ISOLATED POOLS



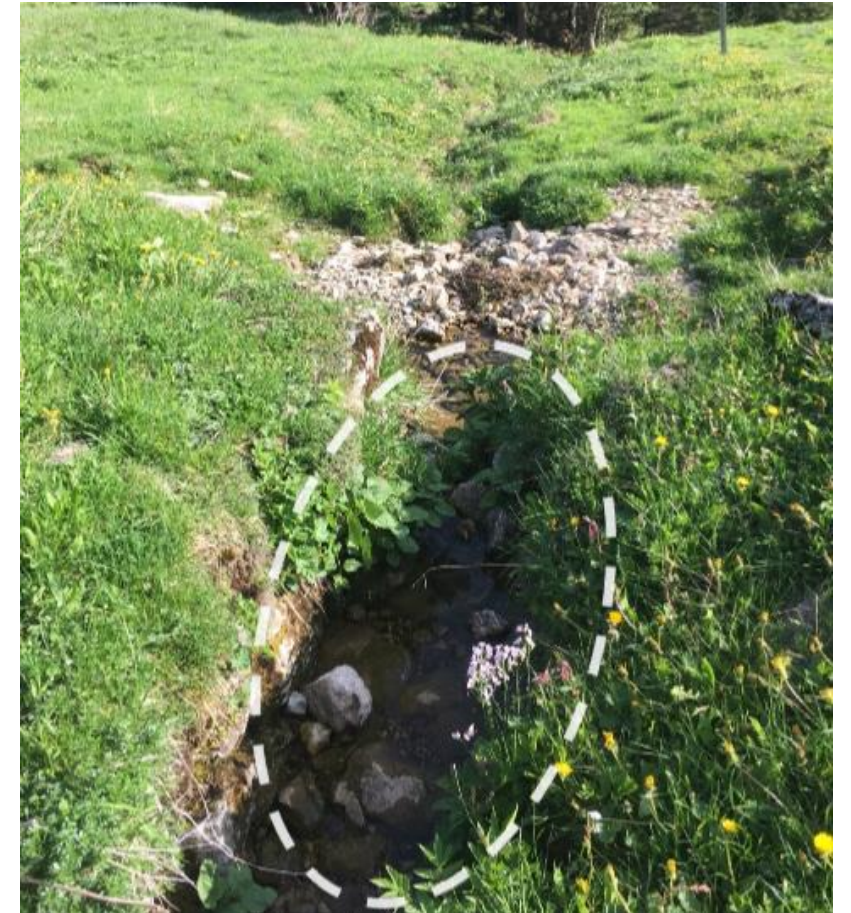
STANDING WATER



TRICKLING WATER



FLOWING



# App: Plastic pollution

Please select the type of observation



FLOATING PLASTIC



PLASTIC ON SHORE

Did you see any plastic?

How many plastic pieces did you count during your stated time and over the stated width of the river?



