



JULES evaluation update

Heather Rumbold & Siyuan Tian

Release of first standard standalone JULES configuration



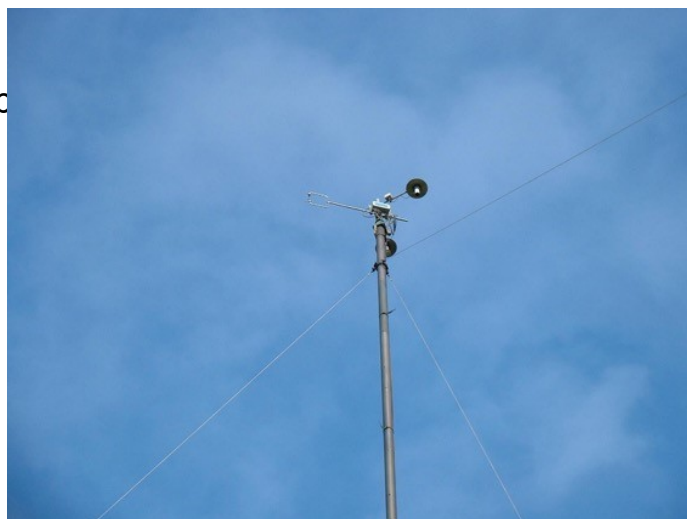
10:00 – 10:15 Wednesday 16th Sept: “Release of the first standard configurations for standalone JULES” by ***Heather Rumbold***

- Configurations are now officially signed off by the JLMP
- Release naming:
 - Earth System: **JULES-ES-2.0**
 - Physical Land: **PL2**
- Standard Cylc8 workflows will be made available on Met Office SPICE Azure and Jasmin in due course.
- Preparation of configuration papers for JULES-ES-2.0 and PL2.
- **Next call** for contributions to standalone JULES configurations JULES-ES-3.0 and PL3: **October 2025**

20-year observation dataset from Cardington for model evaluation

11:00 – 11:15 Wednesday 17th Sept: “Continuous meteorological surface and soil records (2004–2024) at the Met Office surface site of Cardington, UK” by **Simon Osborne**

- **CEDA repository of 24/7 data:**
 - Core data at 50m, 25, 10m, screen, surface, subsoil profiles, SW & LW radiation, latent, sensible and momentum fluxes.
 - 1-, 5-, 10- and 30-min time steps, mid-2004 to end of 2024
 - Kerr-Munslow, A. et al. (2025): <https://catalogue.ceda.ac.uk/uuid/5487380511084413a502c4b229273bc6/>
- **JULES gap-filled forcing files at 4 heights (50m, 25m, 10m, 2m) is a subset of this core data (whole years 2005 to**

