

Regional Climate Change: Consensus, Discrepancies, and Ways Forward

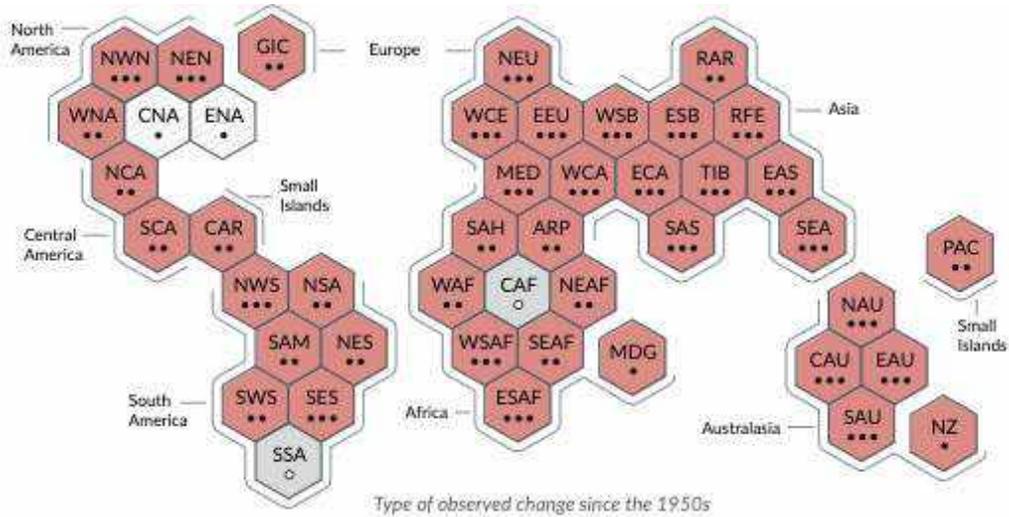


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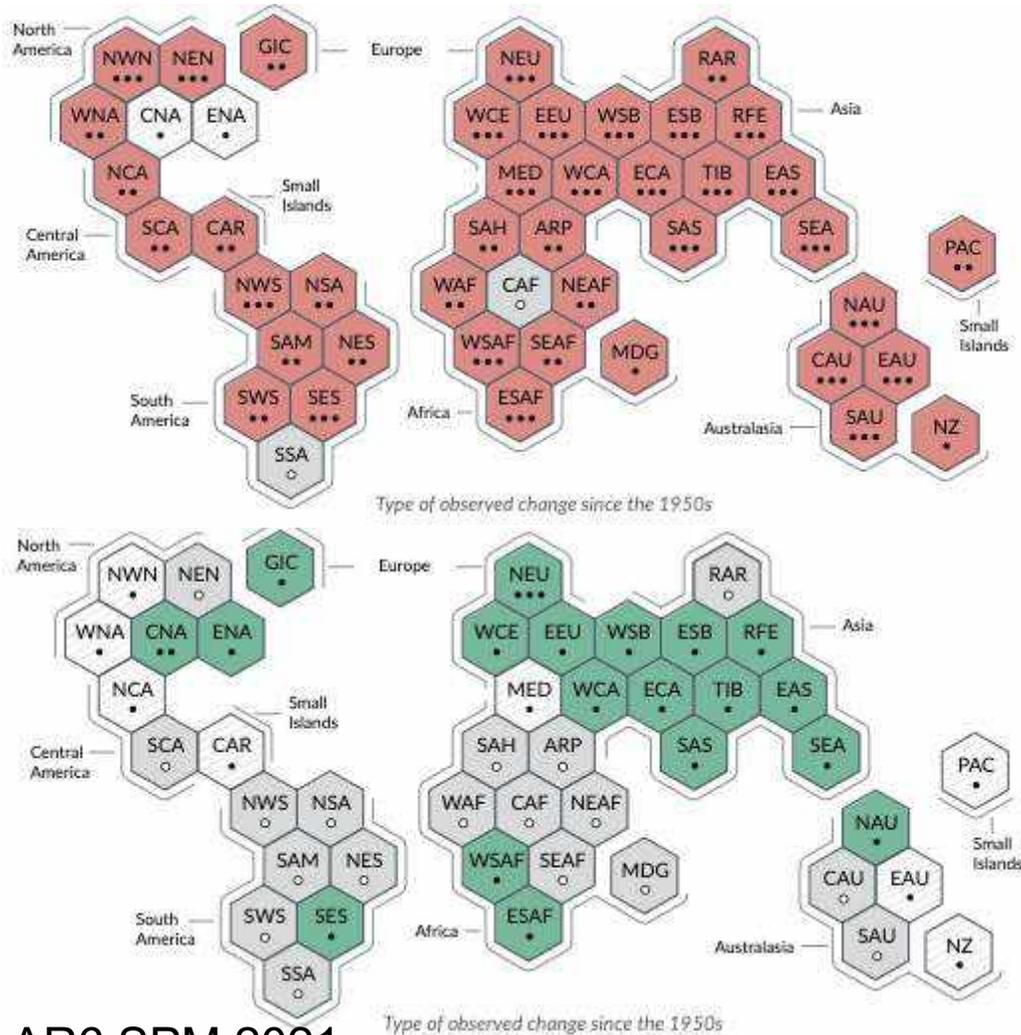
Tiffany A. Shaw, The University of Chicago
WCRP OSC Participants, Regional Climate Change Concept Paper co-authors

Photo credit: @syn_efou

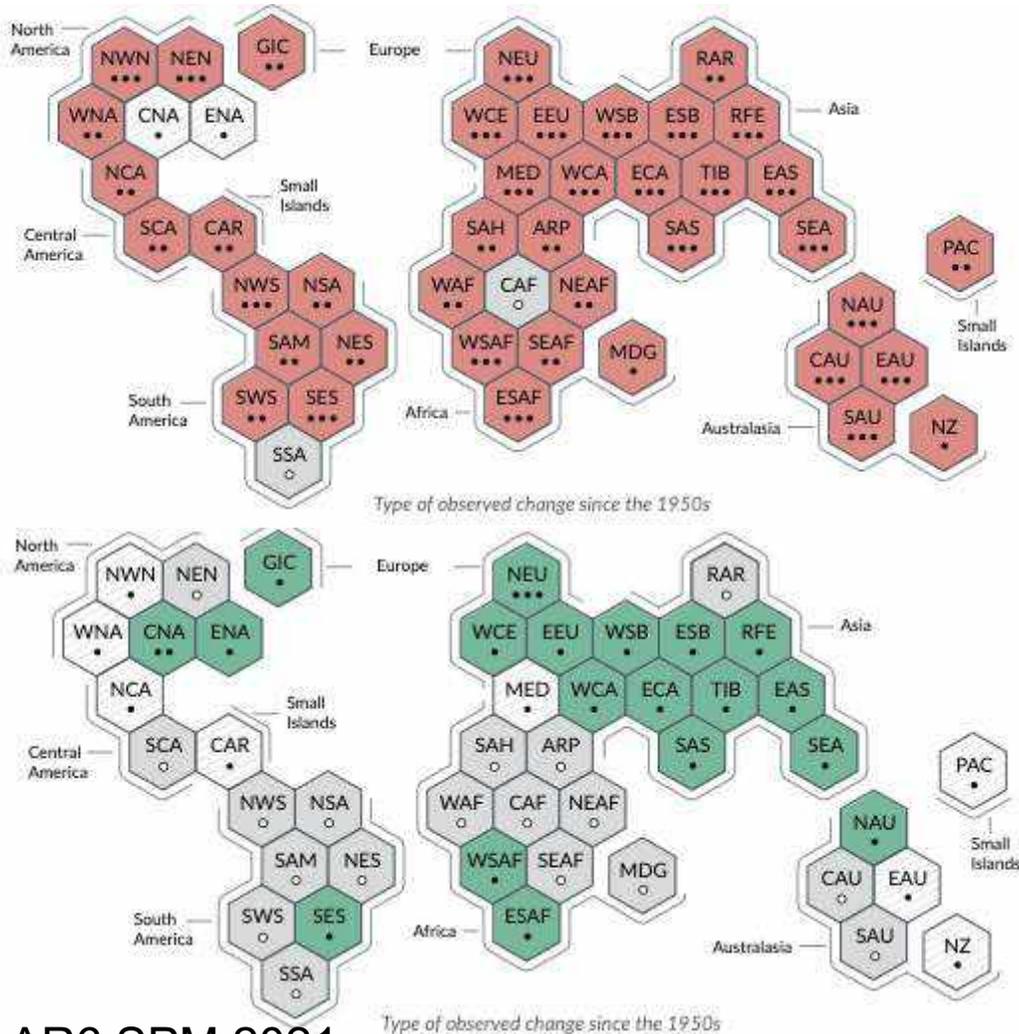
Climate change signals are emerging from the noise across many regions and seasons



