Review of **Examining cross-scale influences of forcing resolutions in a hillslope-resolving, integrated hydrologic model** by Aguayo et al.

The study of Aguayo et al. focusses on assessing the influence of different spatial scales of atmospheric forcing and hydrologic modeling. The Weather Research Forecasting (WRF) model is used and interpolated to different spatial scales to force the ParFlow hydrological model, which is also run on different spatial scales. The authors conclude that the spatial distribution of errors in SWE are at high land surface scale driven by the atmospheric resolution, whereas with coarser land surface scales and atmospheric scales these are more driven by the topography. The total soil water storage showed similar errors, but at coarser scales larger errors due to the topography were found in for example riparian areas.

Generally, the study is concise and has a clear goal, with a well-structured lay-out. However, the list of minor issues is still rather long, that mainly relate to sentences that were unclear to me and may need rephrasing. I also have several more major issues, and I hope the authors will improve on these.

First of all, I found the explanation about the interpolation of the different data not very clear (P9.L251-256). I had to read the paragraph a couple of times to understand what you do. It seems to me that this is however a key explanation, as you are comparing spatial scales, and this explanation deserves therefore more space and elaboration. Please take the reader by the hand and try to explain stepwise what you do and elaborate a bit. State clearly what the original resolution is, what the interpolated resolution is and how you then interpolate again to the land surface resolution. It is especially important to emphasize these different steps, because I had initially the impression that you could skip the interpolation of the WRF-model and interpolate directly to the land surface resolution. But, if I understood correctly in the end, this is not the case, correct?

The authors also draw the conclusions that the topography matters in some cases, and in some cases more the atmospheric resolution. And yes, I agree with it that this can be seen qualitatively from the plots, but I believe the authors can easily make these statements much stronger. For example, the elevation data could be correlated with the errors, which allows for statistical proof that topography matters here. This can as well be done for north- or south-facing cells, as well as slopes. The errors can even be correlated with the atmospheric resolution, by calculating for the higher resolution land surface cells the distances to the center of the atmospheric cell.

In addition, I am also wondering if the Parflow model shouldn't be calibrated. As far as I understood, the authors change just the Manning coefficient manually. My first question here is, why the Manning coefficient? Parflow has many more parameters that can and maybe should be adjusted. And why is it done manually and what are the criteria for a good match? I believe it would be good to have a proper calibration, as comparing to a benchmark model that could be, in the most extreme case, be really bad does not make sense, and "errors" that are found could actually be improvements. The authors show some timeseries in Figure 7 of soil moisture, but how well does the model reproduce observed discharge? At least, if the authors stick with the uncalibrated model, please report how the performance of this model is with some metrics, this could give the reader some trust in the model.

The authors also never mention the model periods. Several times the year 2009 comes forward, but is this also the year you use for the model simulations? Generally, running a hydrological model for just one year seems really short to me and the outcomes could strongly depend on the conditions for that specific year (e.g. how many snow days were there that year?), also in combination with the initial conditions. If so, please report this, and add this to the limitations in the discussion. I believe it would

also be good if the authors test the robustness of their findings by changing the initial states of the model.

I believe the manuscript has potential. I hope the authors find my comments useful and I look forward to an improved version of the manuscript.

Minor Comments

P2.L58. Hillslope-scape → hillslope-scale?
P3.L83 deficits. and → remove period
P5.L143 (Kollet and Maxwell, 2008) → Kollet and Maxwell (2008)
P6.L161. Hydrometerological → hydrometeorological
P6.Eq1. Please be consistent, ME is BIAS in the figures.
P7.L204. Neglecting… snow layers). → What do you mean here? Can you clarify?
P7.L204-207. The mass.. as follows. → This sentence seems a bit off, can you clarify and rephrase?
P8.L210. In snowpack → in the snowpack?
P8.L224. Equivalent are located → equivalent that are located?
P8.L225. Was the data just retrieved in 2009 or are the observational data covering the year 2009?
P8.L234. Please add the reference of Van Genuchten (1980)
P8.L234. were retrieved from Leij (1996) and Simmers (2005) while land cover datasets, → were retrieved from Leij (1996) and Simmers (2005), while land cover datasets
P8.L237. by CLM model → by the CLM model
P9.L242. What do you mean with the modeling requirements here?
P9.L258. What do you mean with dampening the domain?
P9.L265. September 2008. → Do the model runs then start in October 2008?
P9.L277. During 2009 → during the 2009
P10.L292-294. In terms...grid resolution. → Please be specific how to see this. Is this the first row in Fig.8?
P10.produce of high → produce high?
P11.300-303. In these cases…lower elevated areas.-→ What do you mean? Please rephrase and clarify.
P11.L305. Tables 2 and 3 → tables 3 and 4?
P11.308. Specially for SWE, when degrading the hydrologic scale. → This doesn't seem to be true in all cases, I see it for A2, but A3H2-A3H3 goes from 42.03 to 41.61 mm, and A4H1-A4H2-A4H3 decrease from 60.64 to 57.26 and 56.53 mm. Seems that degrading the hydrologic scale matters more for a higher resolution forcing.
P11.L317. (11) → (Figure 11)
P12.L333.However, as decreasing –> However, when decreasing?

Fig.7. Is the unit mm/s for rainfall correct?
Fig.8.,9, 10, 11. Please add in the caption what each subfigure is. Why is this year 2014 and not 2009?

Are the data and modeling results publicly available?