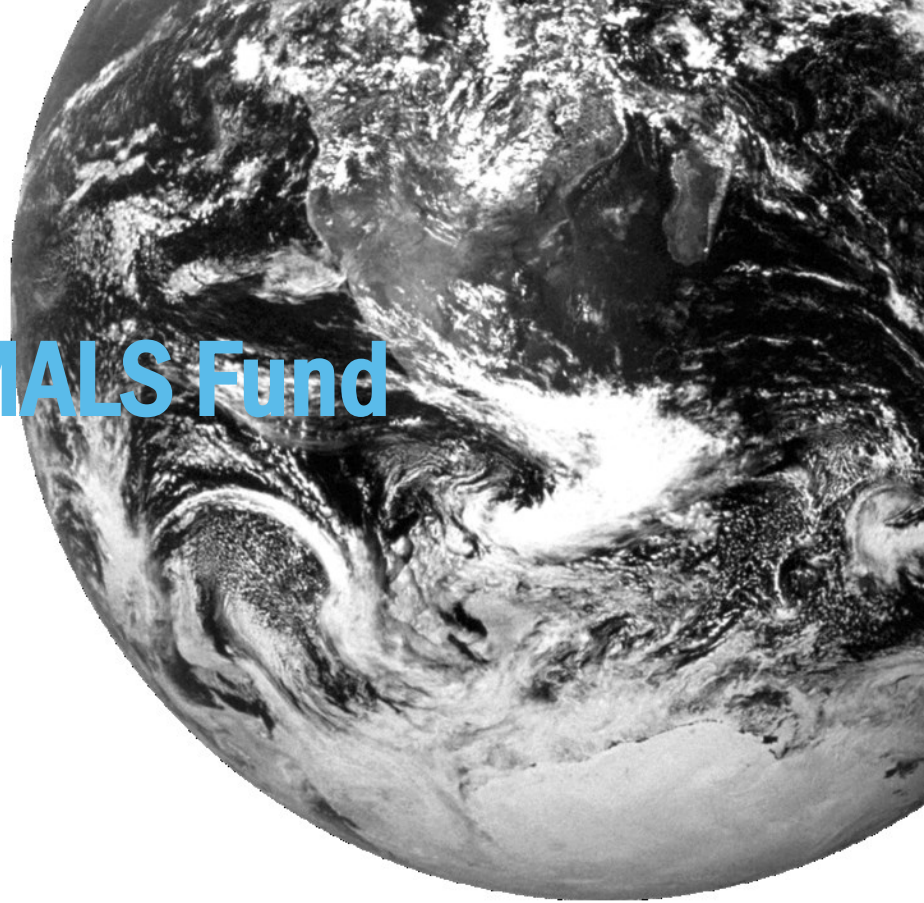
SRMGI Solar Radiation Management Governance Initiative

Lessons from the DECIMALS Fund



Andy Parker

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Honorary senior research fellow – University of Bristol

6 August 2020

The DECIMALS Fund

Building SRM research capacity in the Global South

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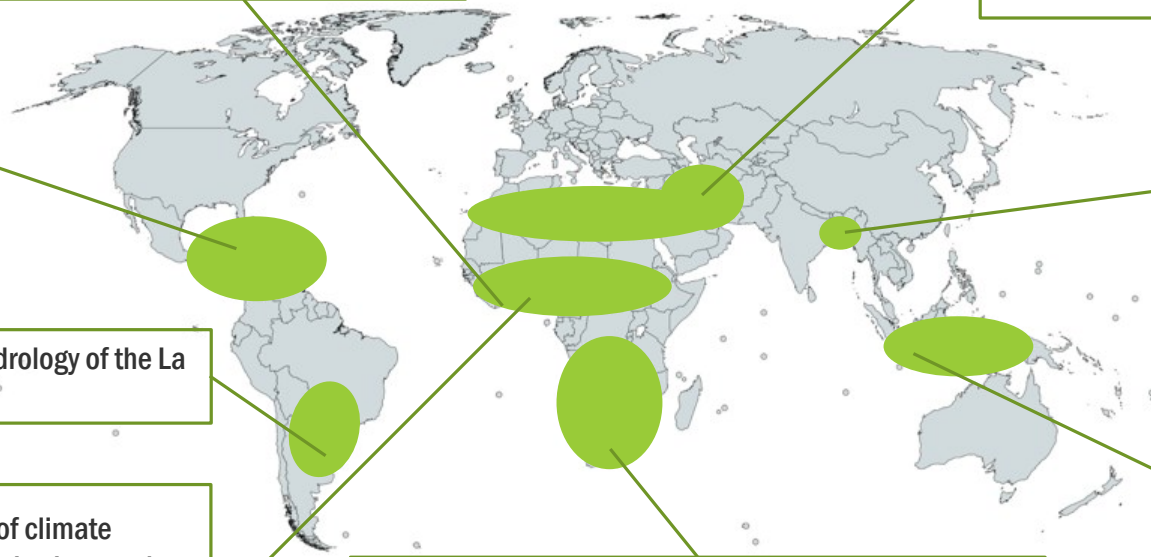
DECIMALS studies

