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Interactive comment on "Flow Intake Control using Dry-weather Forecast" *by* Otto Icke et al.

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First of all, thanks for your useful questions and remarks! We appreciate your comments! Answers to the questions and remarks of referee Klaas-Jan van Heeringen:

1. In Section 1 it is stated that there is a "significant bypass of post-treatment during peak discharge". Please elaborate this with illustrative figures, for example in terms of spilled load or volumes to surface water relative to total. This, to get an idea of impact and potential benefits.

   For this paper, we primarily focused our research on the efficiency of the predictive controller reducing the amount of bypass in relation to the capacity of the post-treatment. Nevertheless, your suggestion for a quantitative analysis on the impact of the volumes and loads on the surface water is interesting for

   further research in the future. For now we would like to keep the scope of this paper in mind.

2. You refer a few times to optimization of inflow "by using predictive control", using predictions on inflow. But, what exactly are you controlling and how? I suspect by controlling the sewerage pumping stations, which are used to pump the waste water from sewer systems into the transport pipe system? Or. . .?

   The predictive control is applied on the influent flow to the Waste Water Treatment Plant (WWTP). So this can be the influent pumping station at the WTTP or the sewerage pumping stations of the water board for catchment areas discharging directly to the WWTP. It depends on the exact configuration of catchment areas and pumping stations. For the case of WWTP Bennekom it concerns the influent pumping station (screw pumps) at the WWTP. We will clarify this in the paper.

3. Line 35: "To verify the preliminary. . ." should be "To verify the results of the preliminary. . ." ?

   We totally agree with that. To be corrected in the next version of this paper.

4. With respect to section 2.1: is there anything to say about the forecast accuracy of the HiRLAM NWP, especially in terms of precipitation depths? Why (old) HiRLAM is chosen and not the newer and (probably better and more accurate) HARMONIE forecast? What about using uncertainty techniques, using for example ensembles? There is some discussion in 3.3, but why you chose Hirlam and not Harmonie on beforehand?

   At the beginning of the project, HARMONIE could not be implemented due

to practical limitations. HIRLAM, HARMONIE and Ensemble forecasts were discussed in the project group. It was decided to start with HIRLAM due to the practical limitations. On the one hand, the study of [Hooijman 2014] showed that HARMONIE better performs than HIRLAM especially for the summer period. On the other hand, investigation of all single events during the period February 2016 – January 2017 for our study area Bennekom showed that for only one precipitation event the prediction of HIRLAM really lacked accuracy. Replacement of HARMONIE with HIRLAM and the application of Ensemble forecasts and nowcasting are again on the agenda of the project group to be discussed.

5. Section 3: I presume that the bypass volume is observed, while the prevented volumes are based on simulations?

   The bypass volume is indeed based on measurements, whereas the prevented volumes are based on real-time concurrent calculations of what would happen if discharge was not limited.

6. Lines 155-160: You state that bypass could completely be prevented. What about the possibly increased CSO volume in this case?

   Analysis of the events of this specific period (early spring) shows that the current control is still quite conservative due to the chosen approach of applying discharge limitation after the rainfall event. Actually, applying discharge limitation during the rainfall event would not have led to increased CSO. The precipitation prediction appears accurate enough during the winter to apply discharge limitation based on the cumulative volume prediction without other restrictions.

7. Line 163-164: completely unclear to me what you mean here.

   This sentence will be rewritten. This sentence intended to summarize that the progressive approach is worth considering although this is riskier regarding CSO. By applying only the volume optimisation technique without any restrictions, the accuracy of the precipitation prediction becomes more important.

8. Maybe a little out of scope for this paper, but given the fact that these kind of predictive control systems are not yet common practise, do you have any additional experiences, do's and don'ts which can be shared with us?

   We have additional experiences with predictive control systems especially for the production and distribution of water supply systems, but also for the aeration and return sludge of waste water treatment plants. Indeed, this might be a little out of scope for this paper. Nevertheless, in this project we experienced that predictive control with a robust and straightforward model delivers satisfactory results. Also the ability to easily couple with several real-time data sources is a must. Important is to investigate the implications of the configuration of the distinct sewer areas and pumping stations on the several possibilities for optimisation.