NO PLASTIC



1-2 PIECES



3-5 PIECES



6-10 PIECES



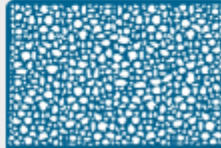
11-20 PIECES



21-100 PIECES



100+ PIECES

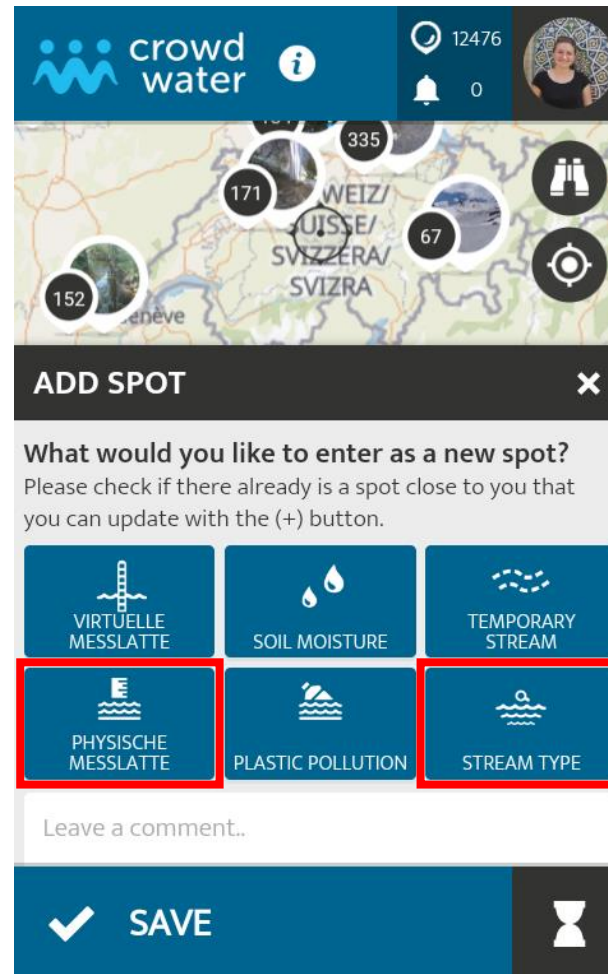


COVERED  
ENTIRELY

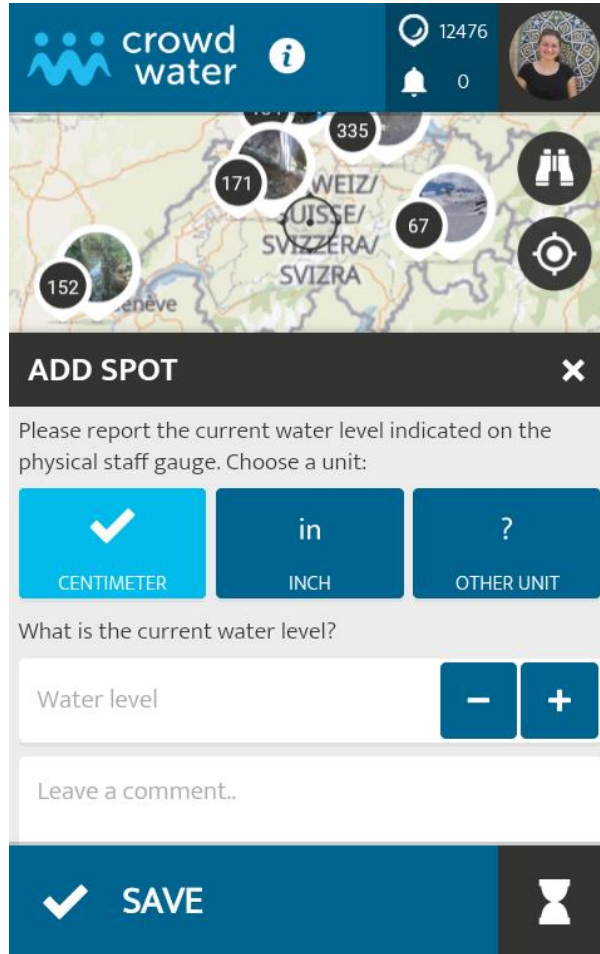


# New: two more categories

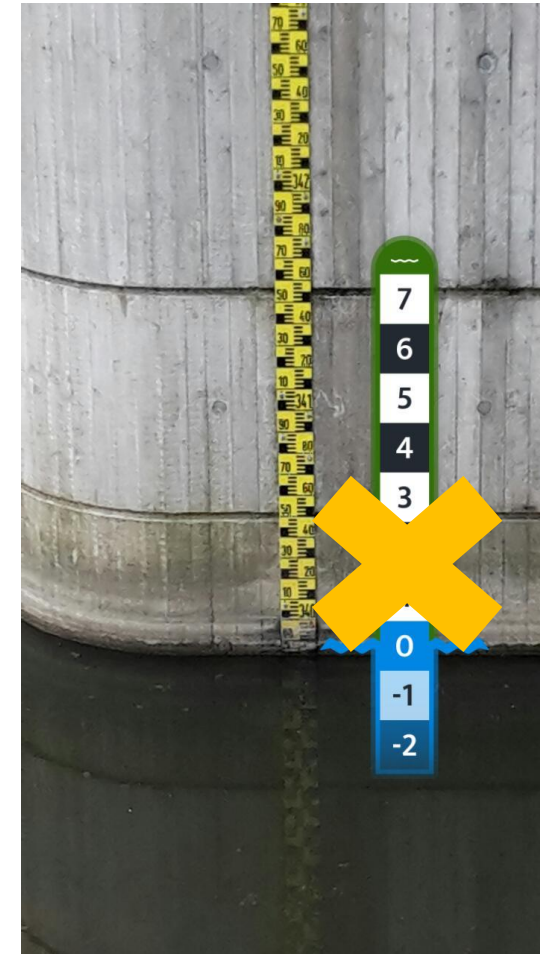
NEW  
April 2020





# New: Physical staff gauge

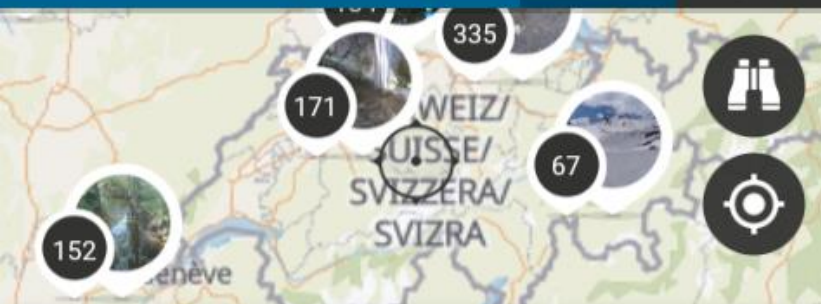


The screenshot shows the 'ADD SPOT' form in the Crowd Water app. At the top, there's a header with the 'crowd water' logo, a user profile picture, and a notification count of 12476. Below the header is a map showing various locations with circular markers containing numbers like 152, 171, 335, 67, and 335. The map also shows labels for 'Weiz/Suisse/Svizzera/Svizra' and 'Geneve'. Below the map, there's a section titled 'ADD SPOT' with a close button (X). The instructions say: 'Please report the current water level indicated on the physical staff gauge. Choose a unit:'. There are three buttons for unit selection: 'CENTIMETER' (with a checkmark), 'in INCH', and '? OTHER UNIT'. Below this, there's a question 'What is the current water level?' followed by a text input field labeled 'Water level' and two buttons, '-' and '+'. At the bottom, there's a text input field labeled 'Leave a comment..' and a 'SAVE' button with a checkmark icon.



# New: Stream type


12476




**ADD SPOT**

What kind of running water is it?

TRICKLE

STREAM

RIVER

LARGE RIVER

Would you drink this water?

YES

NO

Would you swim in this water?

YES

NO

Is this water body natural or controlled?

NATURAL

CONTROLLED

Type of river bed material

What colour is the water?

Colour of the water

Can you see the riverbed?

YES

NO

Can you see fish or other living beings in the water?

YES

NO


Do you see signs of water pollution?