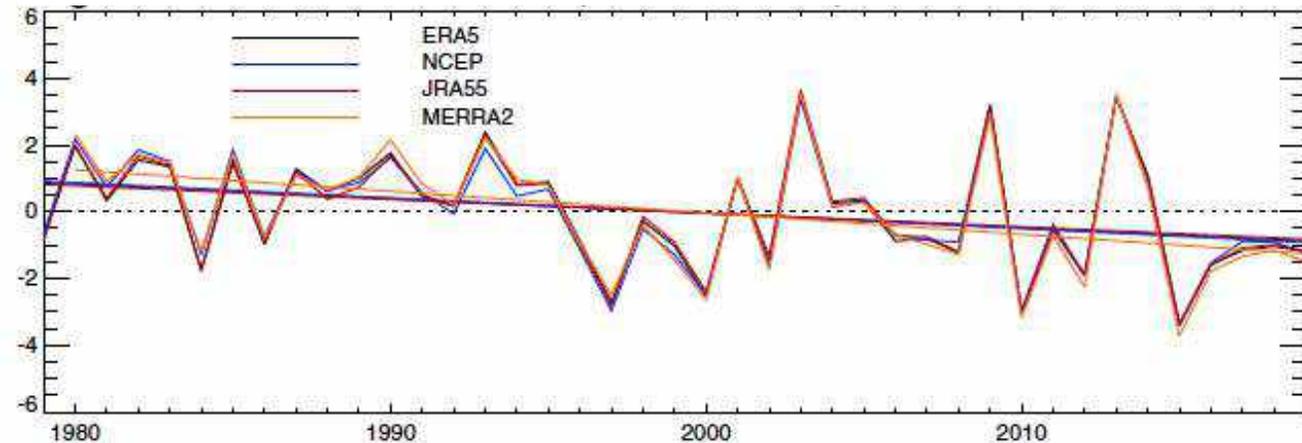
Climate change signals are emerging from the noise across many regions and seasons



Climate change signals are emerging from the noise across many regions and seasons