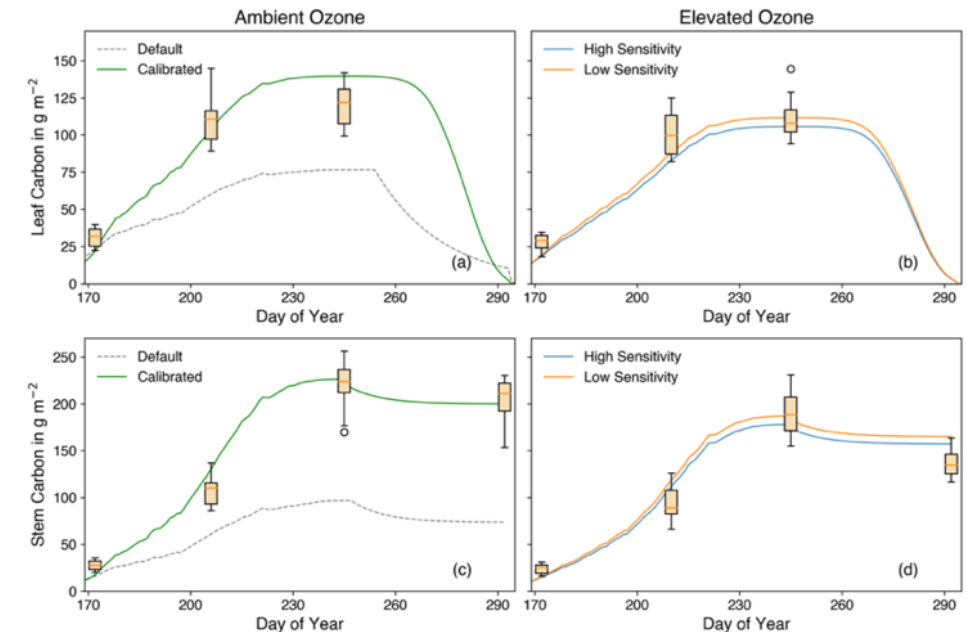
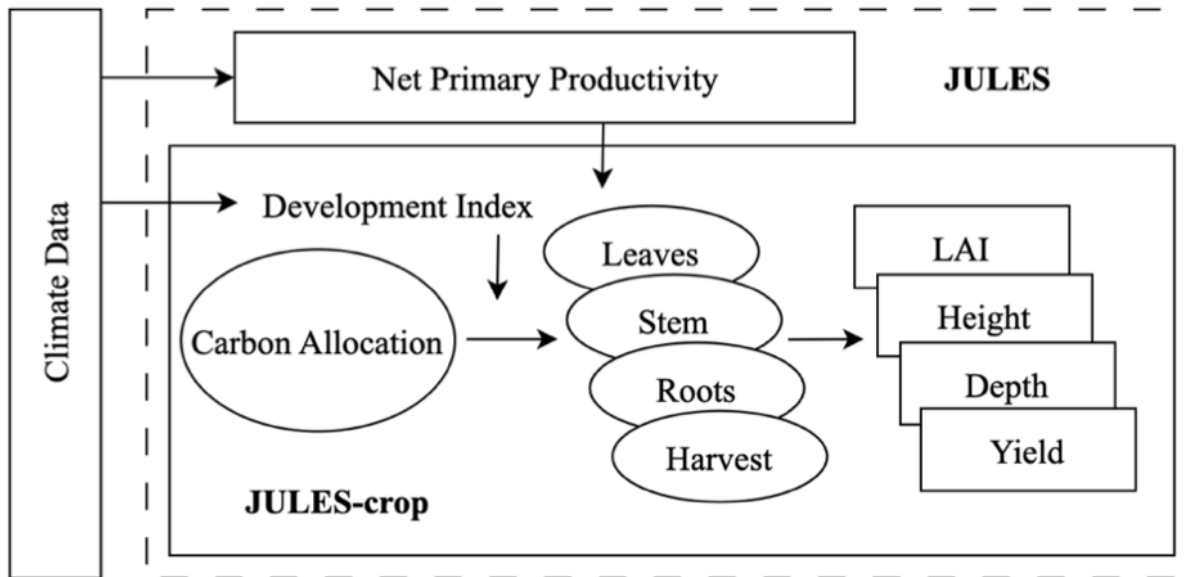


Assessing the impacts of O₃ on agriculture



Xu, B., Dobbie, S., Yang, H., Yang, L., Jiang, Y., Challinor, A., Williams, K., Wang, Y., & Wang, T. (2025). A first calibration of the JULES-crop version 7.4 for rice using the novel O₃-FACE experiment in China. EGU sphere, 2025, 1–24. <https://egusphere.copernicus.org/preprints/2025/egusphere-2024-4077/>

