Spatial analyses of the CrowdWater data collected by citizen scientists

Master's thesis co-supervised by the groups Geocomputation and Hydrology & Climate

The CrowdWater project (www.crowdwater.ch) is a citizen science project by the Department of Geography at the University of Zurich. In CrowdWater, interested people from the public can collect hydrological data wherever and whenever they want by using a smartphone app. The citizen scientists collect information on the waterlevel in streams (using a physically installed or a virtual staff gauge in form of a virtual sticker), they observe the flow dynamics of temporary streams, the soil moisture, as well as plastic pollution of waterbodies. Furthermore, they can also collect general information on a waterbody such as how they perceive the quality of the water.

Since its launch in February 2017, more than 50'000observations have been contributed to the CrowdWater project with the CrowdWater app at several thousand observation sites. The observations were collected by more than 2000 citizen scientists and are located in over 60 countries. For each observation, metadata such as the location, the user id, and the timestamp are available. Most observations also come with a photo. All data are stored in a simple csv file.

As the CrowdWater project is led by a Swiss university, the majority of observations are made in Switzerland and its neighboring countries. However, with increasing recognition of the CrowdWater project, also the number of observations in other regions of the world are increasing. This is partially due to Swiss citizen scientists that collect data also when they are abroad and partially due to new citizen scientists that join the project in their resident countries.

In many citizen science projects, the drop out quota after one contribution is about 50%, i.e., half of the users only make one contribution and stop afterwards. At the moment, this quota is at about 36% in the CrowdWater project (in other words, 64% of all users made at least two observations). However, the partition of citizen scientists in the CrowdWater project with at least 10 observations is only about 14%.

So far, no detailed analyses of the CrowdWater data were made. Possible questions that arise from the descriptions above and that could be analysed based on the dataset are the following:

- What is the spatial development of the distribution of CrowdWater data around the globe? In other words, how did the CrowdWater data spread over different countries after starting in Switzerland?
- Which partition of the data in countries other than Switzerland is collected by citizen scientists that mainly collect data in Switzerland but have some observations abroad and which partition of these data is collected by residents of these countries?
- How long and how often do citizen scientists contribute to the CrowdWater project? When do most citizen scientists start, when do they stop? Which observation sites (CrowdWater spots) are "shared" among different citizen scientists (i.e., contributions by several people) and are thus not abandoned when a citizen scientist stops contributing?

For an overview about the CrowdWater data, check also: https://crowdwater.ch/de/dashboard-3/.

If you are interested in these questions and would like to write your Master's thesis in with the groups Geocomputation and Hydrology & Climate, please get in touch with Franziska Clerc-Schwarzenbach (franziska.clerc@geo.uzh.ch).