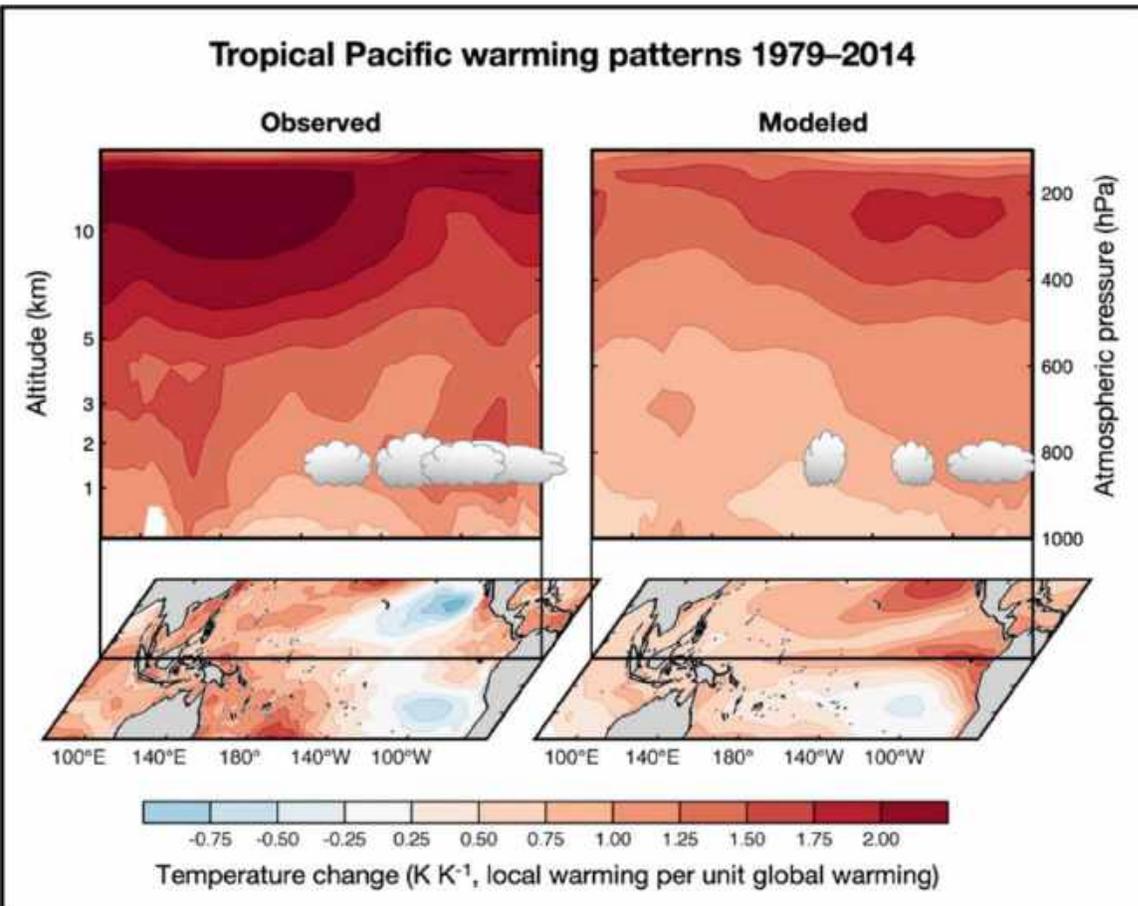


Eurasian westerly jet during summertime



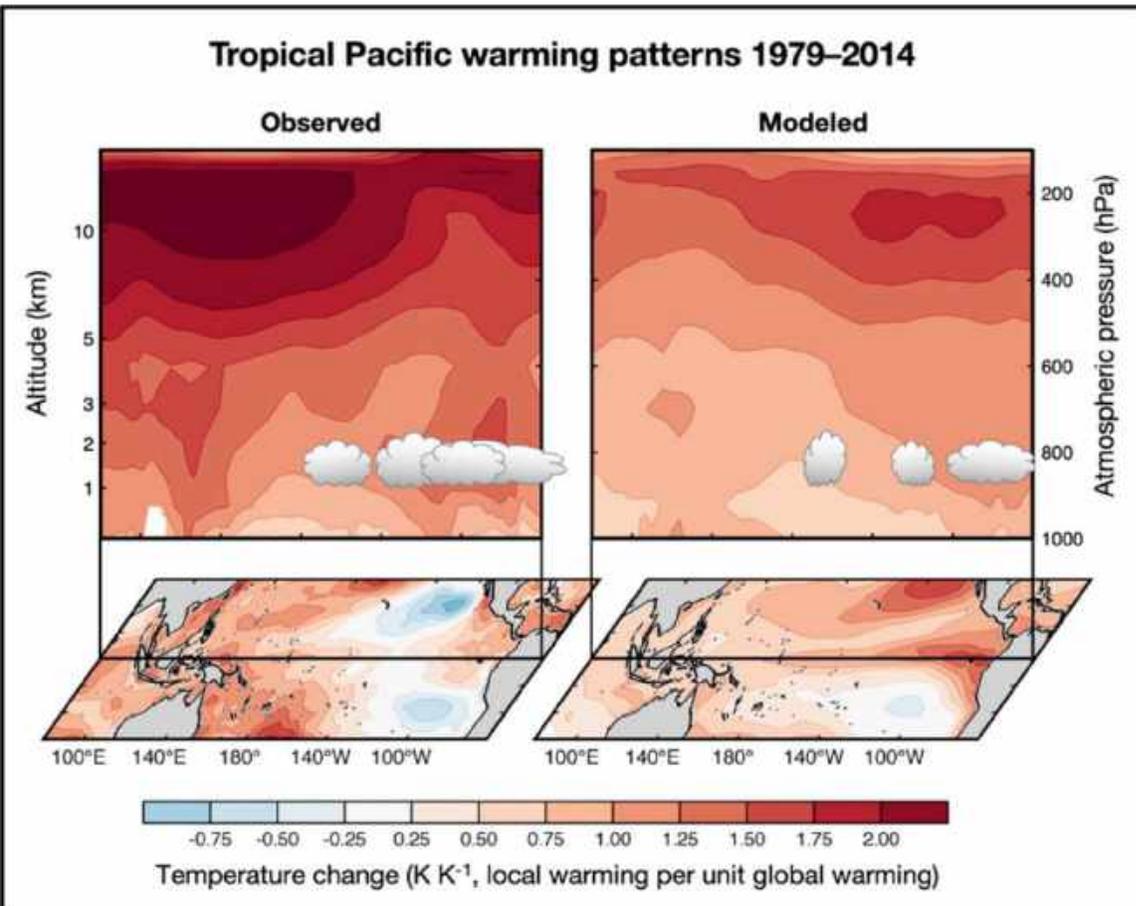
Dong et al. (2022)

Discrepancies between observed and modeled regional trends are emerging



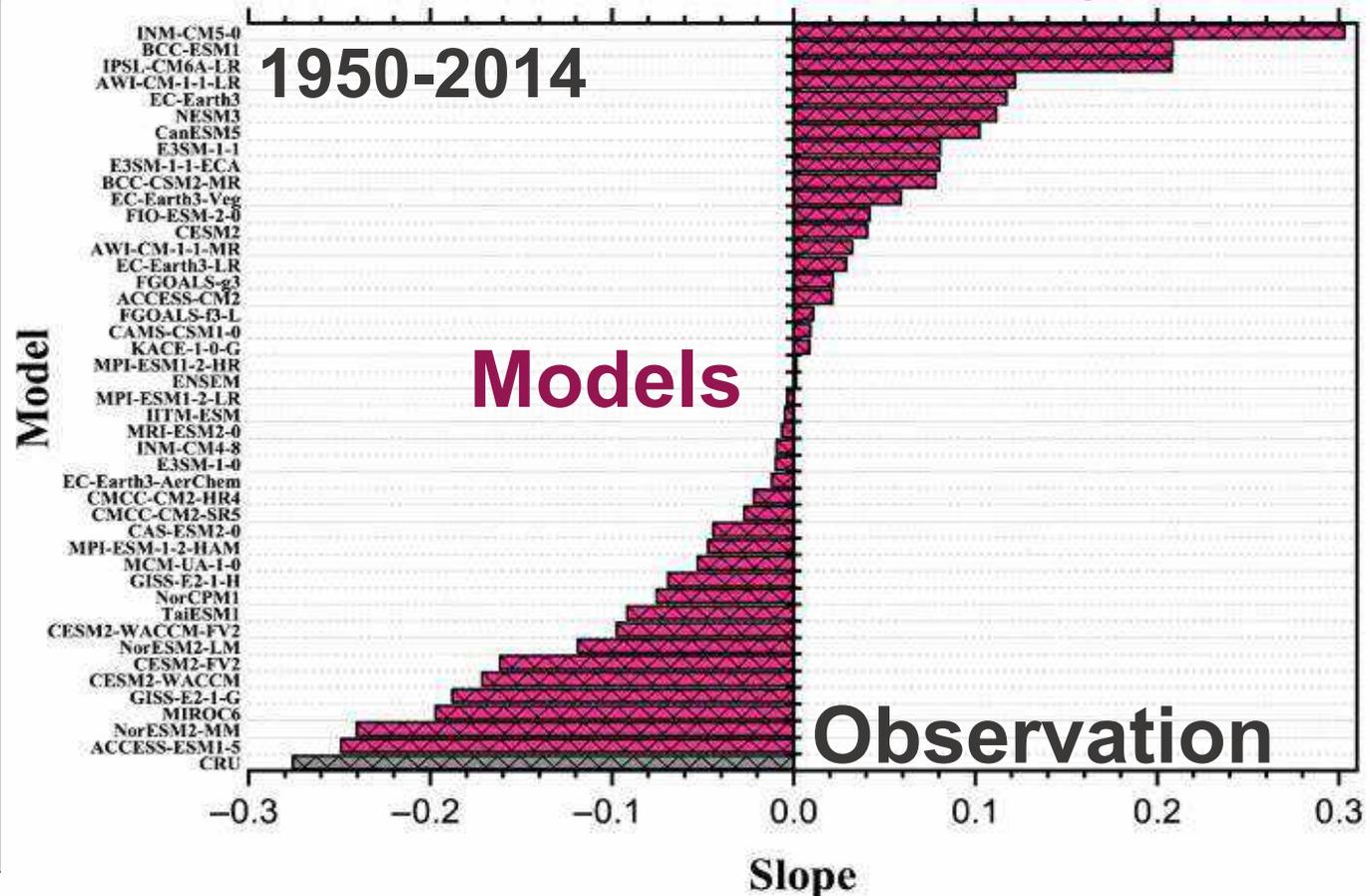
Rugenstein et al. (2023)

