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Earth System Science Data Discussions

Interactive comment on "Measurement of the water balance components of a large green roof in Greater Paris Area" *by* Pierre-Antoine Versini et al.

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Dear Referee,

First of all, we would like to thank you for the interest you have shown to our manuscript and your detailed review. Here are our answers and some proposals to improve our paper regarding your comments and suggestions.

Comments concerning the files: Some headers can easily be added in both Arduino and rainfall files to recall data source and units. The format conversion in .csv can also be considered.

Overall comment (1): The present water level sensors measure the discharge flowing out of a third of the BGW (3,500 m2 on the 10,000 m2). It is already significantly

larger than any prior studies (see references in Introduction section). Moreover, water content sensors can be moved (and have already been moved) over the BGW for additional purposes, as it was the case for evapotranspiration measurements (not presented here). In fact, the whole BGW is used as a pilot site for Blue green solution assessment. Some clarifications should be added in BGW presentation to avoid any misunderstanding and clarify the content of what is presented here as well as the overall context.

Overall comment (2): Indeed, in May 2018 the water content sensors were moved over the BGW to proceed to several evapotranspiration campaigns (comparison with the measurements made with an evapotranspiration chamber on a small area). For this reason, the continuous dataset ends in May 2018. The authors are aware the 6 presented rainfall events are not representative of the full range of precipitation events. Nevertheless, it has to be mentioned that since the BGW is monitored (2017), intense rainfall has never caused any flooding on the surface, nor pipe filling (the higher water level measured was about 12 cm).

The statement at line 381: "this operation is done during a dry period" refers to the collection of Arduino data. Arduino data are currently collected manually. During this operation the sensor is disconnected and no measurement is recorded. To avoid the possible loss of relevant measurements, this collection procedure is carried out during "dry periods" characterized by no rainfall and discharge.

All this information will be added to better understand the context in which this dataset was made.

Overall comment (3): BGW detention and retention properties differ from one event to another depending on the precipitation but also the initial conditions. Detention can be graphically seen at the rainfall event scale (usually 45 minutes between peak rainfall and peak discharge) and retention by computing the runoff coefficient. Both can be done by using the proposed Python script. As mentioned in response to reviewer 1,

the user has to be cautious concerning water retention estimation. We propose to use Topp equation to convert dielectric constant in water content, but we are aware of the possible weakness of this assumption (see response to reviewer 1). Finally, we provide the dielectric constant data, letting free the reader to use another relationship to convert this data in water content. Nevertheless, it is possible to add a particular rainfall event in the paper to illustrate the possible hydrological impacts of the BGW, and compute the runoff coefficient for every water content measurement for an example to illustrate the opportunities offered by this data set. Specific comments (1): "stormwater management network" should be the appropriate terminology. The text will be homogenised to avoid any confusion.

Specific comments (2): As commented in response to reviewer 1, Figure 1 should be modified. Only 16 sensors will be presented.

Specific comments (3): For UM18 this dead zone is estimated to 5 mm in the datasheet. As the sensor is placed on the top of the conduit, only very high values (higher than 240 mm) could be affected by this dead zone. For this range [0-240 mm], the measures made by the sensor were manually verified with some standards. Note that water levels have never been higher than 120 mm for now. For both conduit and storage units, the ultrasonic sensors have never been immersed.

Indeed, Arduino refers to the data collected in the storage unit. Campbell data logger collects only the data measured inside the pipe. The reason for which there are two different record systems is due to the fact that the storage unit was instrumented few months after the conduit, and that the distance was too long to make a connection between the storage unit and the existing data logger.

All these precisions will be added in the manuscript.

Specific comments (4): Some additional information will be added to avoid any confusion.

Specific comments (5): Indeed, it should be indicated "downstream discharge Q1 " in the figure legend.

Specific comments (6): For sure, sensor-level uncertainties can be added as an explanation of this spatial variability. The wavy-form has not moved during time as it was an architectural choice, and the roof is included in the concrete structure of the building. Concerning the granular composition, the natural grain size distribution of the substrate (see Stanic et al., 2019) can explain for a large part this spatial variability. It is quite difficult to assess how it has evolved with time. We have only notices that some of the small particles have been drained out of the substrate.

The authors

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