JULES integrated impacts configuration

Annual JULES Meeting – Met Office – 26th June 2017

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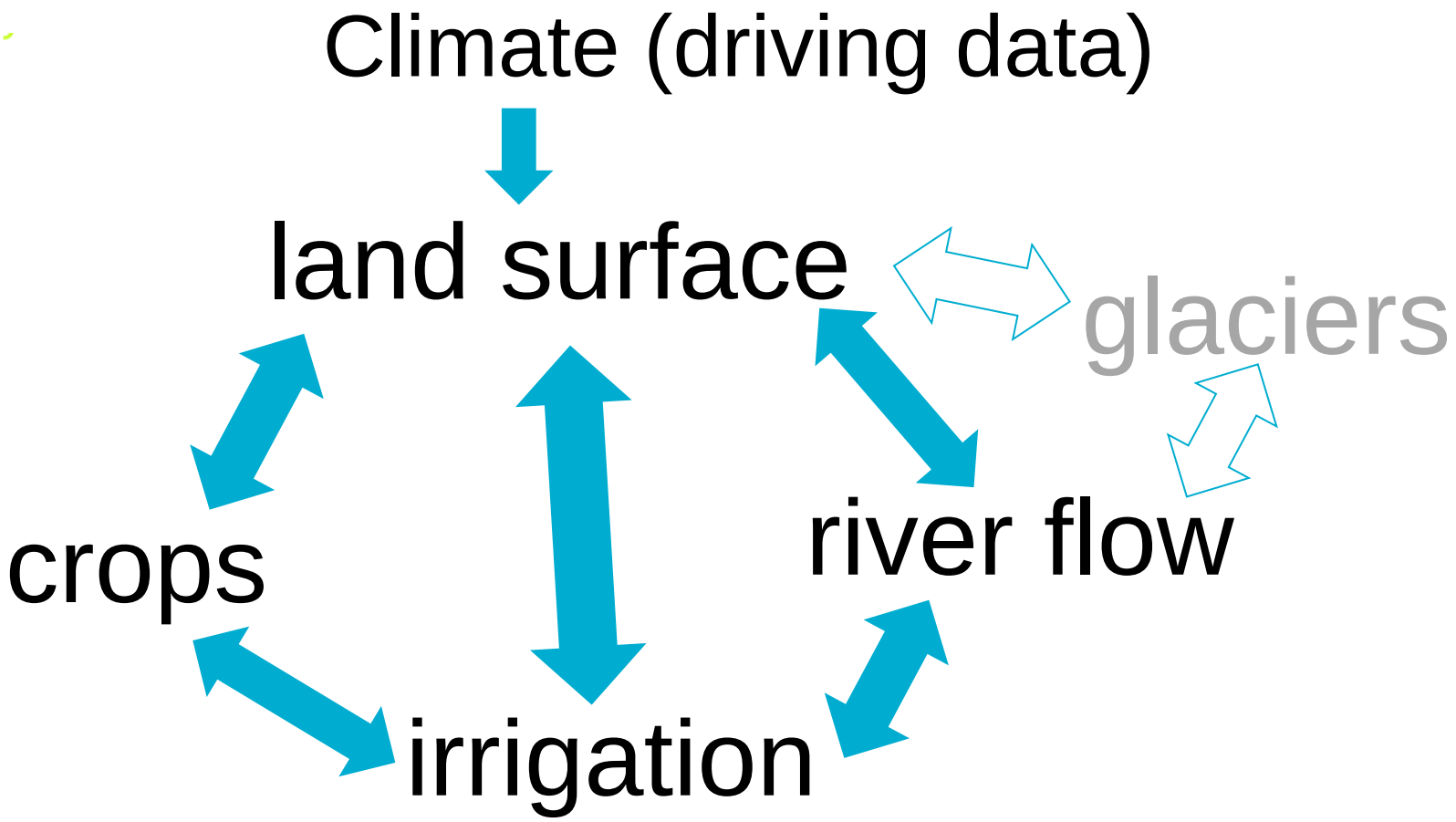
Integrated impacts concept