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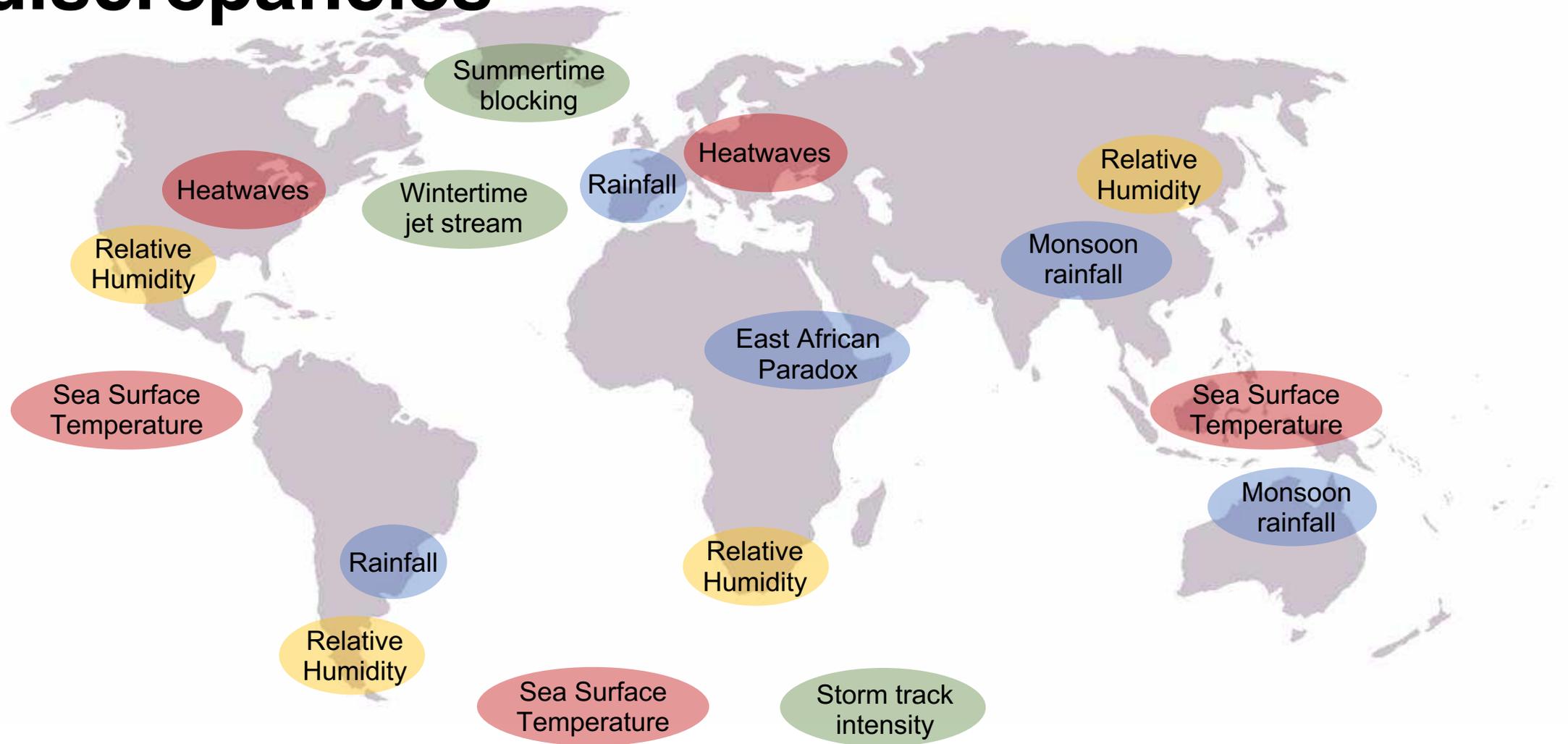
Rugenstein et al. (2023)

Trends of East African Precipitation



Makula & Zhou (2022)

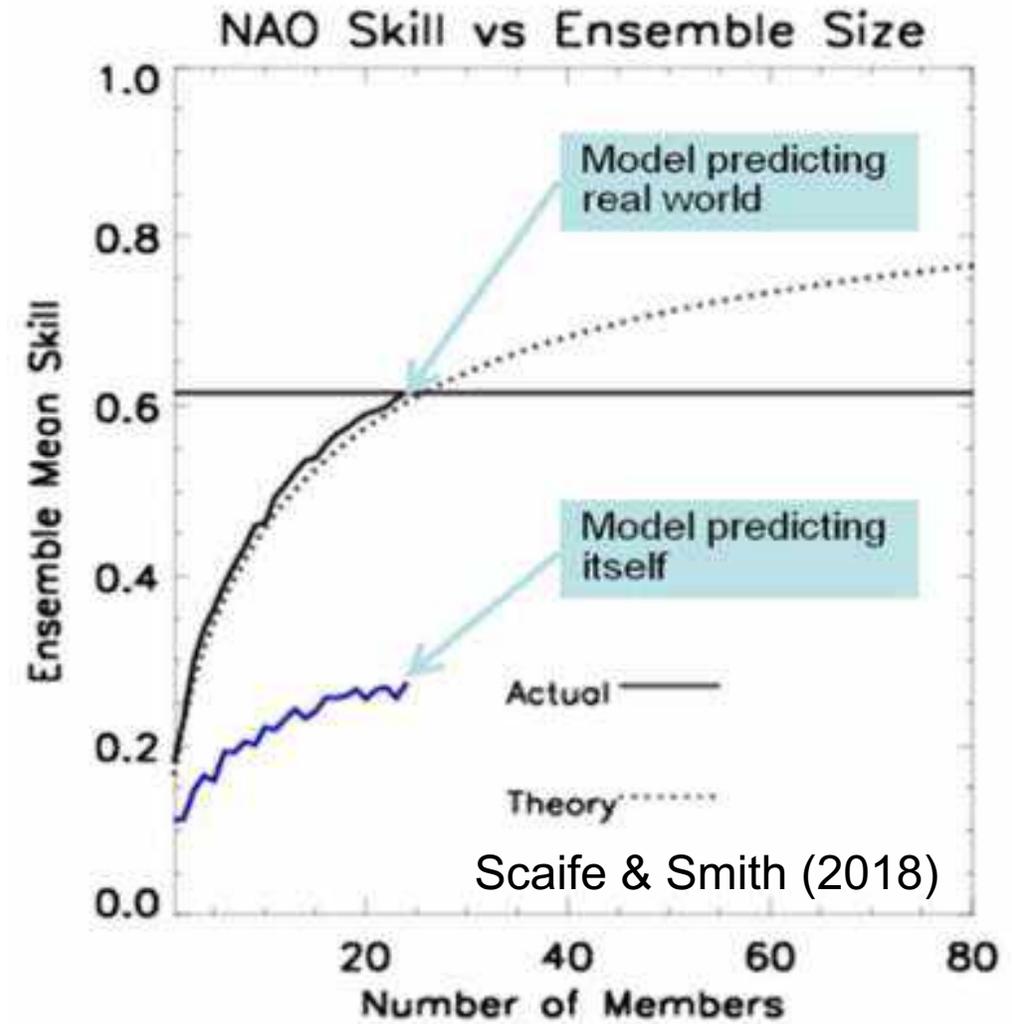
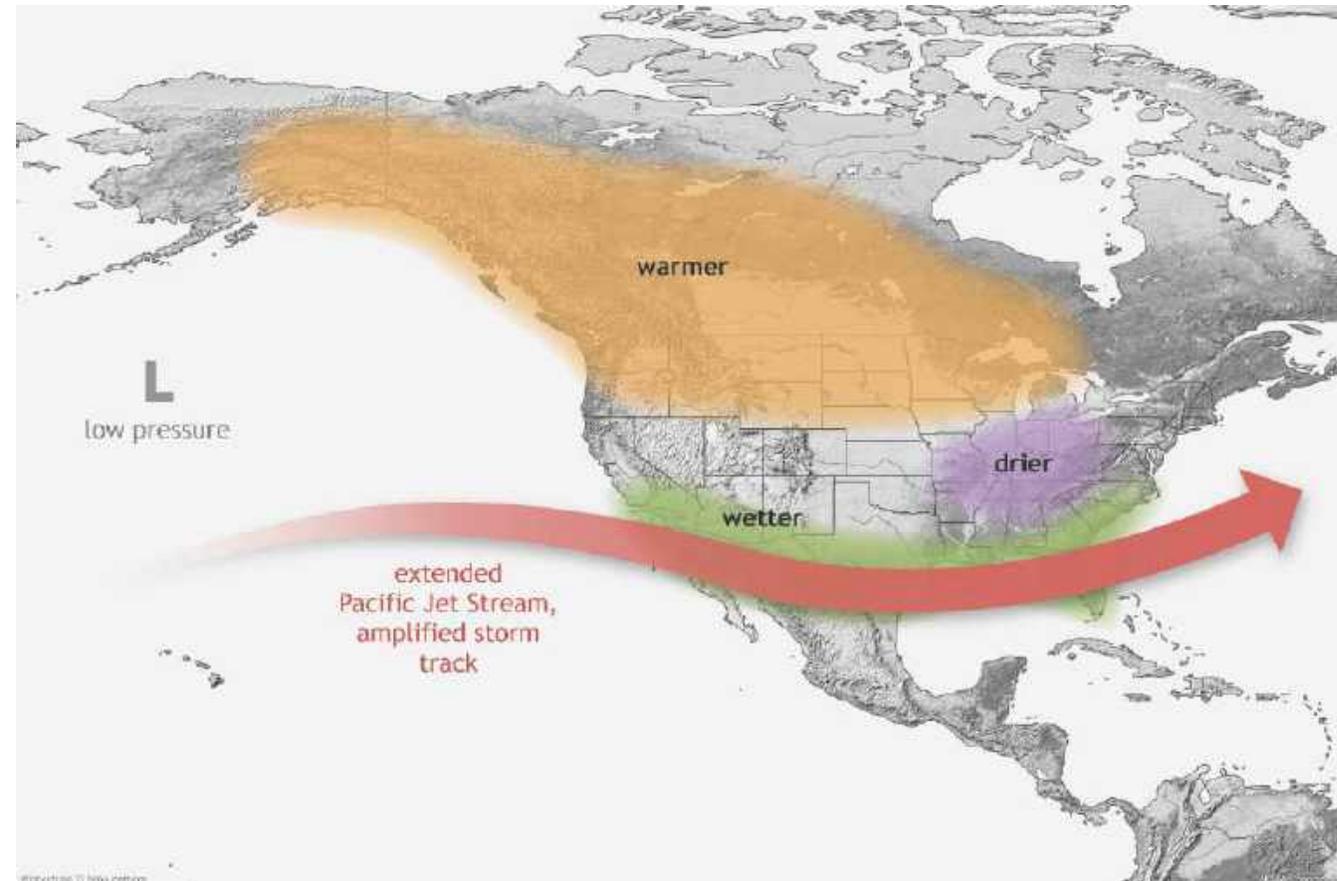
Location of known model-observation trend discrepancies