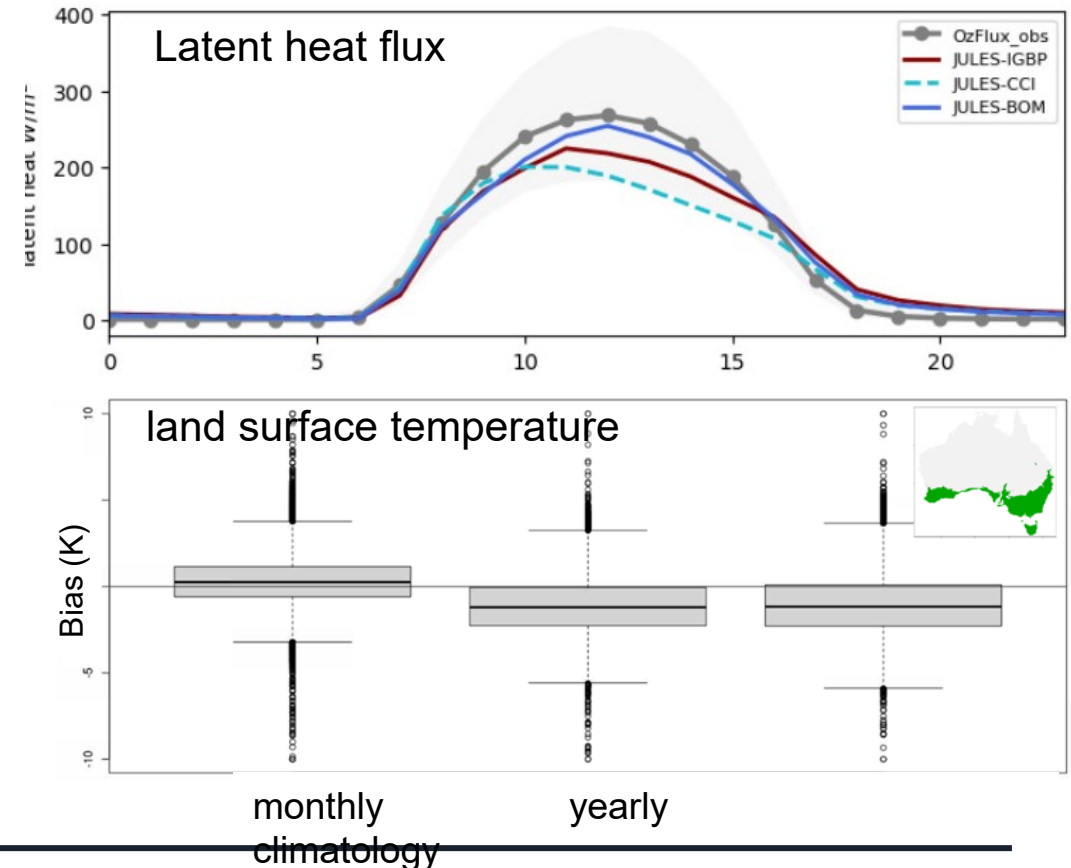
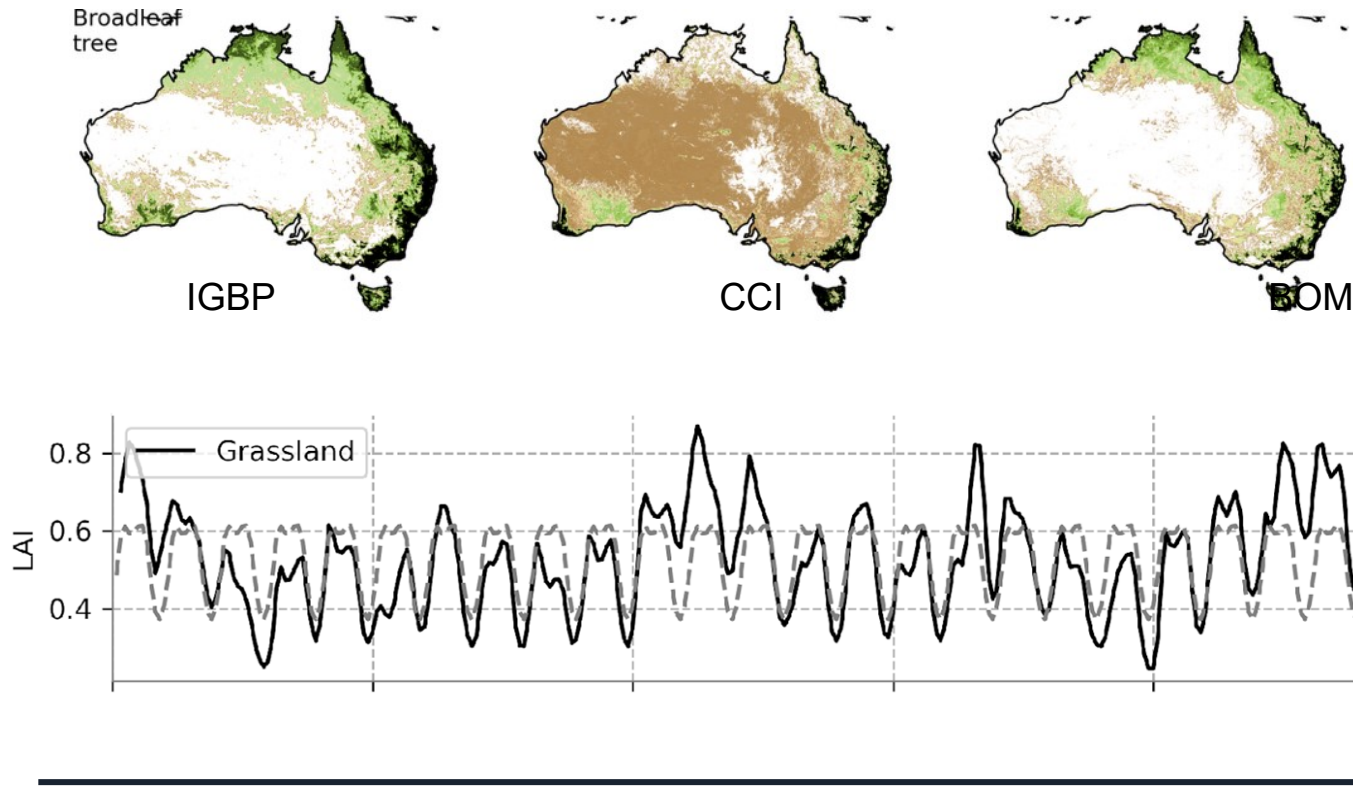
13:30 – 13:45 Tuesday 16th Sept: “Ozone risks to rice yields under warming climate using O₃-FACE observations” by **Beiyao Xu**