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Preliminary setup

- Version 4.7
- 0.5 degree, global
- 1980 to 2010, 3-hourly (WFDEI)
- Tile fractions from UM
- Crop fractions from Monfreda: Wheat, maize, rice, soy.
- prescribed sowing dates (Sacks)
- l_triffid = F, l_phenol = F
- Soil ancillary from CAP, l_vg_soil = F
- Vegetation parameters from TRENDY
- irr_crop =0, ‘real’ irrigation fractions
- TRIP rivers
- Spin-up: 10 x 10 yr

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Plans for this configuration

1. Validate for present day (1980 – 2010) with observations as driving data (WFDEI)

2. Drive with HELIX HadGEM3 control run (N216 AMIP run with ERA-Interim SSTs 1980 - 2010)

3. Run with HELIX HadGEM3 future runs at specific warming levels (1.5, 2, 4 deg C...) : bias-corrected daily, so using disaggregator.

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Validation datasets

- ET: Jung et al
- Runoff: Fekete
- NPP: MODIS
- GPP: MODIS?
- river flow: Dai
- irrigation: FAOstat
- crop yield: FAO?

- Validation metrics: as ISIMIP protocol?

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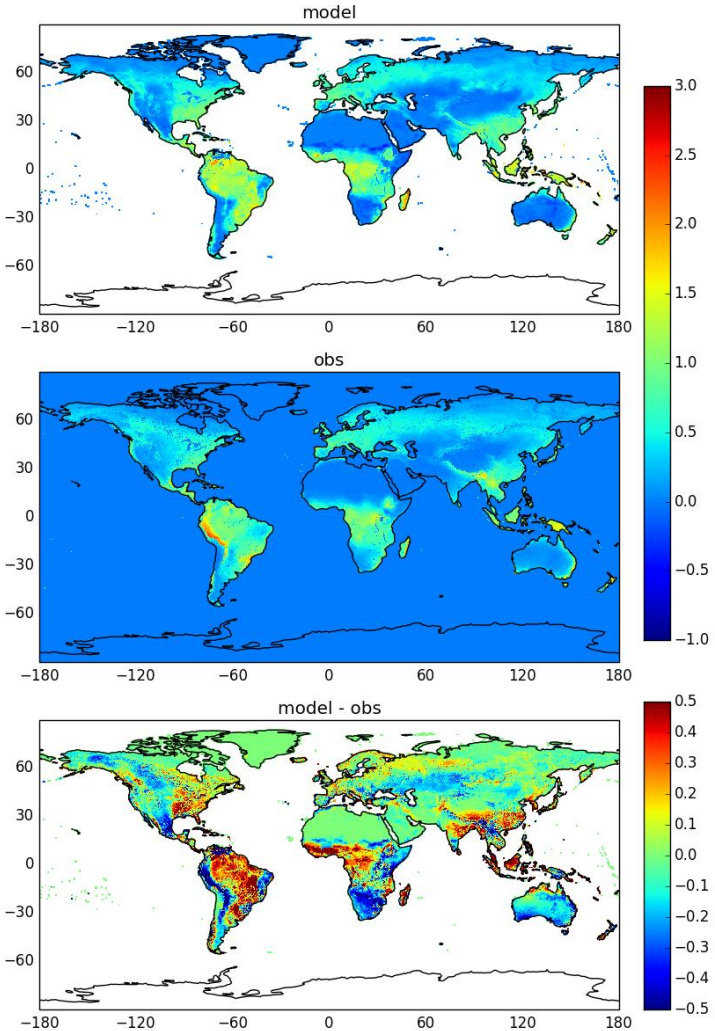
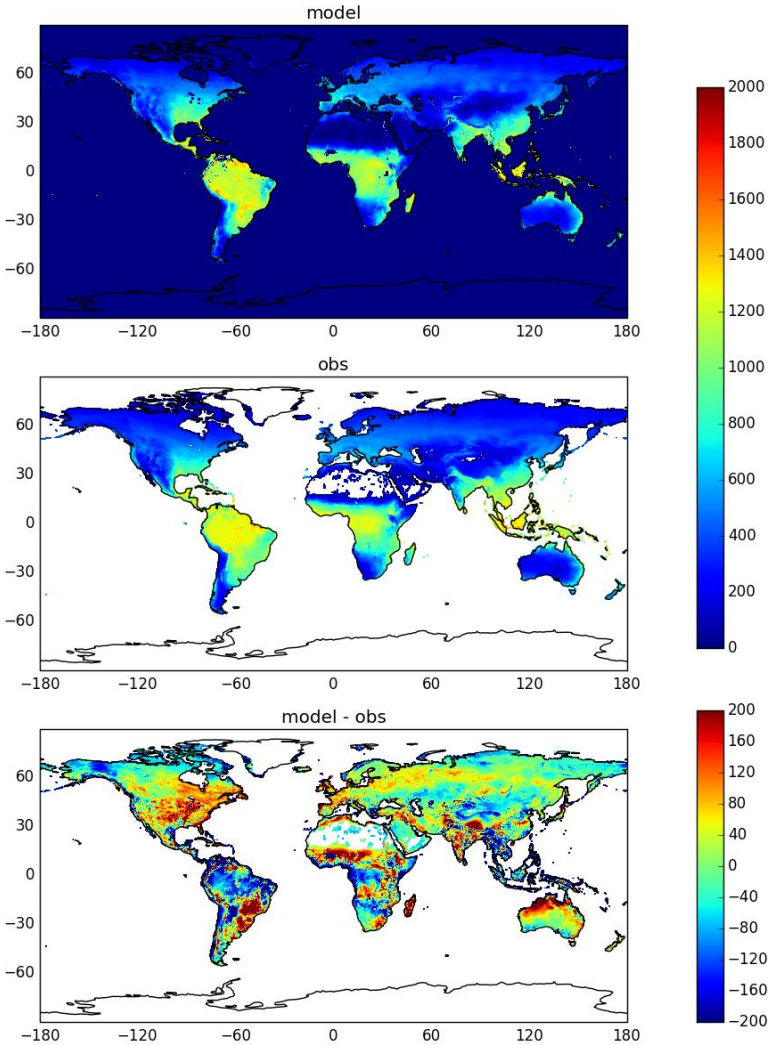
Early model-obs comparisons
(using ‘dummy’ thermal time ancillary)

