



**Met Office**  
Hadley Centre

# JULES-ES Configuration

## Outline

- What is the JULES-ES configuration
- Vegetation Distribution
- Carbon Fluxes

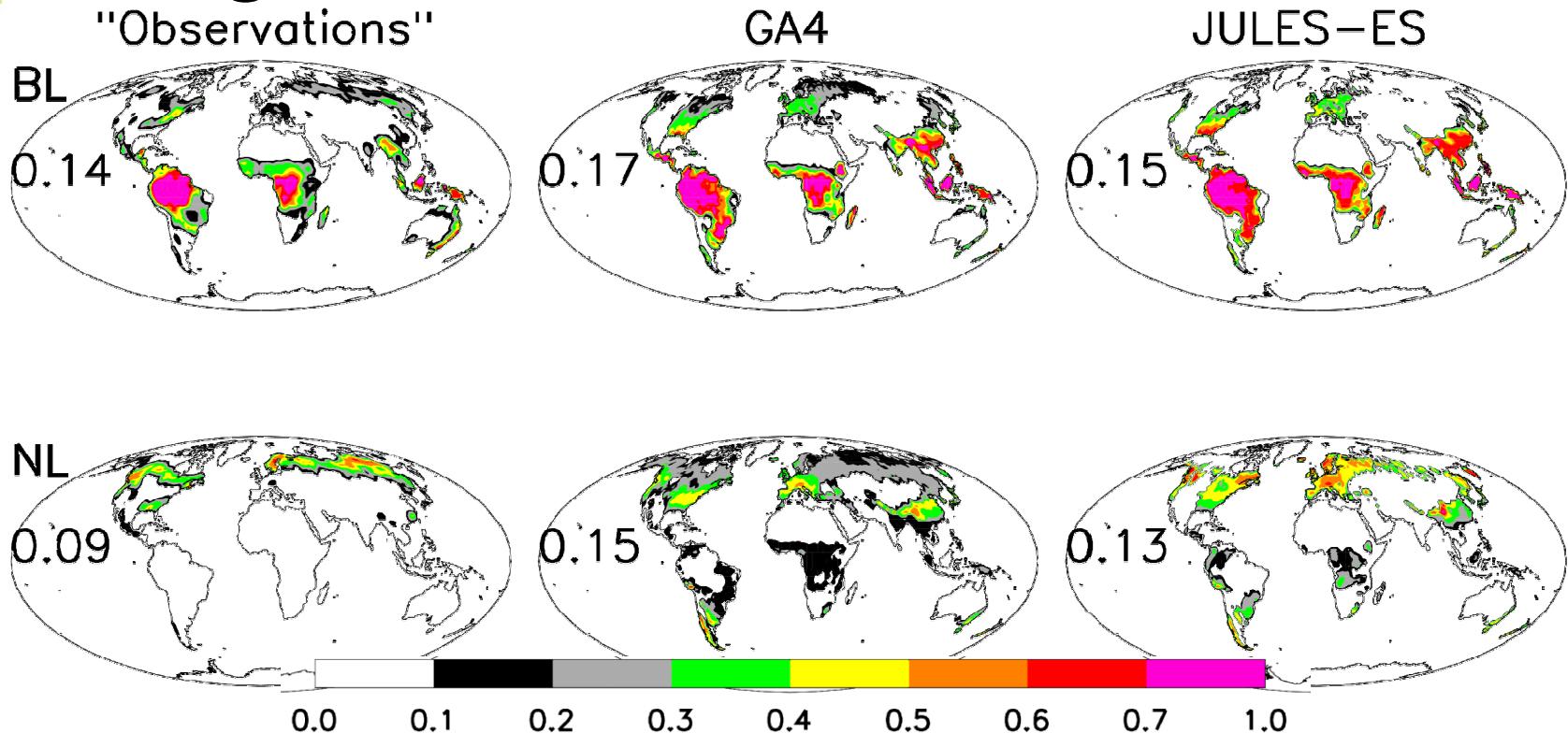