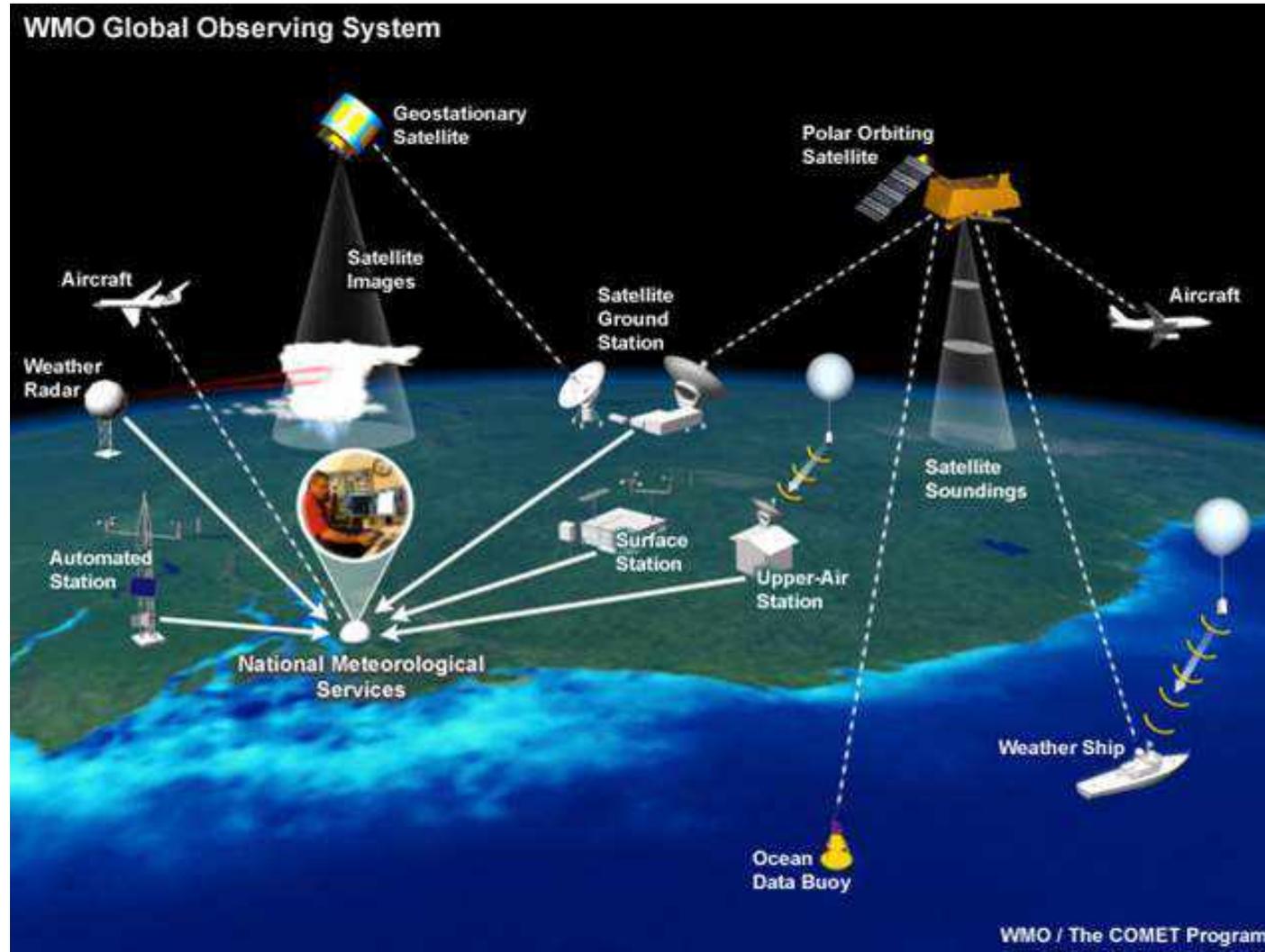
Climate models may not reflect what our future will look like



Climate models exhibit long standing biases in teleconnections and emerging puzzles



There is a need to close observational gaps and the challenges to doing so are greater in the Global South



Real-time record shattering extremes tend to fall outside the possible range predicted by models