Contact: Beiyao Xu <eebx@leeds.ac.uk>

Assessing the impacts of time varying vegetation fraction and LAI on JULES

- Use local high-resolution, 20 years MODIS derived fractional cover product over Australia
- Compared to IGBP or CCI, local fraction shows better performance on surface energy and water fluxes (climatology)
- Dynamic changing of vegetation fraction (monthly, yearly, climatology) shows reduced bias in skin temperature over temperate regions

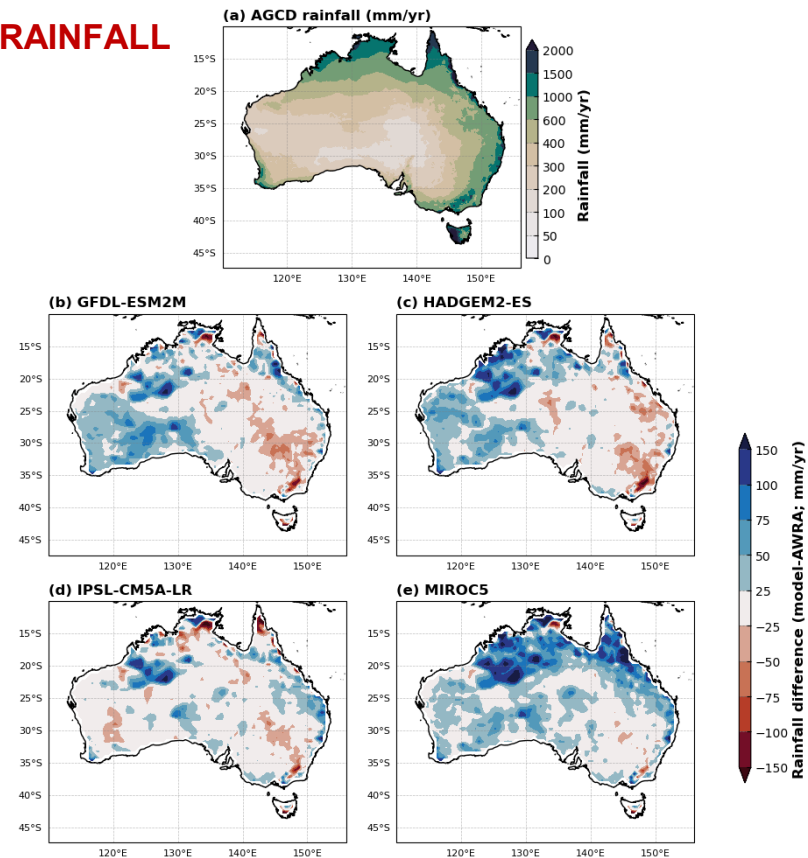


Contact: Siyuan Tian

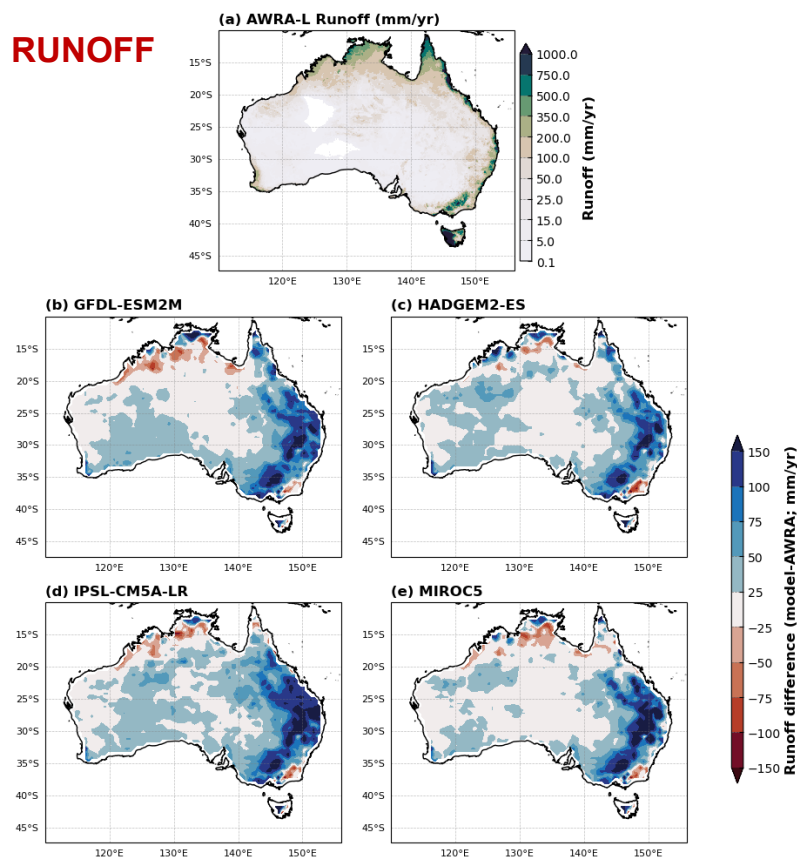
siyuan.tian@bom.gov.au

Assess JULES-ES ISIMIP2b projections against historical observations over Australia