# Purpose of JULES-ES

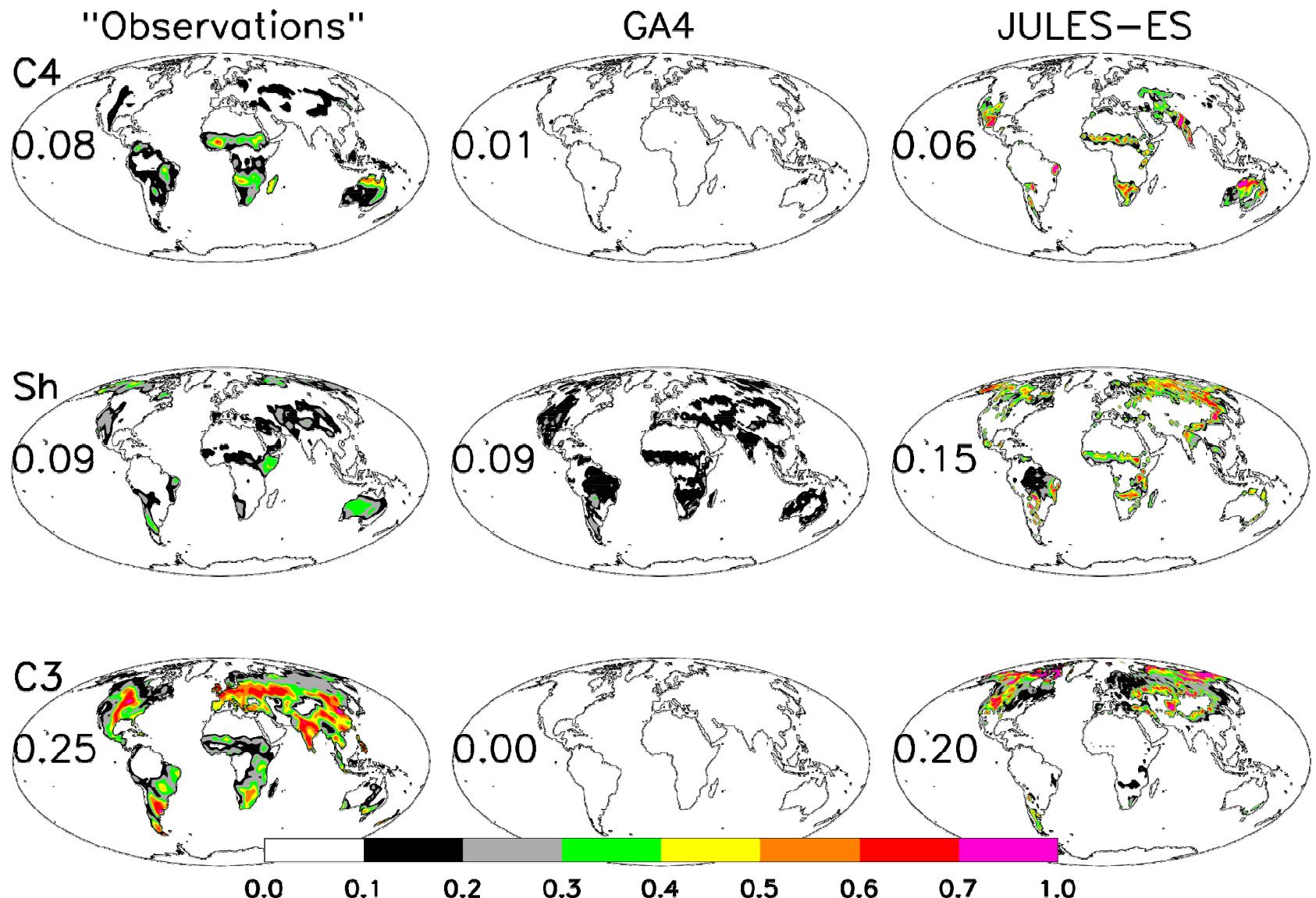
- Carbon cycle and vegetation dynamics
- Develop improvements to TROLL
- In future will become UK-ESM1 setup