NPP
$kgm^{-2}yr^{-1}$



ET
mm/yr



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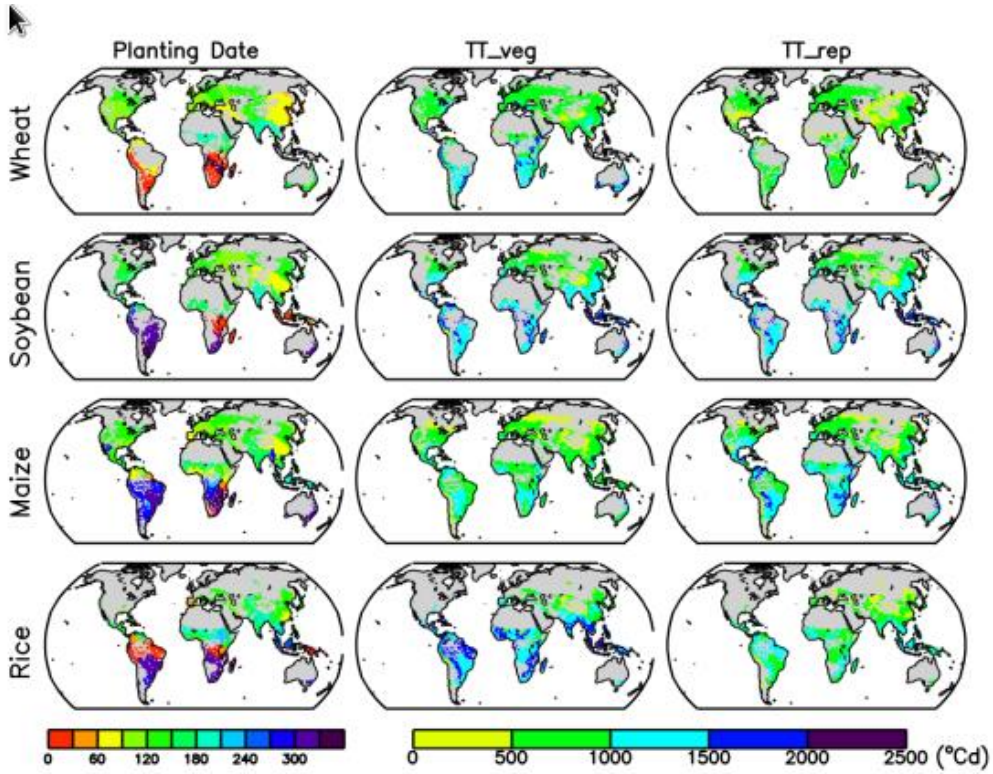
Challenges(!)