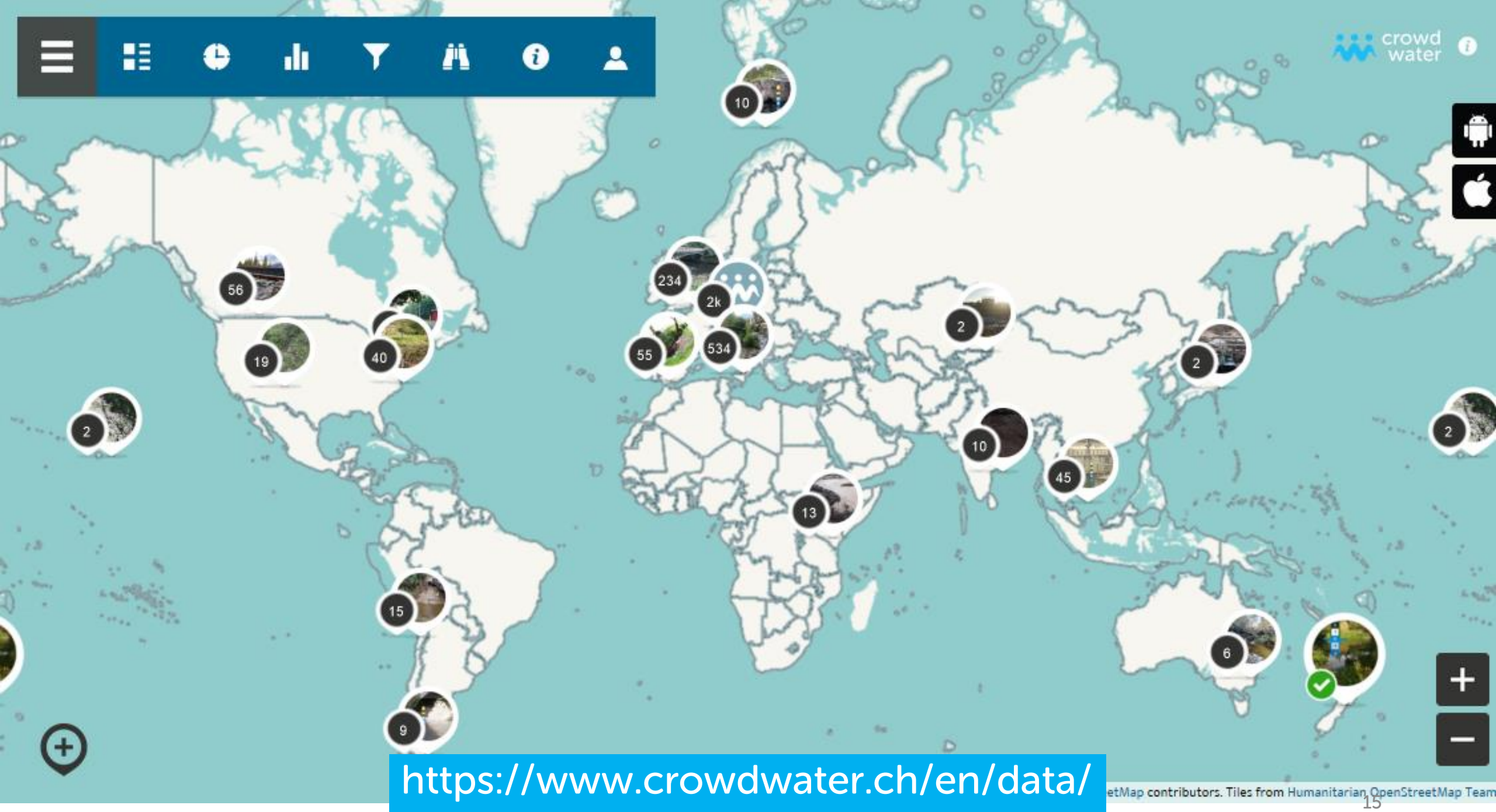
Pollution

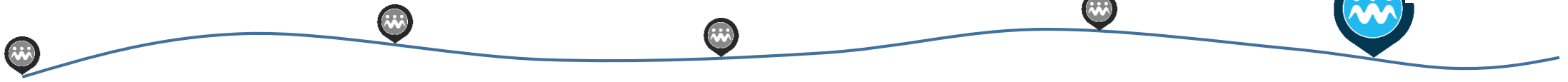
Does this stream sometimes dry up?