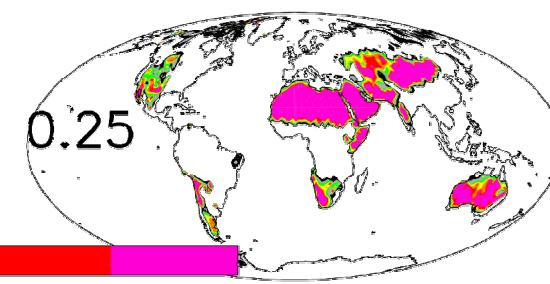
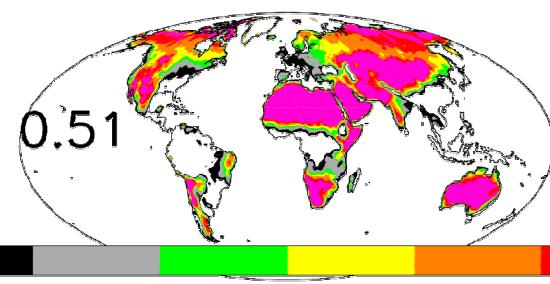
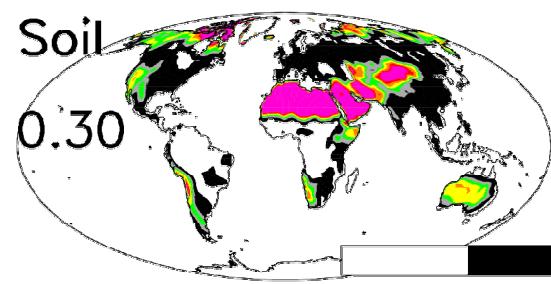
# Setup compared to GA4

- ISI-MIP parameters
  - Grasses are better suited to low temperatures \*
  - Broad leaf tree disturbance rate increased
  - Needle leaf and shrub disturbance rate decreased
- Settings
  - can\_rad\_mod 1
  - Johansen soil thermal conductivity \*
  - Up to 3 layers of snow \*
- And several other changes...

# Vegetation Distribution

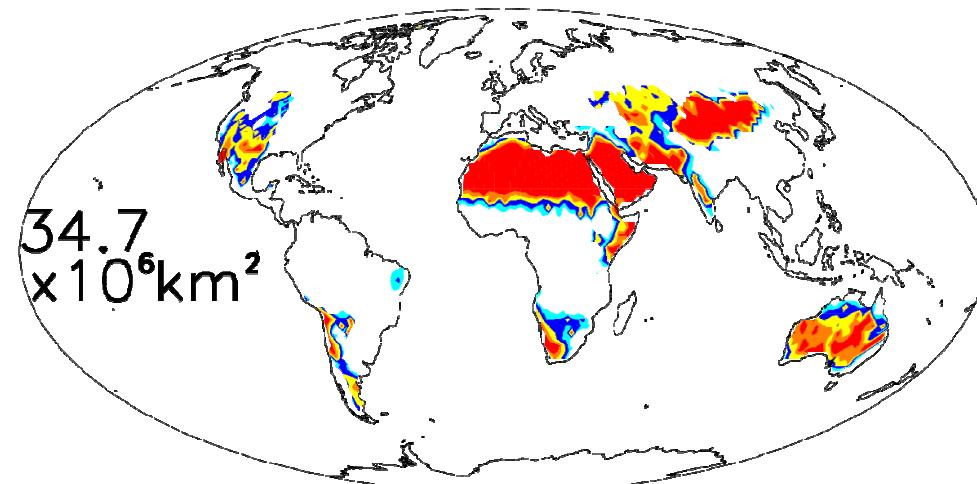
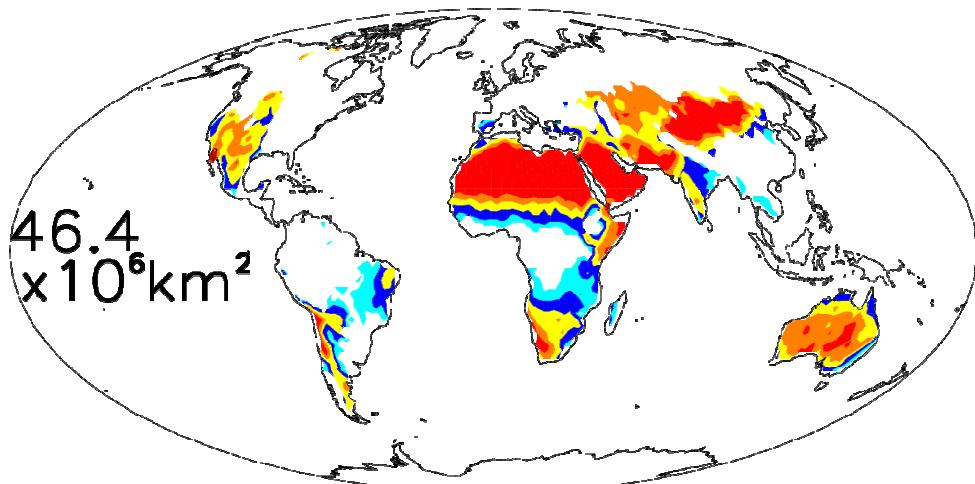