Ivory Coast: impact on temperature and precipitation extremes over West and Central Africa

Jamaica: effects on future Caribbean climate

Argentina: impacts on the hydrology of the La Plata Basin

Benin: effect on the impacts of climate change on West African precipitations and river discharge



South Africa impact on drought, heat extremes and agriculture in Southern Africa

Iran: impacts on storm tracks, atmospheric blockings and dust storms in the MENA region

Bangladesh: impacts on the spread in malaria and cholera

Indonesia: impact on extreme temperatures and precipitation across Indonesia

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How it works

- Studies run for 2.5 years with financial support from SRMGI
- Scientists are given free rein to ask their own research questions
- Data from GLENS and GeoMIP
- Bias correction and statistical downscaling
- SRM modellers as research collaborators

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The SRM research collaborators

Olivier Boucher (Institut Pierre-Simon Laplace)

Peter Irvine (UCL)

Ben Kravitz (Indiana)

Doug MacMartin (Cornell)

John Moore (Beijing Normal University)

Helene Muri (Norwegian University of S&T)

Simone Tilmes (NCAR)

Lili Xia (Rutgers)

Plus Alan Robock (Rutgers) working on the Bangladesh team

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Pinto et al, 2020

Published in Geophysical Research Letters in January 2020 by the South Africa DECIMALS team

Takeaway: In the simulations, SRM would significantly reduce temperature means and extremes. However, the effect on precipitation would not be as linear.

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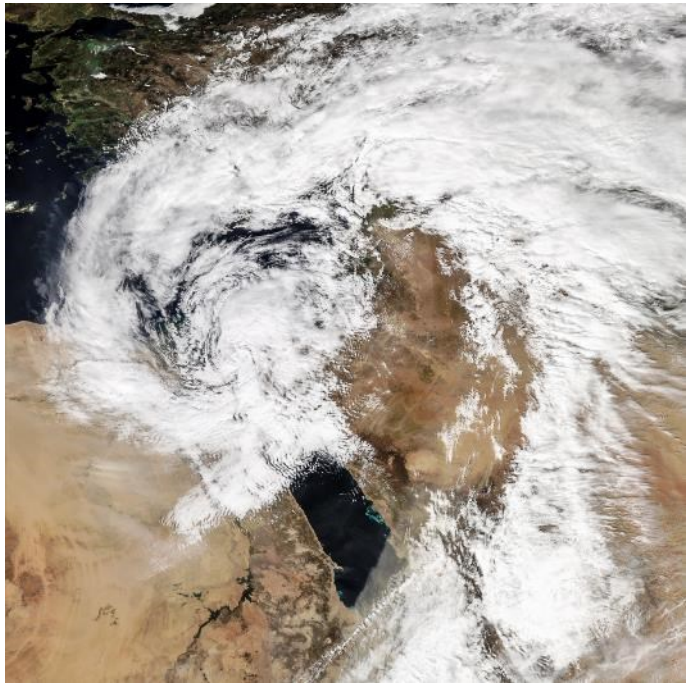
Karami et al, 2020



Published in Geophysical Research Letters in June 2020 by the Iran DECIMALS team

Takeaway: In the simulations, SRM would partially offset the poleward shift of storm tracks induced by global warming, and thus reduce some water stresses in the region.

