

Reduced Complexity Model Intercomparison Project

Zebedee Nicholls^{1,2}, Malte Meinshausen^{1,2}, Jared Lewis^{1,2} and many others

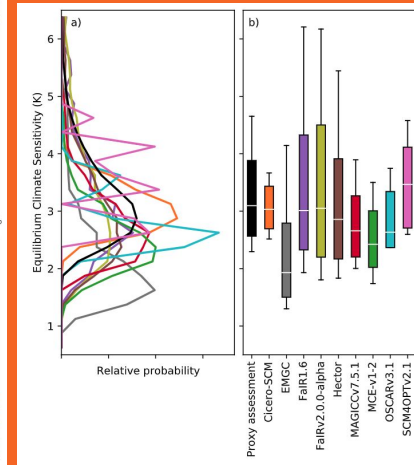
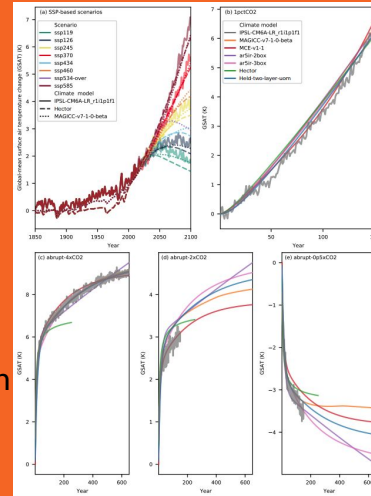
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RCMIP (more info at rcmip.org):

- Systematic intercomparison of models (like CMIP, but for reduced complexity models)
- (Learning from CMIP) Standardised formats, experiments, tools \Rightarrow more time analysing, less time formatting

Insights to date:

- Best emulators reproduce CMIP6 GSAT to within an RMSE of $\sim 0.2\text{K}$ (RCMIP Phase 1 paper)
- performance is notably worse in scenarios compared to idealised experiments
- Probabilistic distributions can represent a range of independent assessments to within $\sim 10\%$ across both best-estimate and likely ranges
- If you know the assessment you want to match, use an emulator which is calibrated to it (seems obvious, but often ignored see e.g. Thomas Gasser's presentation re old DICE parameters)



Future: Carbon cycle, aerosol effective radiative forcing, coupling between ocean heat uptake and ocean carbon uptake, user-driven analyses

More info

For full details, see rcmip.org

Scientific Papers:

- Reduced Complexity Model Intercomparison Project Phase 1: introduction and evaluation of global-mean temperature response (Nicholls et al., *GMD*, 2020), <https://doi.org/10.5194/gmd-13-5175-2020>
- Reduced Complexity Model Intercomparison Project Phase 2: Synthesising Earth system knowledge for probabilistic climate projections (Nicholls et al., *Earth's Future*, 2021 (accepted 26 April 2021)), <https://doi.org/10.1002/essoar.10504793.2>

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