GA4

JULES-ES

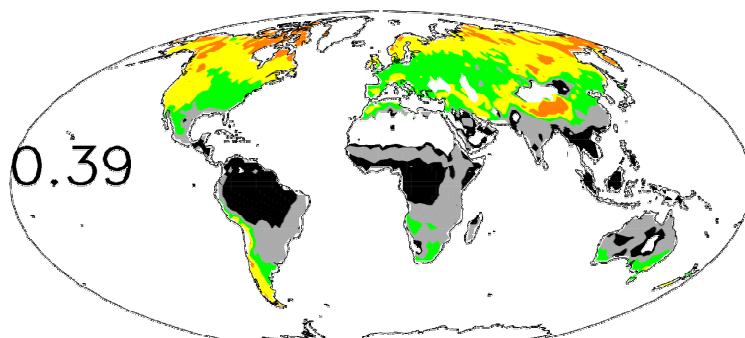


0.00 0.10 0.25 0.50 0.75 0.90 1.00

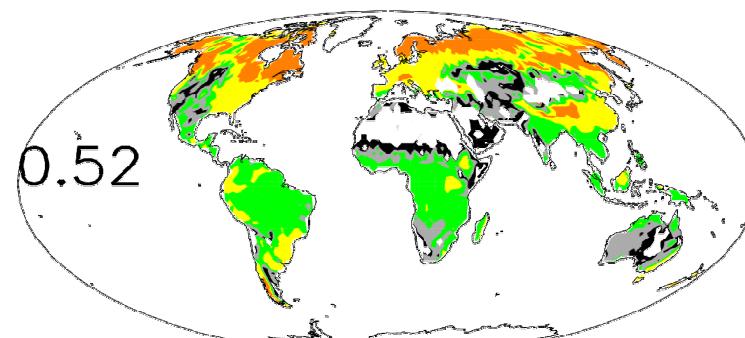
| [Gt/yr] | HadGEM2-ES | GA4  | JULES-ES | Jung et al.(2011) |
|---------|------------|------|----------|-------------------|
| NPP     | 64.9       | 39.1 | 51.2     |                   |
| GPP     | 126.1      | 99.9 | 95.7     | 119.4             |

NPP/GPP

GA4



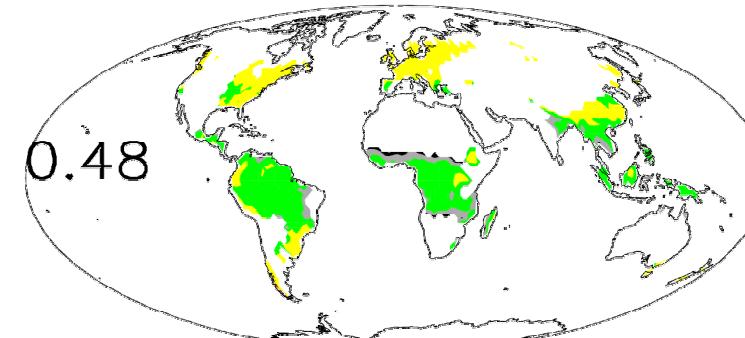
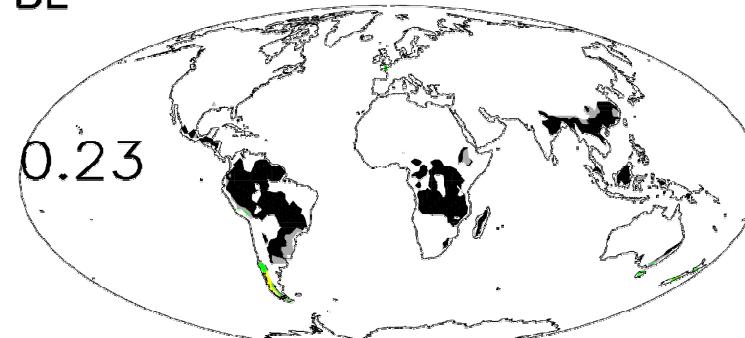
JULES-ES



