Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC1
https://doi.org/10.5194/gmd-2021-60-RC1, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on gmd-2021-60

Richard L.H. Essery (Referee)

Referee comment on "TopoCLIM: rapid topography-based downscaling of regional climate model output in complex terrain v1.1" by Joel Fiddes et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-60-RC1, 2021

This is a useful and well-written paper. The text is rather compressed and benefits from being read alongside Fiddes and Gruber (2012 and 2014), but there would be a lot of repetition otherwise. I have minor comments.

5

GMD guidance is that citations should not be included in the abstract unless urgently required.

83

It is not clear at this point what a “subgrid scheme” is.

84

It is not clear what "repeat (ability to be experimental)" means.

100

31 September should always be missing.

136

It is not observations that are temporally downscaled.

145

FSM is a multi-physics ensemble model, but Figure 6 suggests that a single configuration is run. Which one?

150

It would not take much space to state the predictors in TopoSUB here.

186

ERA5 resolution is stated as 30 km here and 25 km later. It is stored on a 0.25 degree grid (and 37 vertical levels, not 137).

225

"residual error"

273

It would be better to mention that avalanching is accounted for when stating that wind transport is not in 3.4.

276

"upper limit of seasonal snow limit" – lose a limit

334

With downscaled reanalyses used as the reference for bias correction, how can the scheme be used to bias correct historical reanalysis?

Figure 1

Should there also be an arrow from the downscaled reanalysis to the hourly disaggregation?

Figure 3

Use superscripts in units.

Figure 6

The time axis is not day of calendar year. Is it day of water year?

Why is there a downward spike in snow height around day 115?

Figure 7

There is no need to extend the scale to negative snow depths.

Table 1

“CF long name”