WCRP
World Climate Research Programme

Analysis & Prediction

WMO UNESCO IOC ICSU International Council for Science

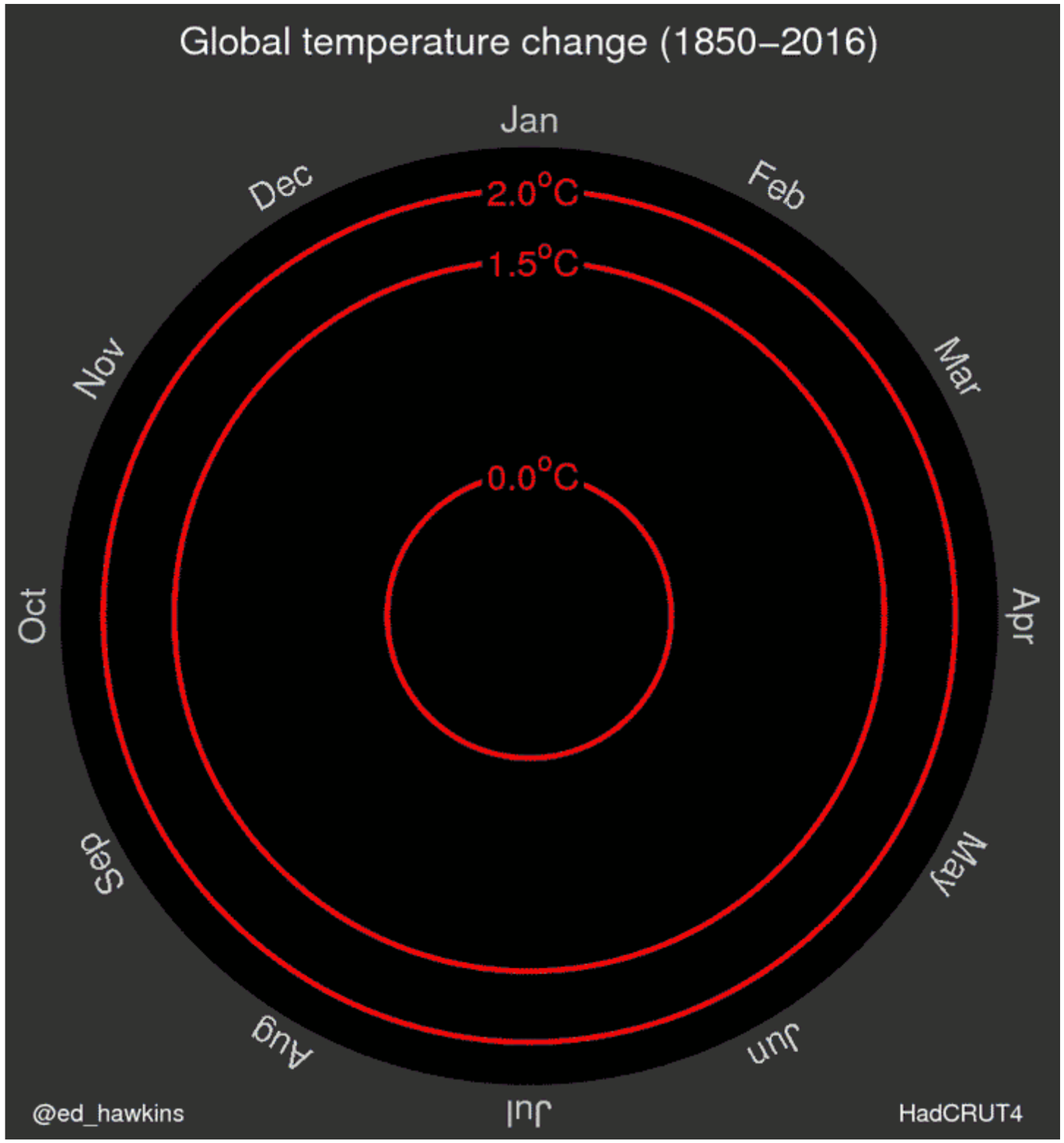
At UNFCCC request:

- Address 1.5ºC
- Slow onset climate processes
- Regional integration with CORDEX

Rapidly approaching 1.5°C:

From Ed Hawkins,

Univ. of Reading



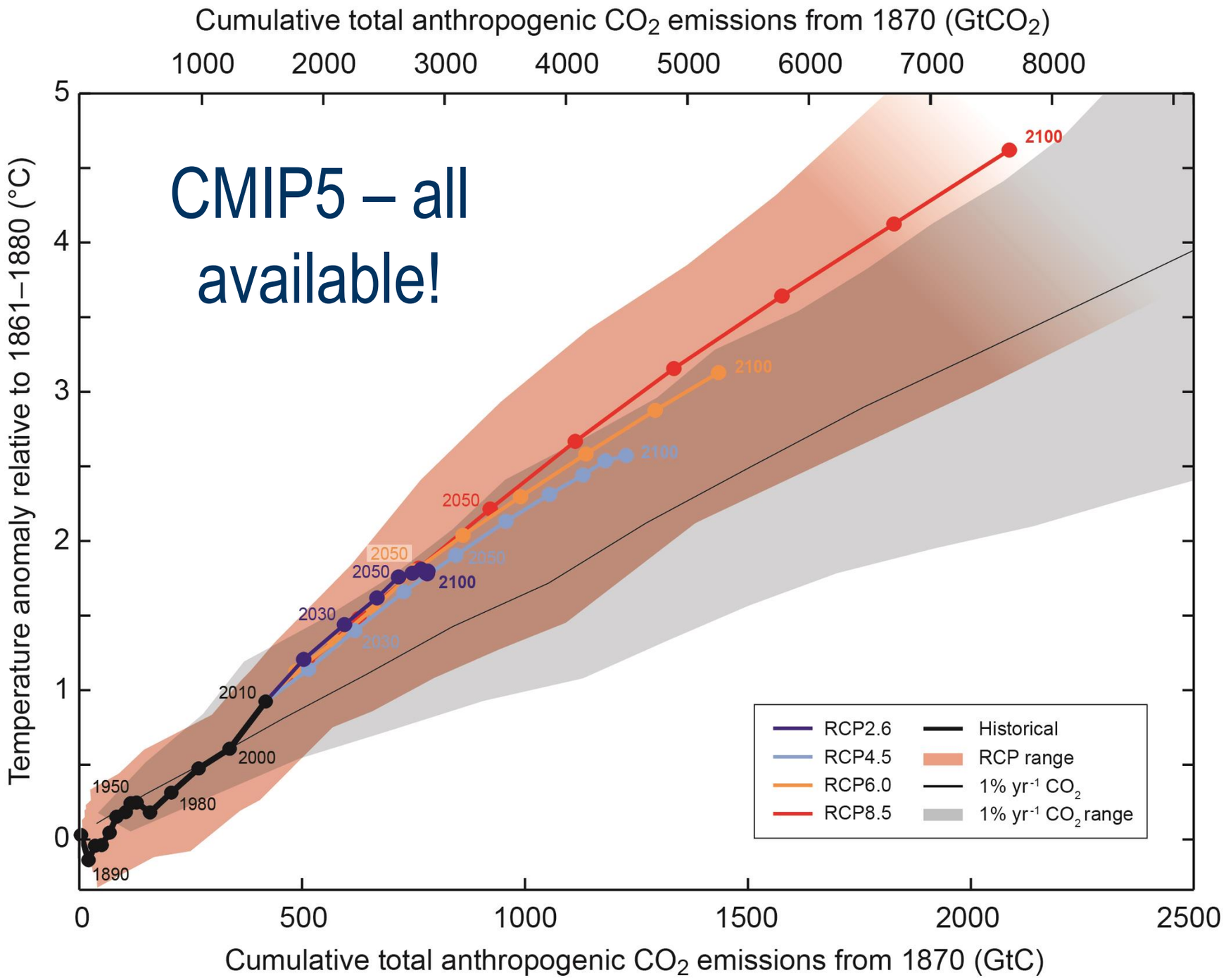
Record includes:

- 2 large volcano eruptions
- Strong El Ninos
- Solar Cycles

WCRP support of CoP 21:

- CMIP5 runs at low RCP ✔
- Regional models for Europe ✔
- Regional atlas and indices for Africa ✔?
- Global models at low SSP ✔?

