

Interactive comment on “The Met Office Unified Model Global Atmosphere 6.0/6.1 and JULES Global Land 6.0/6.1 configurations” by David Walters et al.

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1 Reply to specific comments

Many thanks for your support for this paper and your helpful comments on the details of some of its content. We address each of these in turn below.

1.1 Soil properties

“Are the GA6 soil properties only using HWSD or are other datasets also used?”

C1

Yes, you are correct that these are really a blend of HWSD and the other datasets you have referenced. The details of this blending is not published, but we have updated table 1 to reflect the source data used.

1.2 Canopy height

“Is canopy height based on MODIS data as suggested in Table 1 or is it based on IGBP landcover?”

Yes, again, you are correct. The canopy height is currently held in the same file as the leaf area index, which was calculated from MODIS data, but it is actually calculated from IGBP data. Again, we have clarified this in an updated version of table 1.

1.3 Urban scheme

“For the “Urban Canopy” perhaps it would be worth also referencing Best et al (2006) which shows some limitations with the simple scheme. As well as mentioning the MORUSES scheme which is used in the convective scale versions of the Unified Model (Porson et al, 2010).”

The aim of this paper is not to document the available options within the UM or JULES, but to specifically describe how these are used in our Global Atmosphere and Global Land configurations. To date, the improvement of the urban scheme has focussed on non-GA/GL convection permitting configurations of UM/JULES, so we believe that it will be best to leave the discussion of this issue to the upcoming documentation of those configurations.

C2

1.4 Updated version of table 1

To address comments 1 and 2, we propose including the following updated version of table 1 in the final manuscript.

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C3

Ancillary field	Source data	Notes
Land mask/fraction	System dependent	
Mean/sub-grid orography	GLOBE 30''; Hastings et al. (1999)	Fields filtered before use
Land usage	IGBP; Global Soil Data Task (2000)	Mapped to 9 tile types
Soil properties	HWSD; Nachtergaele et al. (2008) STATSGO; Miller and White (1998) ISRIC-WISE; Batjes (2009)	Three datasets blended via optim
Leaf area index	MODIS collection 5	4 km data (Samanta et al., 2012)
Plant canopy height	IGBP; Global Soil Data Task (2000)	Derived from land usage and m
Bare soil albedo	MODIS; Houldcroft et al. (2008)	
Snow free surface albedo	GlobAlbedo; Muller et al. (2012)	Spatially complete white sky va
TOPMODEL topographic index	Verdin and Jensen (1996)	
SST/sea ice	System/experiment dependent	
Ozone	SPARC-II; Cionni et al. (2011)	Zonal mean field used%
Aerosol emissions/fields:		Only required for prognostic ae
Main primary emissions	CMIP5; Lamarque et al. (2010)	Includes SO ₂ , DMS, soot, OCF
Volcanic SO ₂ emissions	Andres and Kasgnoc (1998)	
Sulphur-cycle offline oxidants	STOCHEM* Derwent et al. (2003)	
Ocean DMS concentrations	Kettle et al. (1999)	
Biogenic aerosol ancillary	STOCHEM*; Derwent et al. (2003)	
CLASSIC aerosol climatologies	System/experiment dependent	Used when prognostic fields not
TRIP river paths	1 data from Oki and Sud (1998)	Adjusted at coastlines to ensure

Table 1. Source datasets used to create standard ancillary files used in GA6.0/GL6.0.

*STOCHEM denotes that these fields are derived from runs of the STOCHEM chemistry model.

%This is expanded to a "zonally symmetric" 3D field in limited area simulations on a rotated pole grid.

C4