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The “big brother” hydrologist is watching snow hydrology in forests and open space

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In times where video cameras are installed everywhere and GSM connections are widely available also in remote regions in the Swiss Alps, it is possible to sit in front of a desktop and contemplate how field observations are processing. So, the “big brother” hydrologist is actually most often a dry hydrologist collaborating with wet and MacGyver hydrologists, while remotely overseeing the field experiments thanks to modern data acquisition devices.

Since 2016 three sites in the Alptal valley (Switzerland) are instrumented with a mix of high-end and low-cost sensing components. Some installations are modified off-the-shell devices including components bought at the garden centre next-door. These three system are mainly designed to quantify snowmelt at sub-hourly temporal resolution and sample meltwater for isotopic analyses on a daily time-scale. In parallel information about different other parameters including air-temperature, precipitation, snow depth and soil moisture is collected. At one of the location a redundant snow-depth sensor with LoRa WAN technology is installed.

Webcams are installed in order to capture soft-information such as interception of snow on trees, unloading of snow from the branches or identification whether precipitation is liquid or solid. Cameras delivers also information on possible need of special maintenance or give view on what is happening in the field in moments of time where nobody would like to be in the field such as during storm Burglind on January 3 2018. On the webcams one can nicely see from home while playing a board game with the family, that numerous branches and countless needles are deposited on the snowpack and later covered by fresh snow. This soft information is useful, since snow albedo will be surely affected by such small vegetation-debris.

Next to the half-hourly updated of the cameras, every hour one-minute data of key parameters of the system are delivered via GSM transfer. The big brother hydrologist can follow the triggering of-snowmelt in real-time. This information will be later combined with isotopic data in order to detect the temporal dynamics of snowmelt contribution to streamflow.

The poster will present some examples on how the “big brother” hydrologist contributes to field work.