Low emissions scenarios in CMIP5



WGI_AR5_FigSPM-10

Low emissions scenarios in CMIP5

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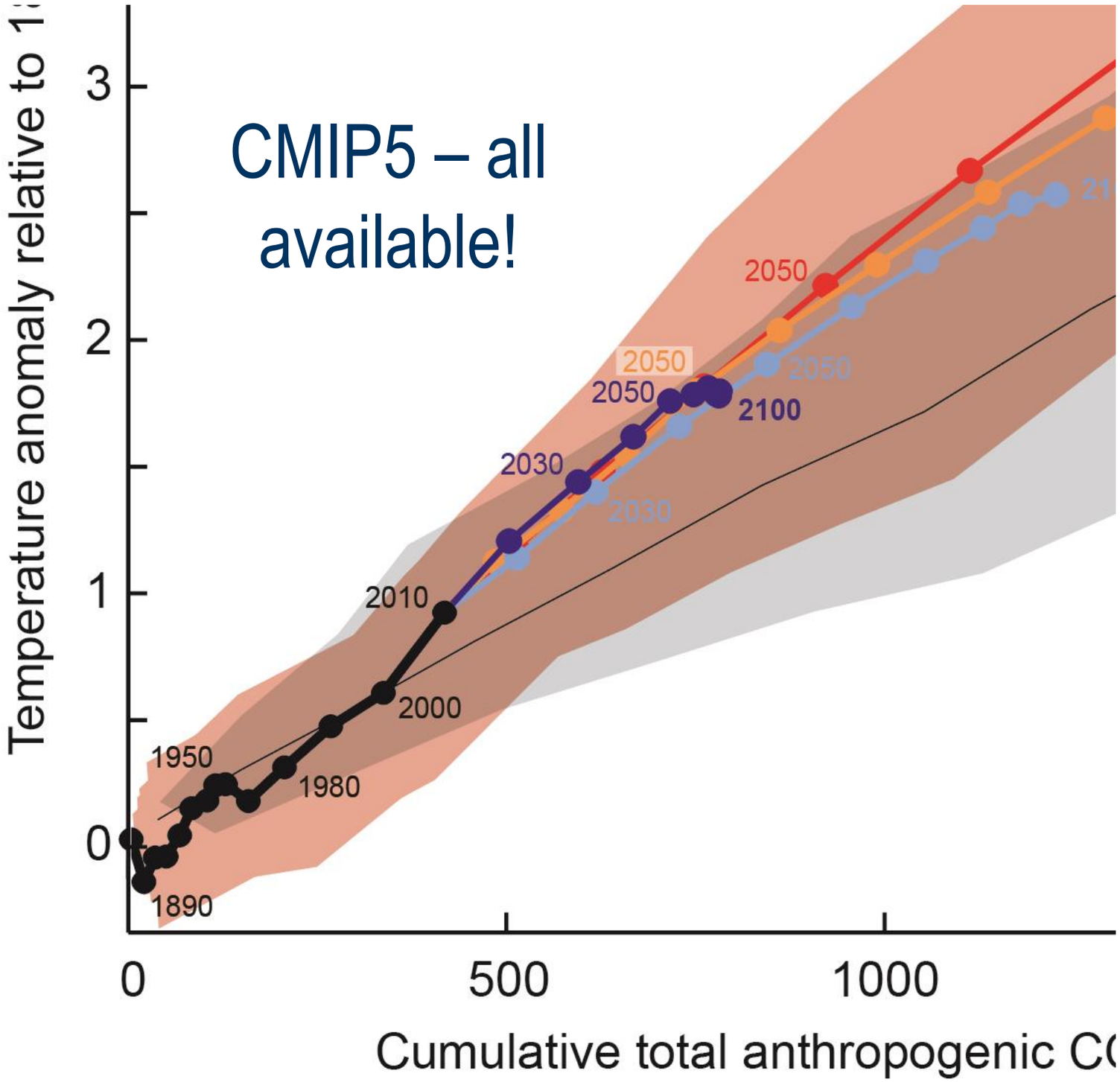
CMIP5 – all available!