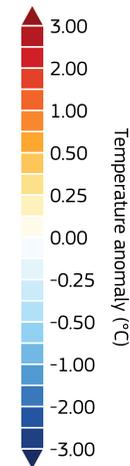
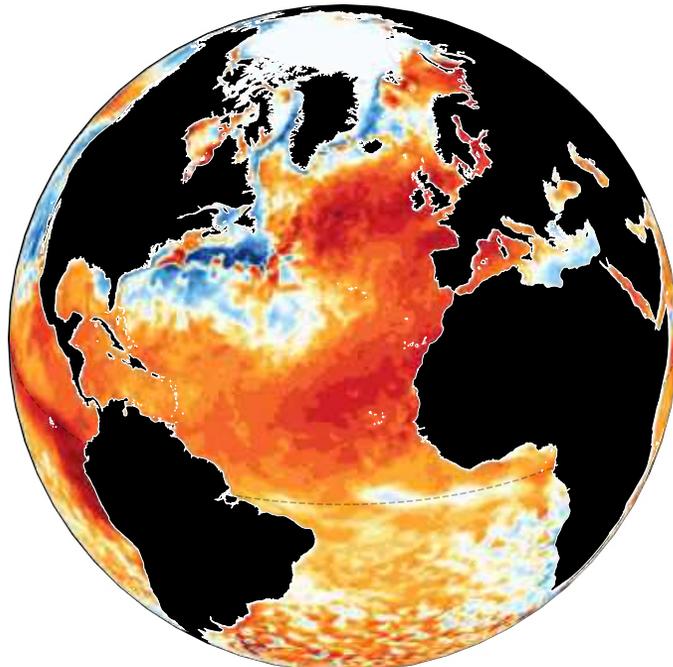
MATT SIMON SCIENCE AUG 28, 2023 7:00 AM

This Brutal Summer in 10 Alarming Maps and Graphs

From the Maui wildfires to ultrahigh ocean temperatures, climate change is leaving its devastating mark on the Earth. It's but a taste of the pain to come.

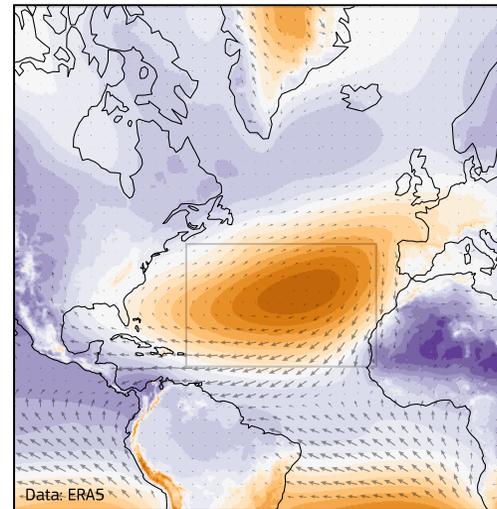
SEA SURFACE TEMPERATURE ANOMALY • JUNE 2023

relative to June average for 1991–2020

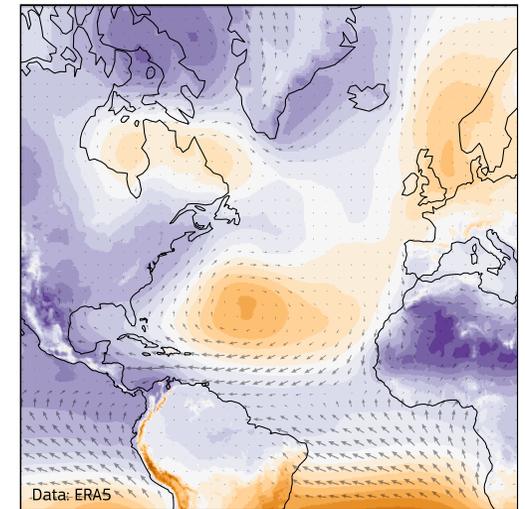


Data: ERA5
Credit: C3S/ECMWF

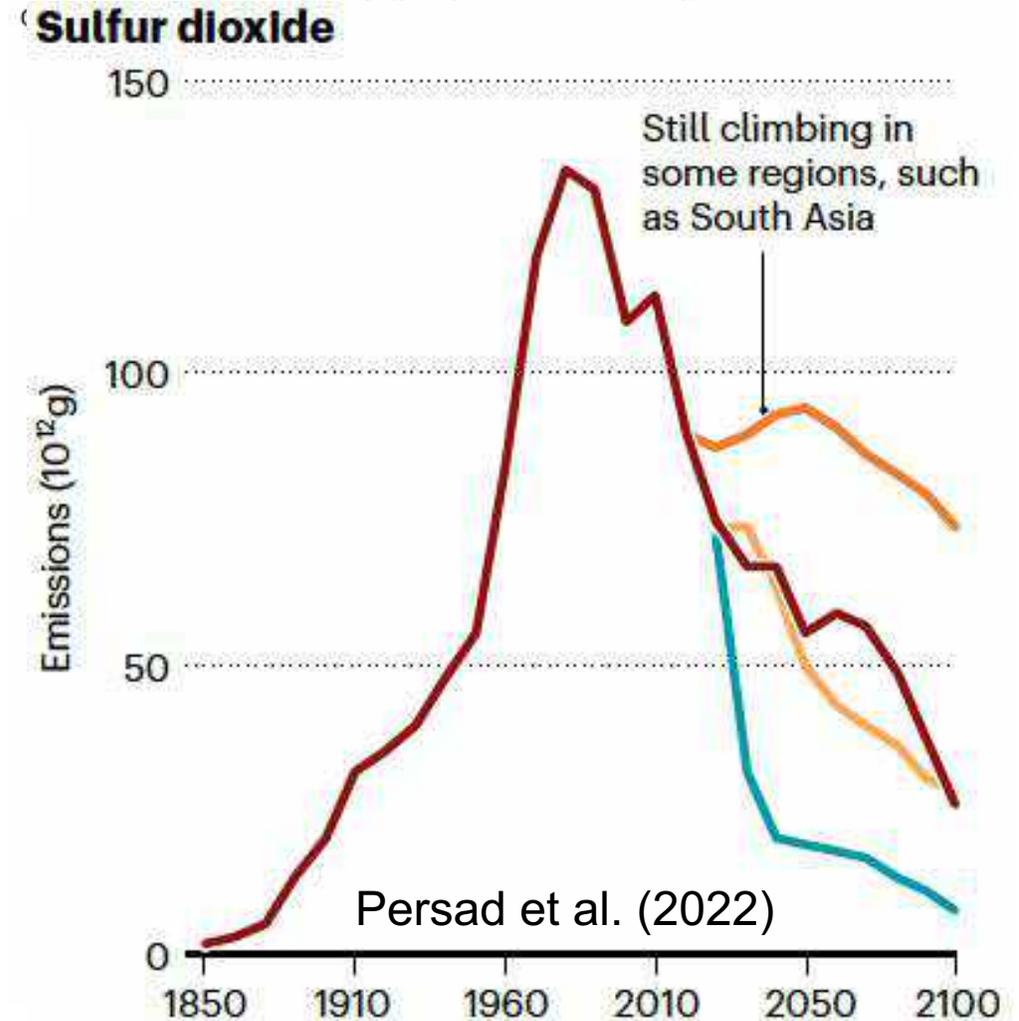
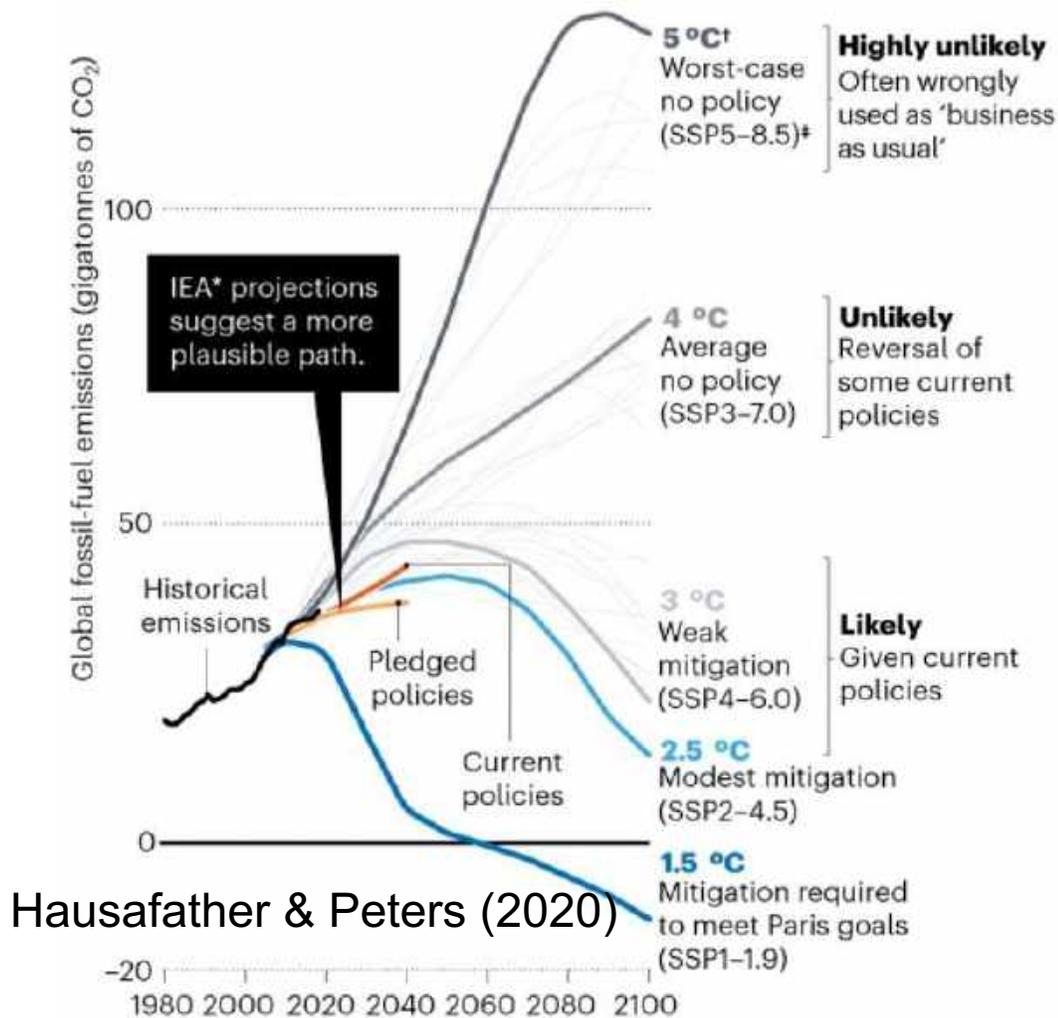
June climatology