GA4

JULES-ES

BL

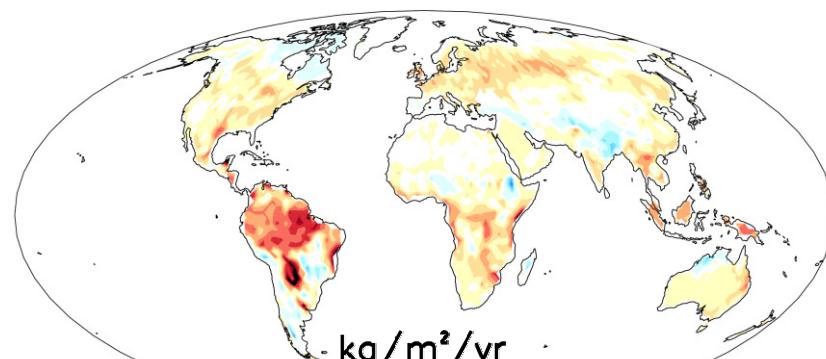
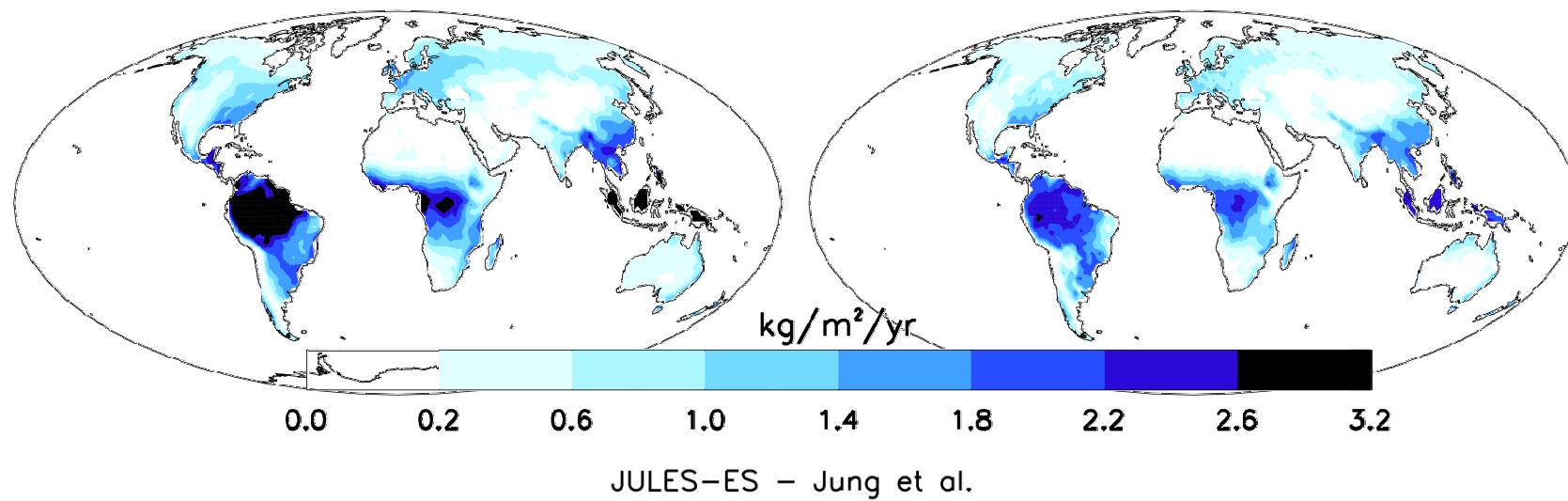


0.0 0.2 0.3 0.4 0.5 0.6 0.7 0.8 1.0

| [Gt/yr]     | HadGEM2-ES | GA4   | JULES-ES | Jung et al.(2011) |
|-------------|------------|-------|----------|-------------------|
| GPP         | 126.1      | 99.9  | 95.7     | 119.4             |
| Respiration | 126.0      | 101.7 | 96.7     | 96.4              |

Jung et al.