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Da-Allada et al, 2020

Published in Earth's Future in June 2020 by the Benin DECIMALS team

Takeaway: In the simulations, SRM would reduce climate-caused disruptions to rainfall in the Northern and Southern Sahel. However, it would increase disruptions in West Africa, turning a small increase in monsoon rains into a larger decrease.

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Reflection 1

Funding research in developing countries returns multiple benefits

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Reflection 2

Capacity building is a prerequisite for international governance

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Reflection 3
Insights for modelling

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Modelling single scenarios:

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Modelling single scenarios:

1) Makes it hard to tell when impacts are scenario-driven

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2) Can simultaneously make SRM look too good and too bad!

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Modelling single scenarios:

1) Makes it hard to tell when impacts are scenario-driven

2) Can simultaneously make SRM look too good and too bad!

Proposed solution: model multiple scenarios as standard

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Reporting multiple scenarios

	RCP 8.5	Halved warming	Hold temps level	Cooled to PIA
Mean temps				
Extreme heat				
Average rainfall				
Extreme precip				
Sea level rise				
Storm intensity				

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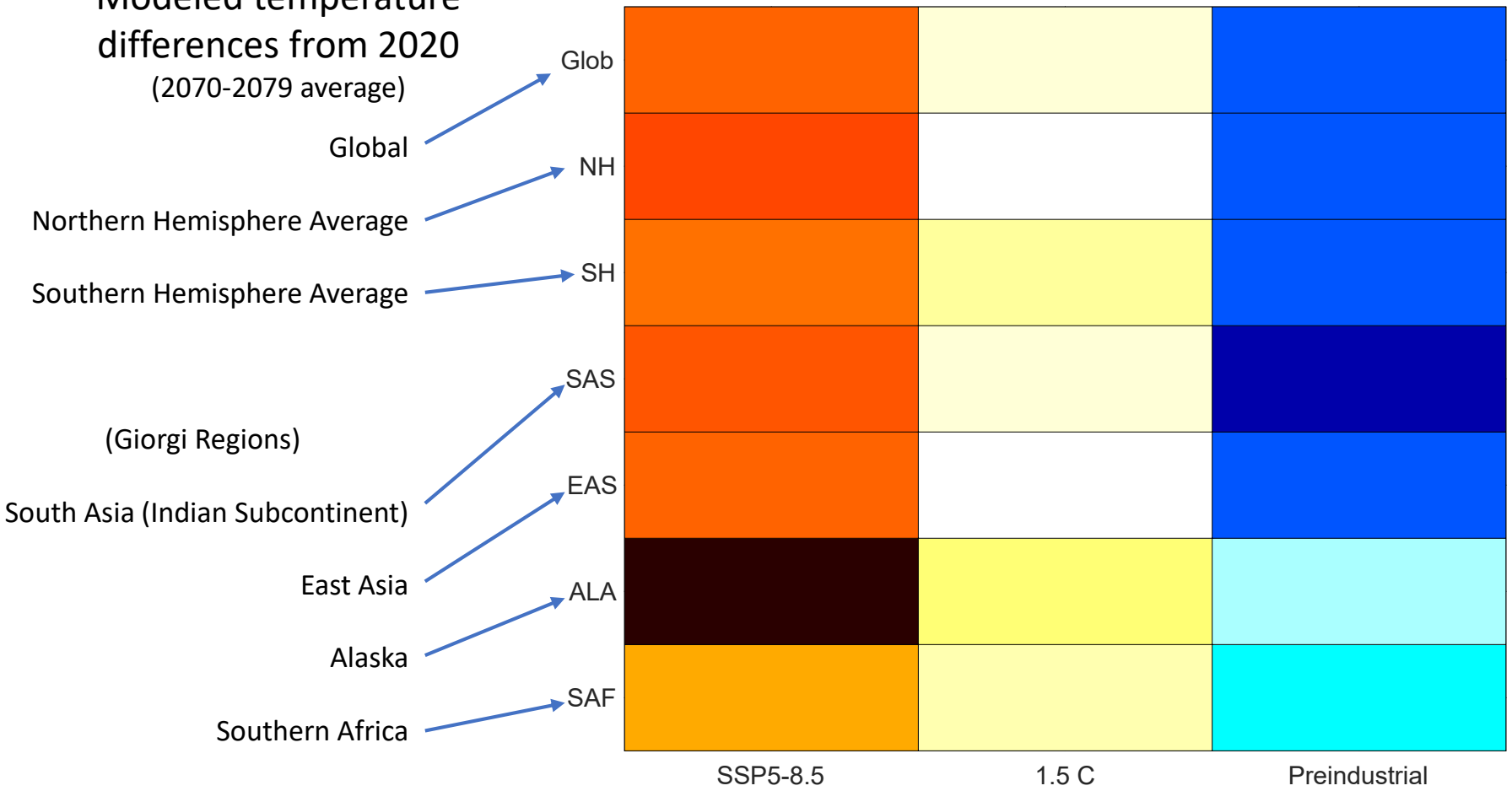
Possibilities for expansion