June 2023



Regional climate change signal depends on how different forcings & internal variability interact



Without a clear understanding of the causes of the puzzles and model-observation discrepancies it will be difficult to

- effectively communicate the impacts of regional climate change to the public**
- produce actionable climate information for downstream applications.**



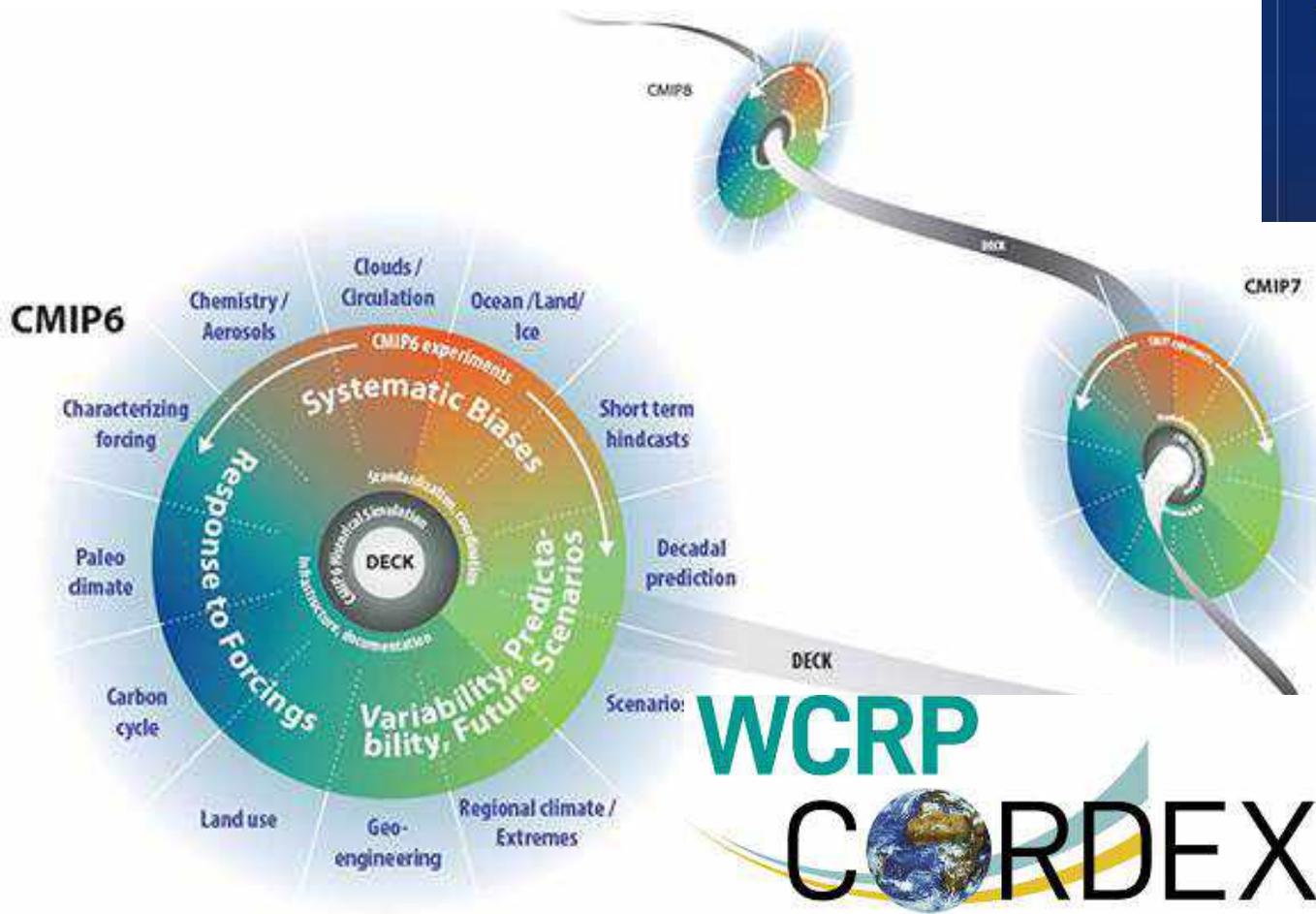
Prioritize resources for evaluating regional climate trends in order understand where and why models go wrong