JULES-ES

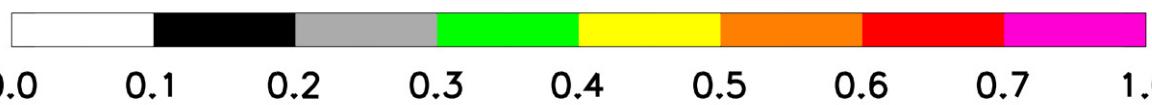




| [Gt]        | HadGEM2-ES | GA4  | JULES-ES | HWSD |
|-------------|------------|------|----------|------|
| veg carbon  | 483        | 617  | 884      |      |
| soil carbon | 1074       | 1236 | 1292     | 1260 |

# Agriculture

"Observations"

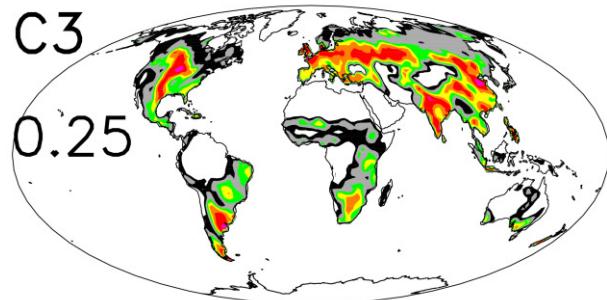


JULES-ES

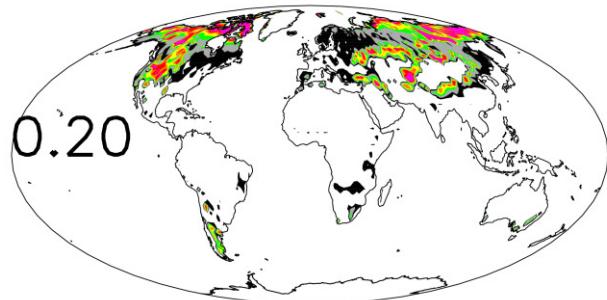
JULES-ES with agric.

C3

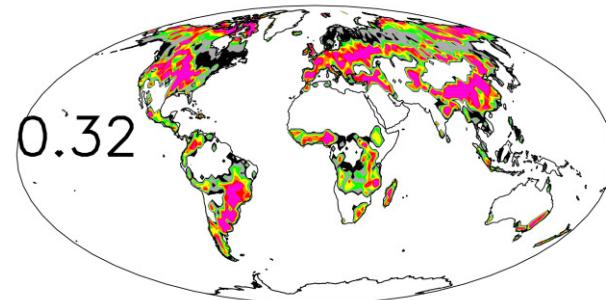
0.25



0.20



0.32



# Future Plans

- can\_rad\_mod 5
  - Agriculture as standard?
  - Varying CO<sub>2</sub>
  - Set targets
- 
- Landuse change in JULES
  - Nitrogen
  - New PFTs
  - Dust emissions
  - Soil carbon equilibrium and spin-up option



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An abstract graphic element at the top of the slide features several thick, curved bands in a bright lime green color against a black background. These bands curve from the left side towards the right, creating a sense of motion and depth.

# Questions and answers

# Carbon Fluxes

|                    | HadGEM2-ES | GA4   | JULES-ES | “Observations”           |
|--------------------|------------|-------|----------|--------------------------|
| Npp (Gt/yr)        | 64.9       | 39.1  | 51.2     |                          |
| Gpp (Gt/yr)        | 126.1      | 99.9  | 95.7     | 119.4 Jung et al. (2011) |
| plant resp (Gt/yr) | 61.2       | 60.8  | 48.2     |                          |
| soil resp (Gt/yr)  | 64.8       | 40.9  | 48.4     |                          |
| Total resp (Gt/yr) | 126.0      | 101.7 | 96.7     | 96.4 Jung et al. (2011)  |
| veg carbon (Gt)    | 483        | 617   | 884      |                          |
| soil carbon (Gt)   | 1074       | 1236  | 1292     | 1260 HWSD                |