	RCP 8.5	Halved warming	Hold temps level	Cooled to PIA
Mean temps				
Extreme heat				
Average rainfall				
Extreme precip				
Sea level rise				
Storm intensity				
Ozone damage				
Ocean acid.				
SRM side effects				
Soc/pol from CC				

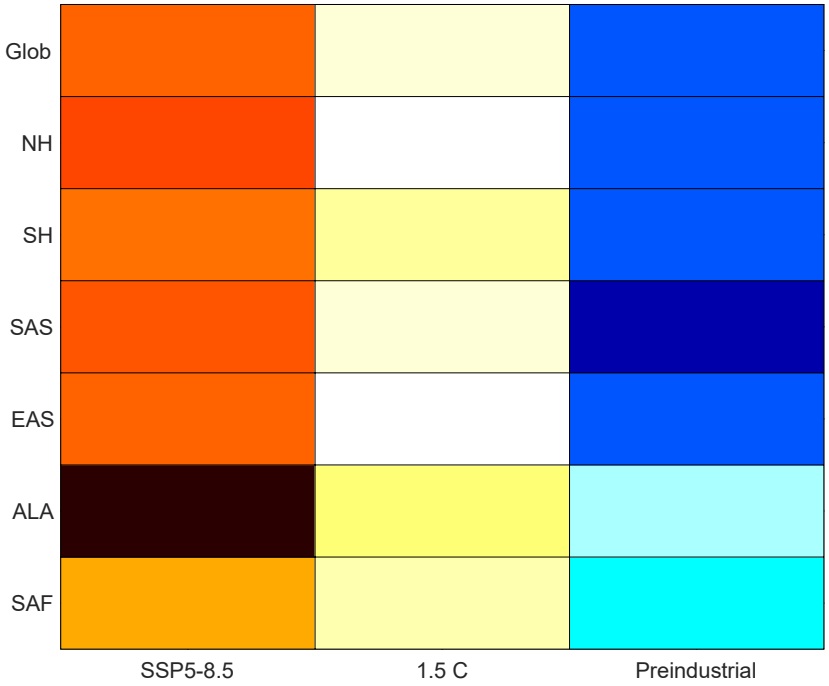
Modeled temperature differences from 2020

(2070-2079 average)

