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The Cryosphere Discussions

Interactive comment on "Snowpack modelling in the Pyrenees driven by kilometric resolution meteorological forecasts" *by* Louis Quéno et al.

R. L. H. Essery (Referee)

richard.essery@ed.ac.uk

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Queno et al. present an interesting evaluation of high-resolution snowpack simulations in a mountainous region with a reasonably high density of observations. There is quite a lot of overlap in descriptions of the snow model, NWP model and analysis system with a paper by the same authors cited herein (Vionnet et al. 2015b), which addresses some similar issues in a different region. Some repetition will be inevitable to allow the papers to be read independently, but if both are to be published it is the differences between them that will be most interesting. This paper also has a lot of figures, sometimes with quite limited discussion; I think that some consideration could be given to the balance between figures and text.

line 35. Redistribution of snow by avalanches would also be worth mentioning here.

Figure 1. To divide the Pyrenees into western, central and eastern regions, it might seem more obvious to have Haute-Bigorre in the central region and Haute-Ariege and Andorra in the eastern region. Is the division trying to distinguish north-south gradients also? The acronym "SD" is used in the Figure 1 caption but not explained until line 194

216. RMSE is barely mentioned hereafter. Knowing two out of bias, RMSE and STDE, the other one can be determined; what is the point of considering all three?

Rainbow colour schemes, as used in Figures 3 and 4, are deprecated.

Figure 5. The cross section passes close to 2 or 3 precipitation measurement stations on the French side. Could these measurements be shown?

Figure 7. I am not sure that this figure adds anything that is not already clear from Figure 6 and the text in lines 347 to 361.

350. It is not clear what "mechanically counterbalanced" means here.

368-376. There is little interpretation of ETS beyond this paragraph. Are Figure 9 and the associated description of ETS essential to the paper?

403. Contrasting accumulation error to precipitation error is not straightforward because it also involves modelled snow density (discussed later).

420. Crocus has its own index of snow drift. Why is it not used? What difference would it make?

Figure 12 clearly shows that the neglect of wind redistribution of snow in kilometre-scale simulations accounts for some errors in comparison with point-scale measurements, but does this really matter? Apart from snow that sublimates in transit (which Crocus can estimate), the snow removed by wind will just end up in a drift somewhere else, likely within the same model grid cell. Snow redistribution is of course enormously important for loading on avalanche slopes, but that isn't being discussed here.

The English is always good enough to be understood but will require editing to be

perfect. There are several constructions of the type “allows to capture” and “allows to avoid” often used by French authors writing in English; “allows capturing” and “allows avoidance of” or just “captures” and “avoids” would be better English. “deplored” (212) is a rather strong term; “adequation” (532) and “prescind” (581) are English words but very uncommon ones – there will be better choices.

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