NATURAL ENVIRONMENT

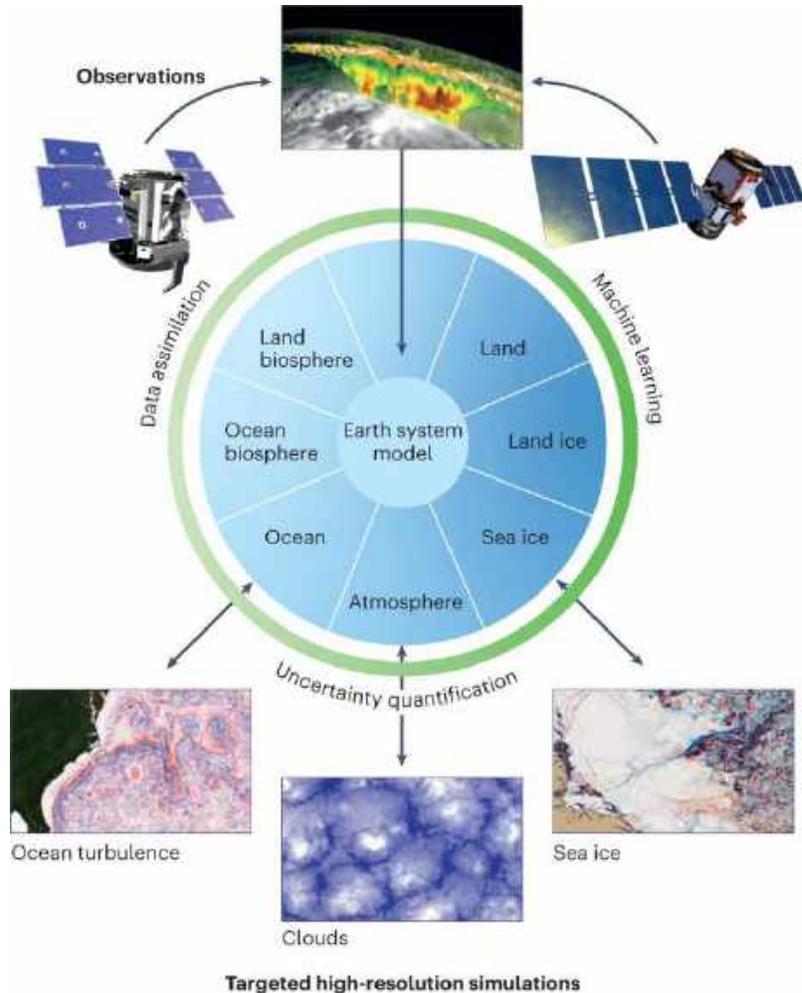
The first African-based Earth system model

By Prof. François Engelbrecht

The CSIR is developing the first African-based Earth system model towards more reliable projections of future climate change over Africa and the Southern Ocean. This is taking place in collaboration with partners in Australia, Japan and France.



Leverage new tools to reveal new drivers and understand model-observation discrepancies



Destination Earth, ECMWF

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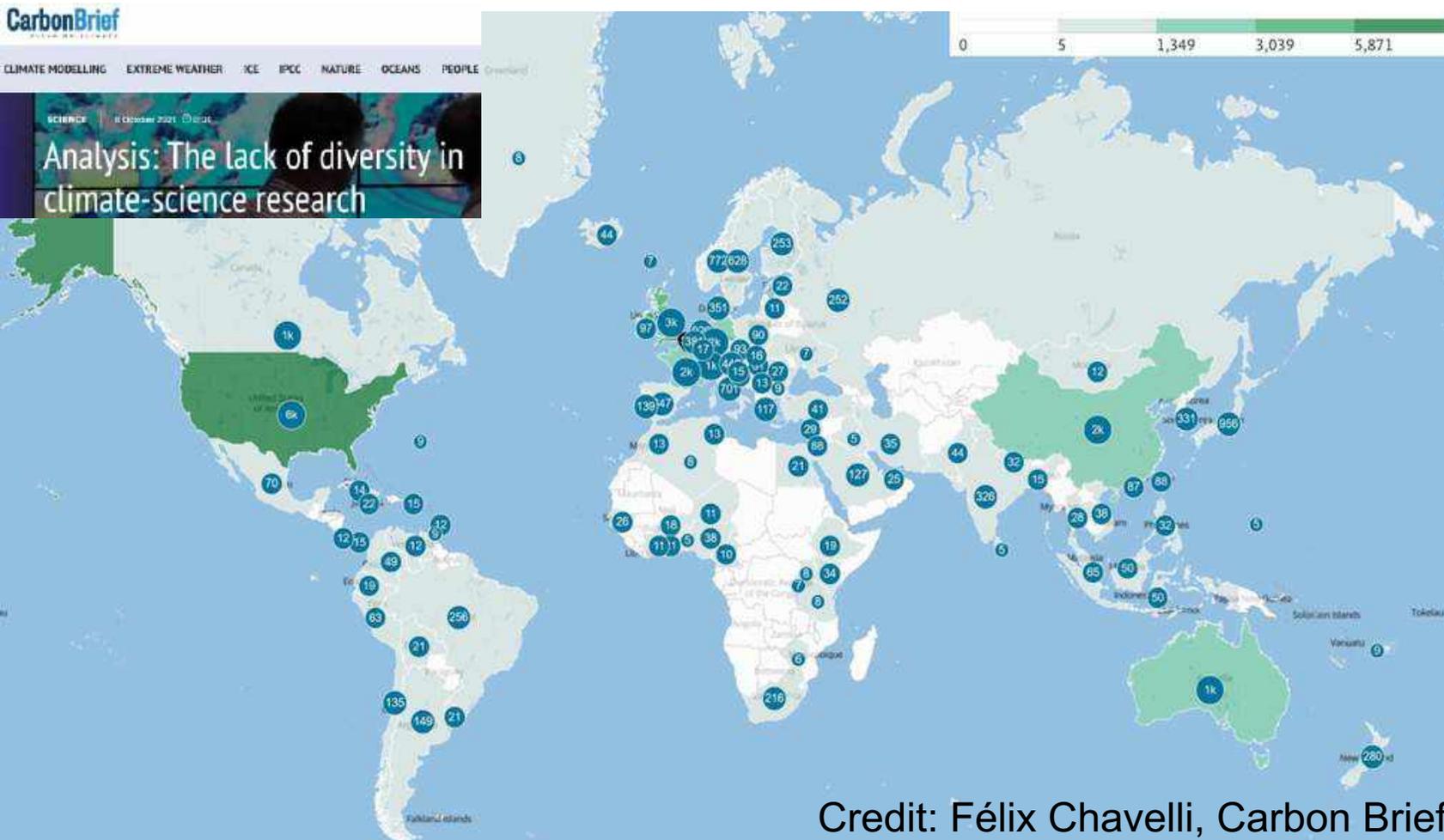
Climate researchers need support to become scientist-communicators

By Daniel Swain



NOAA

Build a more regionally inclusive climate science community that is well-equipped to improve predictions and reduce uncertainties



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Global-south researchers want equal partnerships that value intellectual exchange.

CLIMATE AND DEVELOPMENT
2021, VOL. 13, NO. 10, 853-856
<https://doi.org/10.1080/17565529.2021.1923308>

EDITORIAL

[Equity in climate scholarship: a manifesto for action](#)

Credit: Félix Chavelli, Carbon Brief



My Climate Risk

Explaining and Predicting Earth System Change

Digital Earths

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