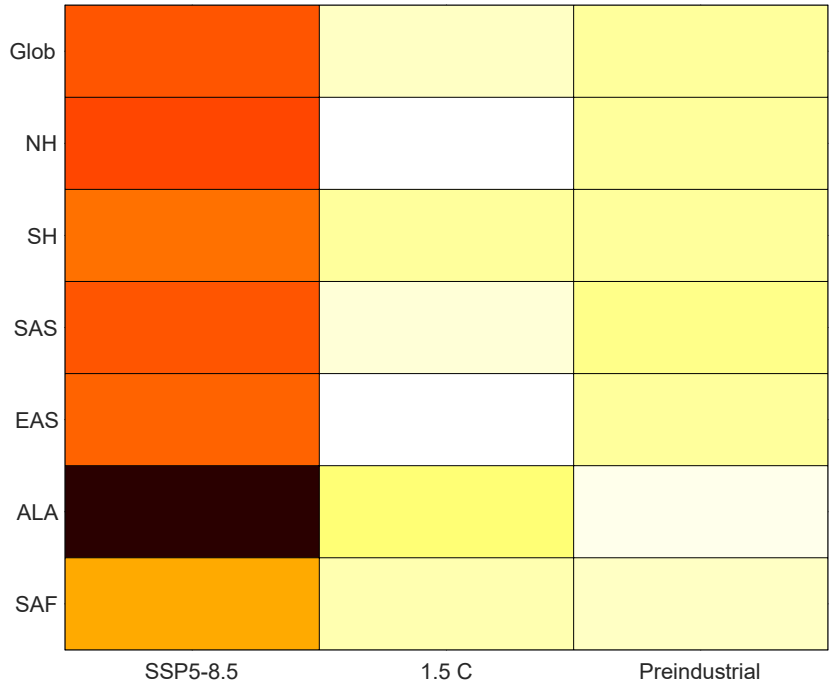


Temperature Heat Maps

Asymmetric “damage function”



Symmetric “damage function”



Each of these conveys a slightly different message

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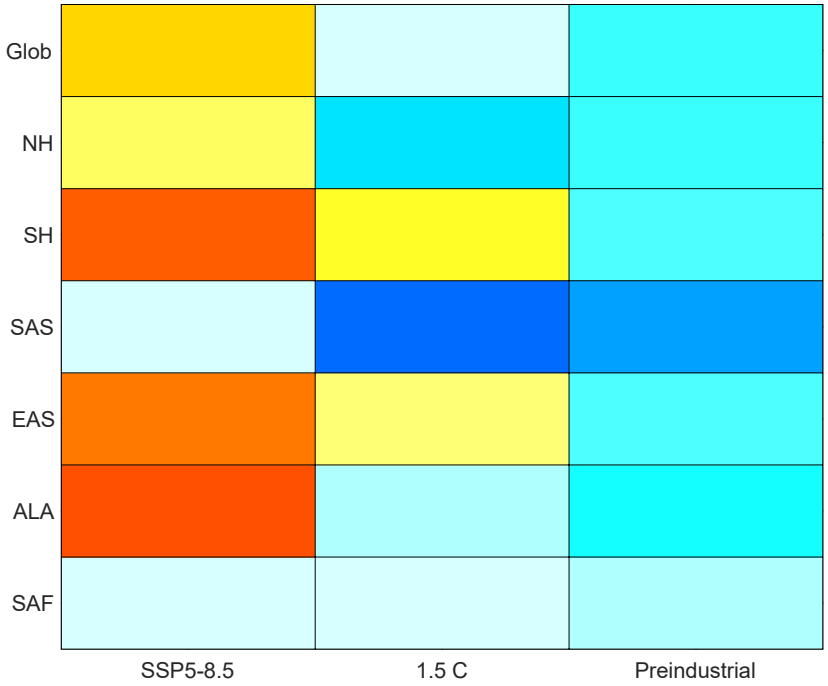
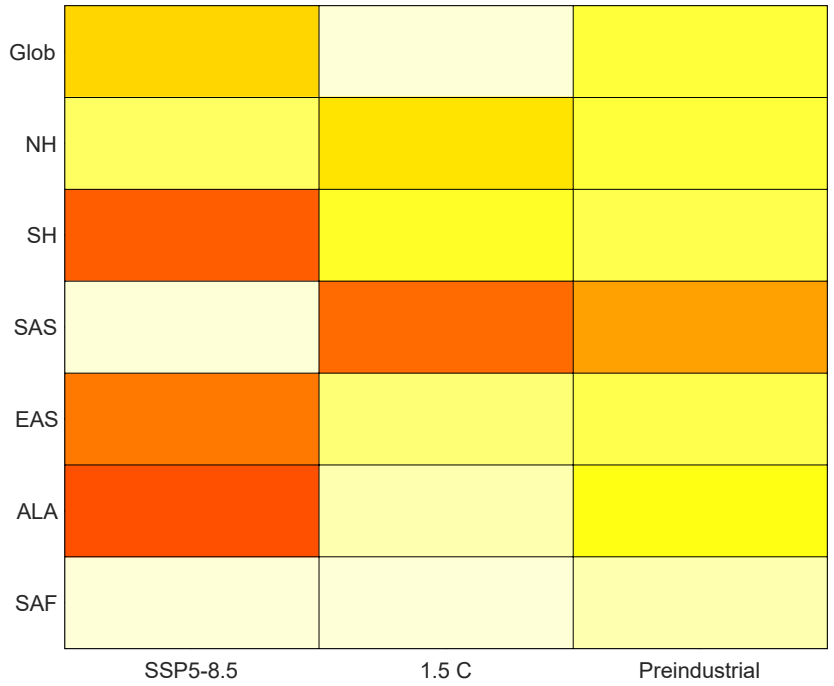
Precipitation Heat Maps