☐ Yes, it sometimes dries up

✓ SAVE

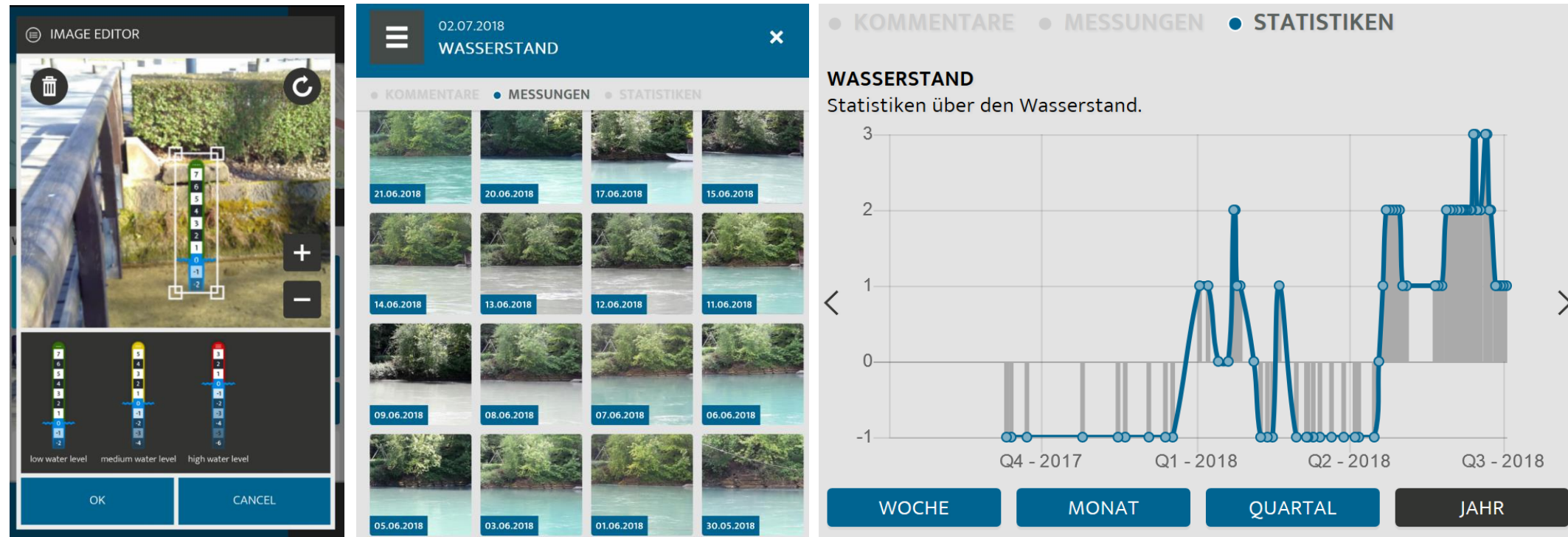






Some of our publications ....

# Virtual staff gauge for crowd-based observations



Seibert, J., Strobl, B., Etter, S., Hummer, P., van Meerveld, H.J.: Virtual staff gauges for crowd-based stream level observations, *Front. Earth Sci. – Hydrosphere*, <https://doi.org/10.3389/feart.2019.00070>, 2019.



# Crowd-based water level classes are informative



Etter, S., Strobl, B., Seibert, J., & van Meerveld, H. J.: Value of crowd-based water level class observations for hydrological model calibration. *Water Resources Research*, 56, e2019WR026108.

<https://doi.org/10.1029/2019WR026108>, 2020

# Data quality control based on an online game



Strobl, B., Etter, S., van Meerveld, I., Seibert, J.: The CrowdWater game: A playful way to improve the accuracy of crowdsourced water level class data – PLoS One, <https://doi.org/10.1371/journal.pone.0222579>, 2019

<https://crowdwater.ch/en/crowdwater-game/>





# Conclusions

- Simple approaches can provide useful data
- Value of data can be evaluated
- Crowd-based water-level class observations can be informative
- A game can help for data quality control

<http://www.crowdwater.ch>





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- Spread the word about our two new PhD positions, applications still welcome ([https://crowdwater.ch/wp-content/uploads/2020/04/PhD\\_announcement\\_CrowdWater2020\\_DE.pdf](https://crowdwater.ch/wp-content/uploads/2020/04/PhD_announcement_CrowdWater2020_DE.pdf))

<http://www.crowdwater.ch>



Hydrological Citizen Science



crowd  
water



Universität  
Zürich <sup>UZH</sup>

POWERED BY  
**SPOTTERON**