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Citizen observers in hydrology – experiences from CrowdWater

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One possibility to overcome the lack of data in hydrology is to engage the public in hydrological observations. Citizen science projects are potentially useful to complement existing observation networks to obtain spatially distributed streamflow data. Projects, such as CrowdHydrology, have demonstrated that it is possible to engage the public in contributing hydrological observations. However, hydrological citizen science projects have, so far, been based on the use of different kinds of instruments or installations. For stream level observations, this is usually a staff gauge. While it may be relatively easy to install a staff gauge at a few river sites, the need for a physical installation makes it difficult to scale this type of citizen science approach to a large number of sites because these gauges cannot be installed everywhere or by everyone. Here, we present the CrowdWater smartphone app that allows the collection of hydrological data everywhere without any physical installation or specialized instruments. The approach is similar to geocaching, with the difference that instead of finding treasures, hydrological measurement sites can be set up by anyone at any location and these sites can be found by the initiator or other citizen scientists to take additional measurements at a later time. This way time series of observations can be collected. For stream levels, a virtual staff gauge approach is used: a picture of a staff gauge is digitally inserted into a photo of a stream bank or a bridge pillar, and the stream level during a subsequent field visit to that site is compared to the staff gauge on the first picture. For intermittent streams, soil moisture and plastic pollution, qualitative scales are used to enable citizens to report their observations. Participants have already contributed more than 10 000 observations. In this pico-presentation, we report on our experiences after about four years with the CrowdWater project and discuss the use of the app by citizen observers, methods to ensure data quality, and illustrate how these data can be used in hydrological model calibration.