Asymmetric “damage function”



Symmetric “damage function”



Each of these conveys a slightly different message

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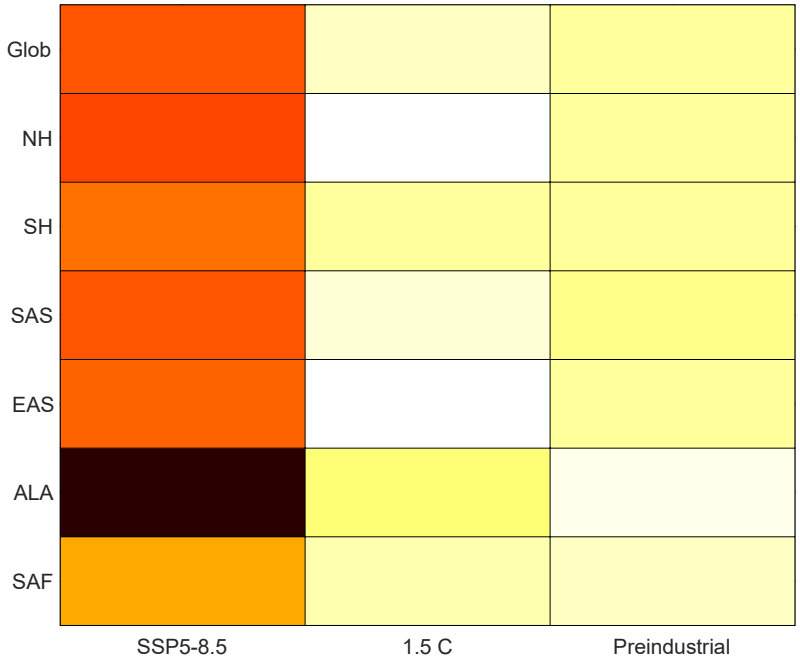
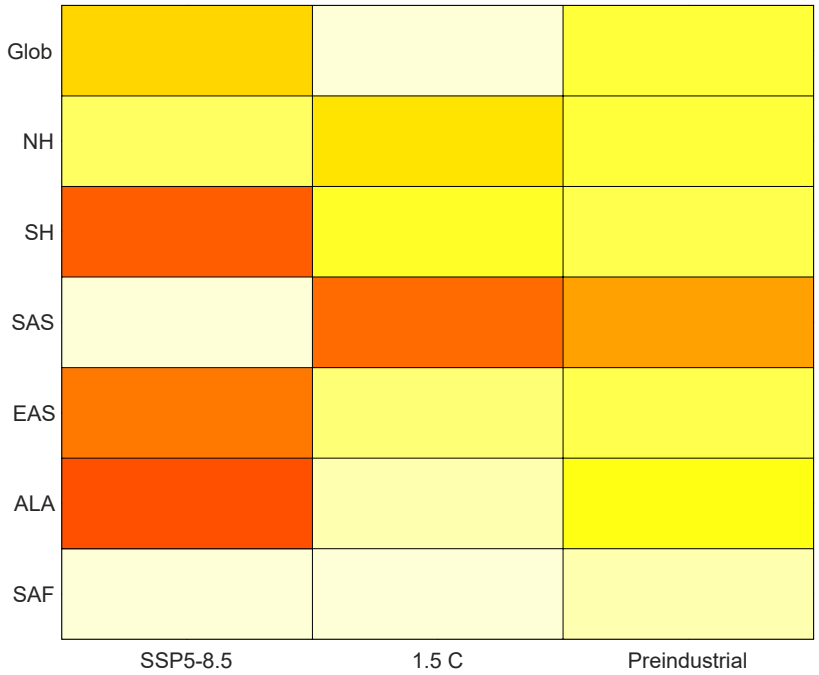
A pluralistic assessment of the effects of geoengineering

Temperature



Precipitation



Putting different variables on the same plot is difficult

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Thank you

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