1. Thermal time ancillary for crops



TT_veg = thermal time between emergence and flowering

TT_rep = thermal time between flowering and harvest

"x = (TTveg +TTrep) = 0.5, 0.45, 0.6, 0.6 for soybean, maize, wheat, and rice, respectively"

Osborne *et al*. (2015)

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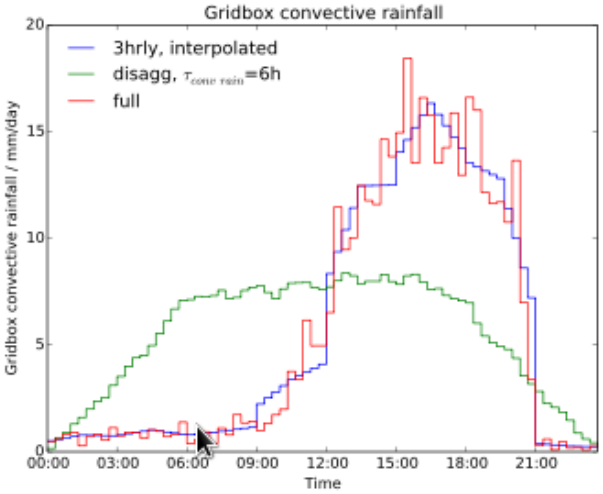
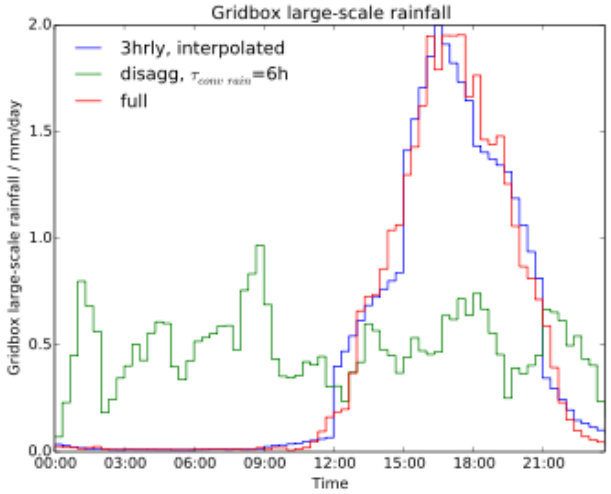
2. Disaggregation





Williams & Clark (2014)

3. l_vg_soil in the HG3 runs

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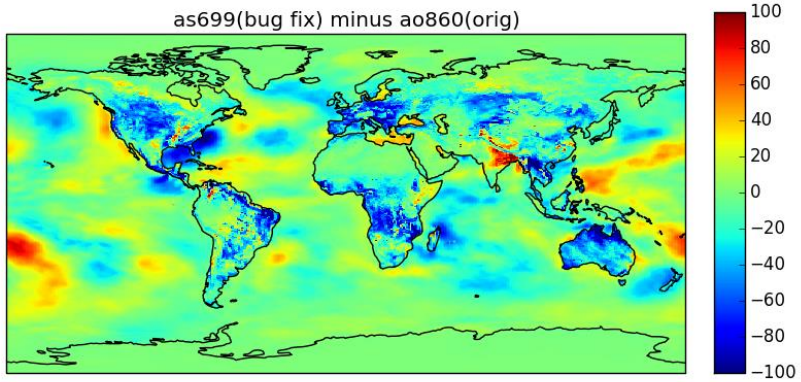
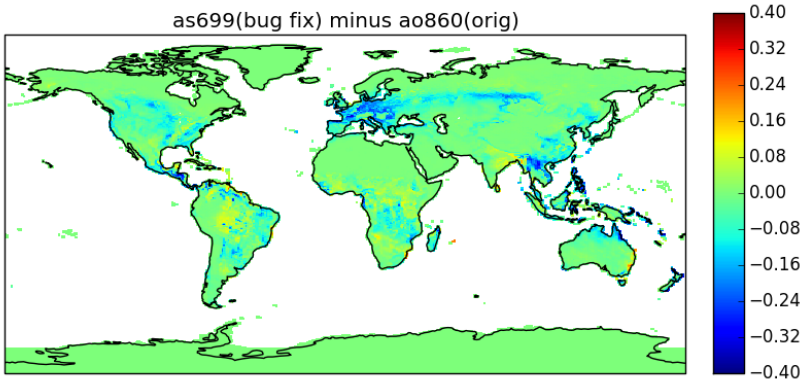
Soils in HadGEM3

