

Interactive comment on “The BRIDGE HadCM3 family of climate models: HadCM3@Bristol v1.0” by Paul J. Valdes et al.

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1 Overall Thoughts

The version of HadCM3 used regularly within the group at Bristol has clearly branched from the Met. Office's original version. I think that this documentation (Valdes 2017) of it is a worthwhile contribution to GMD. I appreciate the provision of the source modifications and a list of the simulations. I would hope that in the final version there could be a link to the simulation output on the BRIDGE webpage. I had a couple queries, but suspect those could be addressed with revised sentences. I also found the figures and tables a little too small to be seen well on a printed version.

C1

2 Queries

- Table 1 implies that two RHCrit values are due to level dependence rather than land/sea.
- Table 2 shows that MOSES2.2 (and hence TRIFFID) either is or cannot be used with the atmosphere only model. I wasn't sure why.
- What is the 3A spectral scheme (p7, L19)
- You state the soil layer thicknesses are a function of soil heat capacity and conductivity on p9, yet provide their depths on the p12. Are they constant across the globe?
- Are the surface types, LAI etc prescribed for each gridpoint (so 2D) or just each PFT.
- You state moving from MOSES2.1 to MOSES2.2 have "particularly big" effect. Can you either quantify or refer to later section.
- In section 4.1.3 and the Table 2, you state that there is a ratio of solar radiation components that is 0. Is this correct, and what does it mean physically.
- Section 4.1.5 seems redundant as only the sea-ice diffusivity in Table 1 hasn't been explicitly mentioned.
- What is the updating frequency of HadRM's lateral boundary conditions - you state 6 hours on p17 and 3-4 hours on p18.
- Please provide a little more information about the HadRM3 vs HadAM3 diffusion - there are 2 parameters in Table 1 and isn't clear to me what they mean.
- Some Figures (e.g. Fig2) appear to use different acronyms to the text.

C2

- The discussion on p24 about leeward precipitation appears to be in the opposite sense as shown in figure 4.
- Section 5.1.3 does not discuss TOA flux - rather heat transports.
- Fig 5 contains no explanation of the gray lines.
- p27, l7. It isn't clear to me what is meant by "larger annual variation" - within year or between years.
- The references to Fig 9e/f need correcting
- The discussion in Section 5.3.2 doesn't necessarily recognise the big peak in the MODIS data at 25oN - rather it considers the feature symmetric around the equator.

3 Sentence Suggestions

- p2, l2. I wonder if the final sentence of the abstract should use "predominantly" rather than "particularly".
- p2, l9. Flux corrections are not often discussed anymore, so I think you need to explain a little more
- p7, l3. "which determine" occurs twice in quick succession.
- p7, l13. Be explicit that this relates to RHCrit in Table 1.
- p7, l26. you may want to consider giving the origin of some of the default fields.
- p8, l14-15. This feels like duplication of prior sentence.

C3

- p8, l24. "direct" -> "dynamic"?
- p9, l10. The end of this sentence reads awkwardly.
- p10, l6. Reference and explanation of the Visbeck scheme?
- p10, l11. "numerous" -> "multiple" and incorporate ref to supplementary info.
- p10, l19. wrong section reference
- p10, l24. This sentence has too many clauses. Split into two.
- p11, l21-24. This reads awkwardly
- p13, l16. Could this be related to section 3.1.2?
- p19, l16. Rename section to "surface temperature patterns"?
- p19, l32 " of 2" -> ", by 2"
- Fig2 caption. section symbol § in a variable name
- p25, l20. Spell FAMOUS correctly
- p26, l2. You may want to add that this is despite the OHT biases.
- p29, l15. remove paragraph break
- p30, l7. I was unsure what "this version" of HadCM3 was from previous sentence. Refer to figure panel
- p30, l11. Why only this resolution?
- p31, l10-12. Can you refer back to the definition of these different terms?

C4

- p31, l24 "and which" -> ". We additionally show that"

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