

Interactive comment on “The first Met Office Unified Model/JULES Regional Atmosphere and Land configuration, RAL1” by Mike Bush et al.

Anonymous Referee #1

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General Comments

This paper provides a good overview of the science configurations for the regional (kilometre scale) model based on the Met Office Unified Model (UM) and JULES land surface model. With the range of locations and institutions where the model is used it is important to have a well-documented science configuration to serve as a baseline for future model development and evaluation. I found the inclusion of the evaluation over different geographical regions and weather regimes particularly interesting and useful.

Specific comments

It would be good to specify in section 1 that the Met Office you're referring to is the UK Met Office.

C1

In section 2.6 where you discussed the Smith cloud scheme you give $RH_t = (q_v + q_{cl}) / q_{sat}$. Could you define q_v , q_{cl} and q_{sat} to make it unambiguous? Also, RH_c is not defined, is it RH_{crit} ?

The tickets discussed in Section 3 aren't sequential. It is understood that only the most important tickets are discussed and arranged per topic, but it would be useful to have a complete list of the tickets that documents all the changes to the model.

In section 3.5 "CCI" and "IGBP" is not defined. I like the description of the physical effects of the changes in the last paragraph of section 3.5 as it makes it more tangible.

The second paragraph in section 4 is a bit ambiguous. The first sentence on p15 talks about "several aspects" but then name two. Maybe the use of "such as" instead of "namely" would be better in that case? And in the following sentence about the differences in the representation of turbulence between RAL1-M and RAL1-T it would be good to specifically note that the values given there is for RA1L-T, or state the opposing values for RAL1-M as well.

GPM in section 4 and IMERG in section 5 is not defined in the text.

When you explain the "scorecard" in section 5.1, you should also indicate which direction of arrows indicate improvement/decline. Something along the lines of "triangles pointing upward (green) are indicating that model A is better than B and downward "blue" triangles indicating model B is better"

The legends in Figure 13 are not legible.

In section 5.5 it is stated that a total of 130 TC forecasts were produced, and only storm cases appearing in both RA1L-M and RAL1-T were kept. However, in Figure 19 the number of cases are up to 140 with a 0-hour lead time. Does that mean that some simulations had more than one TC at the same time? And is the mean bias for model-obs? Also, it would have been interesting to know how often storm cases appeared only in one of the experiments. Which configuration was more likely to form storms?

C2

Is there a reference for the Random Parameter scheme mentioned in section 5.6?

Technical corrections

P3 line 2: "added to the RAL0 base to define RAL1-M" P7 line15: Maybe start "This represents" as a new sentence P9 line 5: "Ri is less"? P10 line 9: Remove "Therefore" P14 line 29: There is an extra "reason" P16 line 18: "most" should be "must" P17 line 25: 3-hour or 3-hourly? P17 line 32: "can lead to difficult to interpret verification scores" rather "can lead to verification scores that are difficult to interpret". P20 line 3: "reduces significantly the ability" change to "significantly reduces the ability" P23 line 5: "evaluate its performance"

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