Interactive comment on "Sensitivity of hydrological model to the temporal and spatial resolutions of rainfall input" *by* Yingchun Huang et al.

Anonymous Referee #2

- Summary

Overall, this is a very interesting paper that approaches the issues of the combined impact of temporal and spatial resolutions on the efficiency of a hydrological model, by using both distributed and lumped versions of the same hydrological model, and different densities and time resolutions of precipitation. I find it however unnecessarily complex, the authors should not try to show us everything they have done, they should try to simplify it into a coherent ensemble. I suggest removing the part on the different rainfall densities, and only keeping the densest network (high density daily disaggregated into hourly). This will allow the authors to focus on the spatial and tem-

poral resolution issues. Also, I suggest to widen the scope of the analysis, which only focuses on high flows presently (because of the chosen criterion).

- Literature issues

I would say that you literature review is quite superficial. Of course, given the considerable increase of published literature, it has become obviously impossible to read everything that is published on a given topic. However, when you aim to publish a paper in a given journal. . . you should perhaps try to look at what has been published there in more detail. It is a little annoying that you seem to ignore a paper that is precisely on the topic you address in your paper:

Lobligeois, F., V. Andréassian, C. Perrin, P. Tabary, & C. Loumagne. 2014. When does higher spatial resolution rainfall information improve streamflow simulation? An evaluation on 3620 flood events. Hydrology and Earth System Sciences, 18: 575-594

And this is a pity because when you write that "the increase of spatial resolution improved the performance of the model insubstantially or only marginally for most of the study catchments", this is precisely what Lobligeois et al. find. . .

- Vocabulary issues

I understand that you use "pluviometer" for "recording pluviometer / raingage" and "daily station" for "non-recording pluviometer / raingage". This makes your paper difficult to follow.

- Redaction issues

Your conclusion (especially the last paragraph) is difficult to understand. Try to be more explicit.

- Performance criteria

By using the Nash and Sutcliffe criterion on non-transformed flows (instead of, for example the NS on the square-root or the log or the inverse of flows) you make an explicit

choice to focus on high flows only. Why? Could you extend your study by using another transformation in addition?

- Interception

I would like to know how the interception process is accounted for in your version of HBV? This is important for your comparison, because the simple solutions that work well at the daily time step (i.e. neutralisation of daily rainfall by daily pot. Evaporation) may not work as well at the hourly time step, which may require an interception store.

- Typos

There are a few typos in the paper. Please make a careful check.