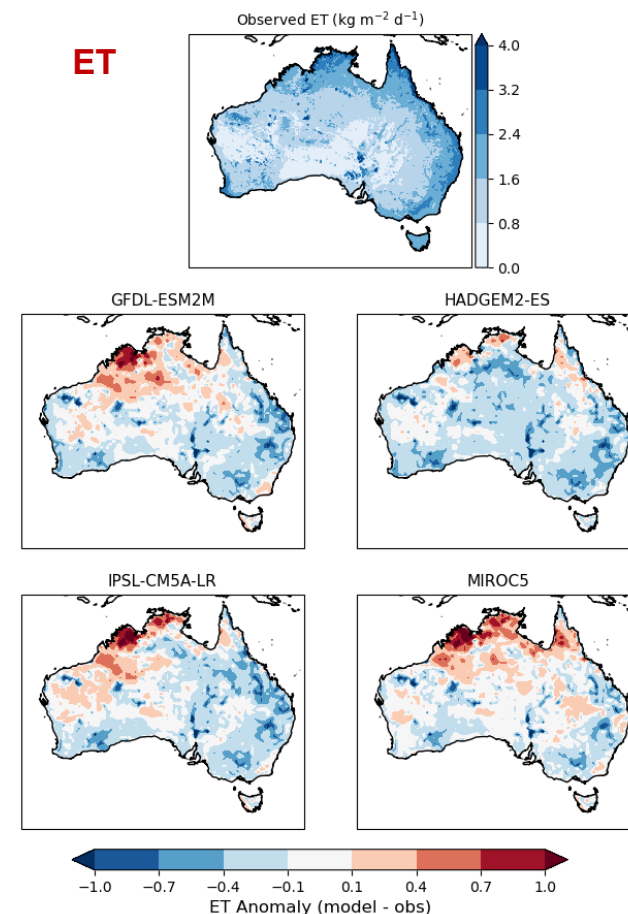
RAINFALL



RUNOFF



ET



- **RUNOFF:** JULES-ES overestimates runoff across eastern Australia, while underestimating it in the north, some parts in the west and south-east of Australia, especially MIROC5.
- **Rainfall-Runoff:** Spatial patterns of runoff biases are linked to ET, runoff underestimation in the north is linked to overestimation of ET and underestimation of ET elsewhere

PLUMBER2 MIP

Uses Machine Learning models as our benchmarks - i.e. use ML to predict fluxes using meteorological variables as predictors

Seminar by Gab Abramowitz: “Machine Learning for Benchmarking Land Models”, 21st May (Recording available on request)

- Simulations of latent, sensible heat, carbon fluxes at 154 flux tower sites.
- 20 different international land models.
- Linear regression, cluster and regression, LSTM, random forest as benchmarks – all out of sample
- Land model provided with observed vegetation type, reference and canopy height, LAI and 30-60min meteorological forcing. No calibration.
- How predictable are the surface fluxes? How good are existing mechanistic models at prediction? Under which conditions/environments do they excel, or we know they can improve?
- Results are broadly consistent: **Simple out-of-sample empirical models, including linear regression, comfortably outperforming mechanistic land models.**

<https://doi.org/10.5194/bg-21-5517-2024>

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On the predictability of turbulent fluxes from land: PLUMBER2 MIP experimental description and preliminary results

Gab Abramowitz , Anna Ukkola, Sanaa Hobeichi, Jon Cranko Page, Mathew Lipson, Martin G. De Kauwe, Samuel Green, Claire Brenner, Jonathan Frame, Grey Nearing, Martyn Clark, Martin Best, Peter Anthoni, Gabriele Arduini, Souhail Boussetta, Silvia Caldararu, Kyeungwoo Cho, Matthias Cuntz, David Fairbairn, Craig R. Ferguson, Hyungjun Kim, Yeonjoo Kim, Jürgen Knauer, David Lawrence, Xiangzhong Luo, Sergey Malyshev, Tomoko Nitta, Jerome Ogee, Keith Oleson, Catherine Ottlé, Phillipe Peylin, Patricia de Rosnay, Heather Rumbold, Bob Su, Nicolas Vuichard, Anthony P. Walker, Xiaoni Wang-Faivre, Yunfei Wang, and Yijian Zeng

