This manuscript presents comparisons of the valley circulations from four neighbouring valleys in the Nepal Himalaya, using the Weather Research and Forecasting model. The wind and potential temperature are compared over five days in the dry season, and variations between the valleys are attributed to topographical differences. In addition, the effect of large-scale weather on valley circulations is considered, and the authors find that northerly winds cause greater disruption to the valley circulations than westerly winds. I found the discussion of up-valley wind speed increases due to narrowing of valley topography particularly interesting, along with the hypothesised switch in drivers from the valley volume effect to increases in buoyancy, in valleys with steeper valley floors.

Overall, the manuscript is well presented, and the results are clearly described. The valley circulations are thoroughly analysed, and the authors have carefully considered both along-valley and cross-valley wind changes, as well as the temperature profiles.

Scientific comments

1. My main comment is that I think the manuscript would benefit from a longer model run. I appreciate that the authors are running at high resolution over a relatively large domain, but I think that a model run longer than five days is needed to make climatological conclusions about the differences between the valleys, or the differences with different large-scale weather patterns.
   If it is computationally impractical for the model to be run for a few weeks or for all of December, perhaps case studies could be picked to analyse a few instances of large-scale northerly winds and westerly winds, for example. Alternatively, strong justification is needed as to why these few days are representative of the broader climatology, however please also see point 2 below about spinup time, which may cut the run even shorter.
2. It's not clear whether the model was run with any spinup time. In general, meteorological features take at least a number of hours to spinup in high-resolution regional climate models (e.g. Bonekamp et al., (2018), Jankov et al., (2007), Román-Cascón et al., (2015)), and this period is normally discarded before analysis. If the model was run without spinup, I suggest this may be the cause of the atypical wind speeds in the first twelve to twenty-four hours in figures 5 and 6.
3. For the comparison in figure A1, I would recommend adjusting the model wind height of 10 m to the observation wind height of 5 m, using a logarithmic profile (see Whiteman (2000)).
4. Lines 272-280 and onwards: as discussed in point 1, comments like 'typically up-valley winds have speeds of….' Or discussion of the variation in timings of the diurnal cycle require a longer time period to assess, especially where only two or three days from the run is being discussed.
5. Figure 5: what are the initial very strong negative wind velocities I the first two days at the top of the Gaurishankar and Makalu valleys? If they are too strong to display easily on the graphs, perhaps mention the minimum value in the figure caption? I'd also recommend adjusting the scale in Gaurishankar to show the top peak.
6. Line 297-302: is the domain big enough to check whether there is a local strong temperature difference between the valley and the plain? Or is this evident from figure 9?
7. If there's room, or perhaps as an appendix, it would be interesting to see some vertical cross sections across the valley, e.g. to illustrate the hypothesised single circulation cell in Kanchanjuga mentioned on line 327.

Typographical comments

8. Table 1 and Figure A1: recommend keeping the name for the pyramid station the same.
9. Figure 1: include the coloured crosses in the figure caption
10. Figure 4: wind vectors in valleys are difficult to see. I recommend using the same colour scheme as in figure 3, and making the topography lines much thinner or sparser.
11. Section 4.1 it would be worth adding more of the along-valley grid point numbers into the text, e.g. line 281 'At the valley entrance…' would be easier to understand as 'at the valley entrance (155 in fig 5 c)…' Or mention the line colour as you have done at other points.
12. Figures 5 and 6: 'wind speed' should be 'wind velocity' as speed cannot be negative.
13. Figure A1: adjust scales to the full model output can be seen (unless this is due to the model still stabilising during a spin-up period, in which case discard this data). Y-axis needs a label (local time or UTC?).

References

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