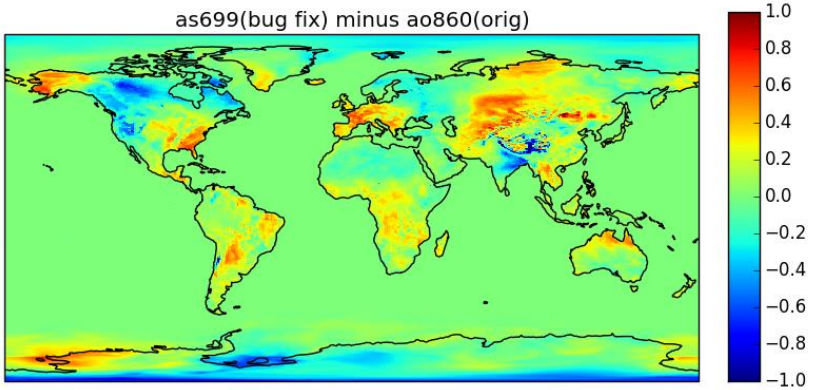
ET
mm/yr



NPP
$kgm^{-2}yr^{-1}$



Surface
temp
K



l_vg_soil=F - l_vg_soil=T

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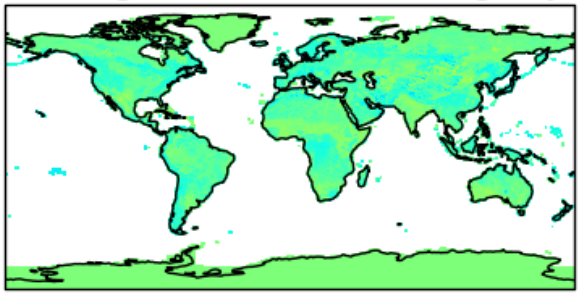
Soil moisture

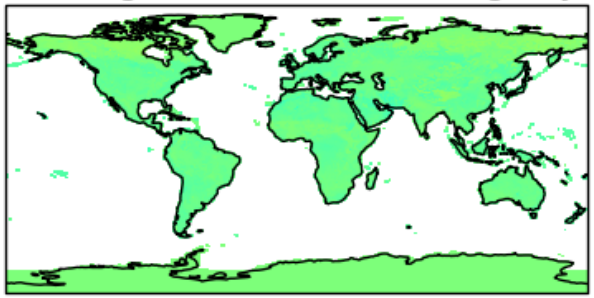
kgm^{-2}

as699(bug fix) minus ao860(orig) layer1

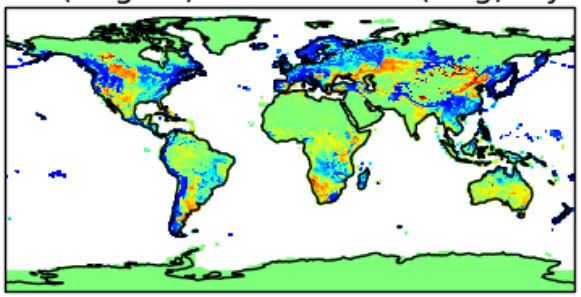
as699(bug fix) minus ao860(orig) layer3

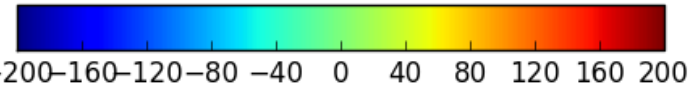


as699(bug fix) minus ao860(orig) layer2



as699(bug fix) minus ao860(orig) layer4





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