

Rapid response emulators/tools for impacts projections

"PRIME" and FastMIP

Chris Jones 24th April 2024



www.metoffice.gov.uk



WG3 has lots of global-mean info – mainly timeseries of global temperature

- Draws on emulator output
 - Calibrated against WG1 findings



Assess hundreds of scenarios – cheap/fast to run

...but lack any spatial detail





Ecosystems Glabal	Changes in ecosystem structure			Species range shifts			Changes in timing [phynology]			
	Concertal free	Frishwater	Doran	(c)	Freihouster	Docan	(c)	Probastar	Ocean 0	Confidence in attribution to dimate change
		Africa								
data.					- X				- H I	Medun
Acatrolacia								- N		i lav
Central and South America	ĕ		ĕ		•	ĕ	0		ŏ.	 Exidence limited, insufficient
Europe	•	•	•	•	•	•	•	•	•	na Notappilcable
North America	•	•	•	•	•	•	•	•	•	
Small blands	•	•	•	•	•	•	•			
Arctic	•		•	•	•	•	•			impacts to human systems in panel [b] = Increasing adverse
Antarctic	•			•		•	•			
editerranean region	•		•	•	•	•	•			
Tropical forests	•		14			04			14	
Mountain regions			6.0	•	•	14	•		10	impacis
Desets	•	60	60	•	14	04		60	14	± increasing adverse
induresity hotspots									not ,	impacts

WG2 has lots of <u>regional detail</u> – maps/regional impacts

- Draws on climate model output
 - ("CMIP")

Assess only a few scenarios

- often a CMIP generation behind WG1 due to timescale of literature



Met Office Hadley Centre

Wouldn't it be great if...?

- we could take up-to-date / novel scenarios and within daysweeks have regional patterns, impacts and feedbacks?
- Well we can...
 - PRIME (Mathison et al: 2024)

https://egusphere.copernicus.org/preprints/2024/egusphere-2023-2932/

A rapid application emissions-to-impacts tool for scenario assessment: Probabilistic Regional Impacts from Model patterns and Emissions (PRIME)

Camilla Therese Mathison 🖂, Eleanor Burke, Eszter Kovacs, Gregory Munday, Chris Huntingford, Chris Jones, Chris Smith, Norman Steinert, Andy Wiltshire, Laila Gohar, and Rebecca Varney

PRIME



A rapid application emissions-to-impacts tool for scenario assessment: Probabilistic Regional Impacts from Model patterns and Emissions (PRIME)

Camilla Therese Mathison ⊠, Eleanor Burke, Eszter Kovacs, Gregory Munday, Chris Huntingford, Chris Jones, Chris Smith, Norman Steinert, Andy Wiltshire, Laila Gohar, and Rebecca Varney



PRIME



Wouldn't it be great if...?

- we could take up-to-date / novel scenarios and within daysweeks have regional patterns, impacts and feedbacks?
- Well we can...





FASTMIP exercise in early CMIP7 phase (development of emissions scenarios)



Proposal for CMIP7: FASTMIP exercise in early CMIP7 phase (development of emissions scenarios)

FASTMIP

FASTMIP 1 (late 2023/ early 2024) CMIP6 / SSP recomputation*, NGFS, overshoot?

*Larger subset of 1200 IPCC WG3 scenarios (which ones?) FASTMIP 2 (late 2024) Pre-CMIP7 preparation FASTMIP 3 (2026?) Parallel to CMIP7

Slide courtesy Sonia Seneviratne FastMIP led from ETH: Yann Quilcaille, Michael Windisch



FastMIP Summary

- Aims to fill gap that leaves impacts studies and IPCC WG2 a CMIP generation behind
- Rapidly run any scenario, any climate patterns, any climate sensitivity
- Range of emulator tools already exist climate drivers, extremes, land impacts etc
- Keen to engage with ISIMIP re what is needed and required timelines
 - Clearly this isn't perfect and doesn't replace full ESM runs but gives a very fast turnaround that ESMs simply cannot achieve