

Interactive comment on “The Met Office Global Coupled model 2.0 (GC2) configuration” by K. D. Williams et al.

K. D. Williams et al.

keith.williams@metoffice.gov.uk

Received and published: 21 April 2015

1 Reply to general comments

We thank the referee for his/her review and positive comments.

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2 Responses to Minor concerns

2.1 Comment #1

We fully accept the referee's point that the full set of papers is needed to have a complete description of GC2 and it is undesirable to have some available without others. We had intended for all of the papers to be submitted around the same time, however submission of the GA6 description paper (Walters et. al.) has been delayed due to unexpected operational issues taking the time of key authors of that paper. Nevertheless we expect it to be submitted within the next couple of months. All of the other papers (including the GSI6 paper by Rae et. al.) have now been submitted or accepted in GMD (references have been updated). We intend to form a special issue of GMD to collect together the 4 papers forming the description of GC2.

2.2 Comment #2

At the Met Office we make a distinction between the physical model which is used across all timescales, and an earth system model (ESM) which uses one of our physical models but contains additional processes (interactive vegetation, carbon cycle, chemistry, etc.) which only become essential for climate change projections on centennial and longer timescales. Developing a full ESM model takes a considerable amount of human and computational resource and most centres who only develop a climate model will build a physical and earth system model around once every 6 years (generally to feed into the CMIP/IPCC process). At the Met Office, we require updating of the physical more often for systems making forecasts on shorter timescales (seasonal and NWP) hence our physical model is developed on an annual timescale. Whilst it might be desirable to build a full ESM annually, the resource required make this impossible. We have added: *“Due to the additional resource required to build an earth system*

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model...” before the sentence starting: “*The intention...*” on p523 line27 in order to make our reasoning clearer.

2.3 Comment #3

As the referee suggests, the following has been added after p528 line9: “*On 36 nodes of the Met Office IBM Power7 machine, HadGEM3-GC2 at N216-ORCA025 achieves 1.87 simulated years per wall clock day. Of the 36 nodes, 17 (544 processors) are used by the atmosphere, 18.75 (600 processors) by the ocean and the remaining 8 processors by OASIS.*”. Only N216 is given since this is the resolution presented in the paper, is what is being used operationally for seasonal forecasts and will be the resolution used for most of the climate work to be conducted with GC2.

2.4 Comment #4

As the referee suggests, the area weighted RMS differences have been added to Figures 6 & 8. The following has been added to p531 line 15: “*Overall the area-weighted root mean square (RMS) error for the field is reduced from 2.02 to 1.55.*” and the following to p532 line 18: “*The RMS error is slightly increased (from 1.68 to 1.76), primarily due to an increased mean bias over the tropical west Pacific and east Indian Ocean.*”

Interactive comment on Geosci. Model Dev. Discuss., 8, 521, 2015.