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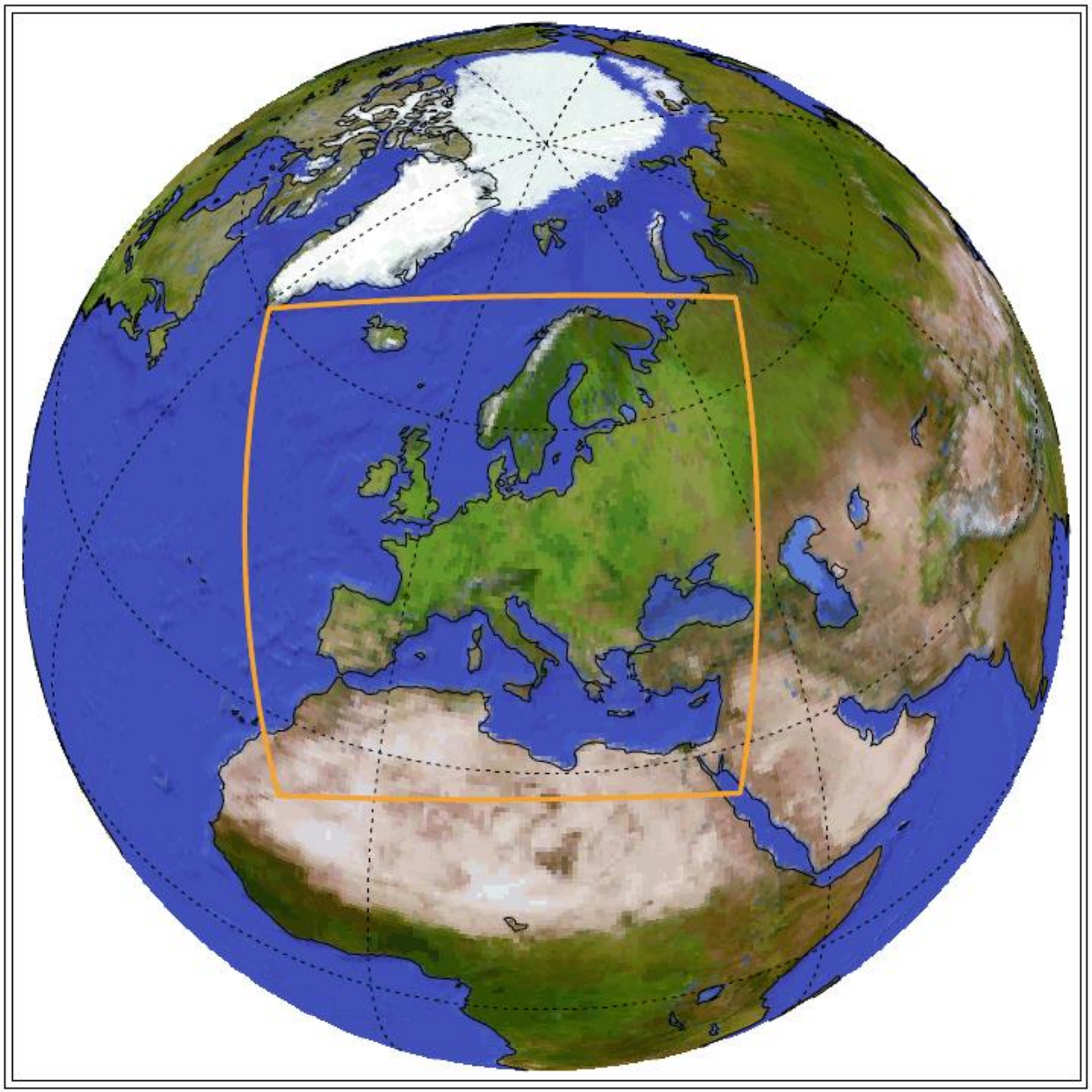
Regional models Euro-CORDEX



Propose 3 runs at RCP2.6

When: now

Regional models CORDEX Africa

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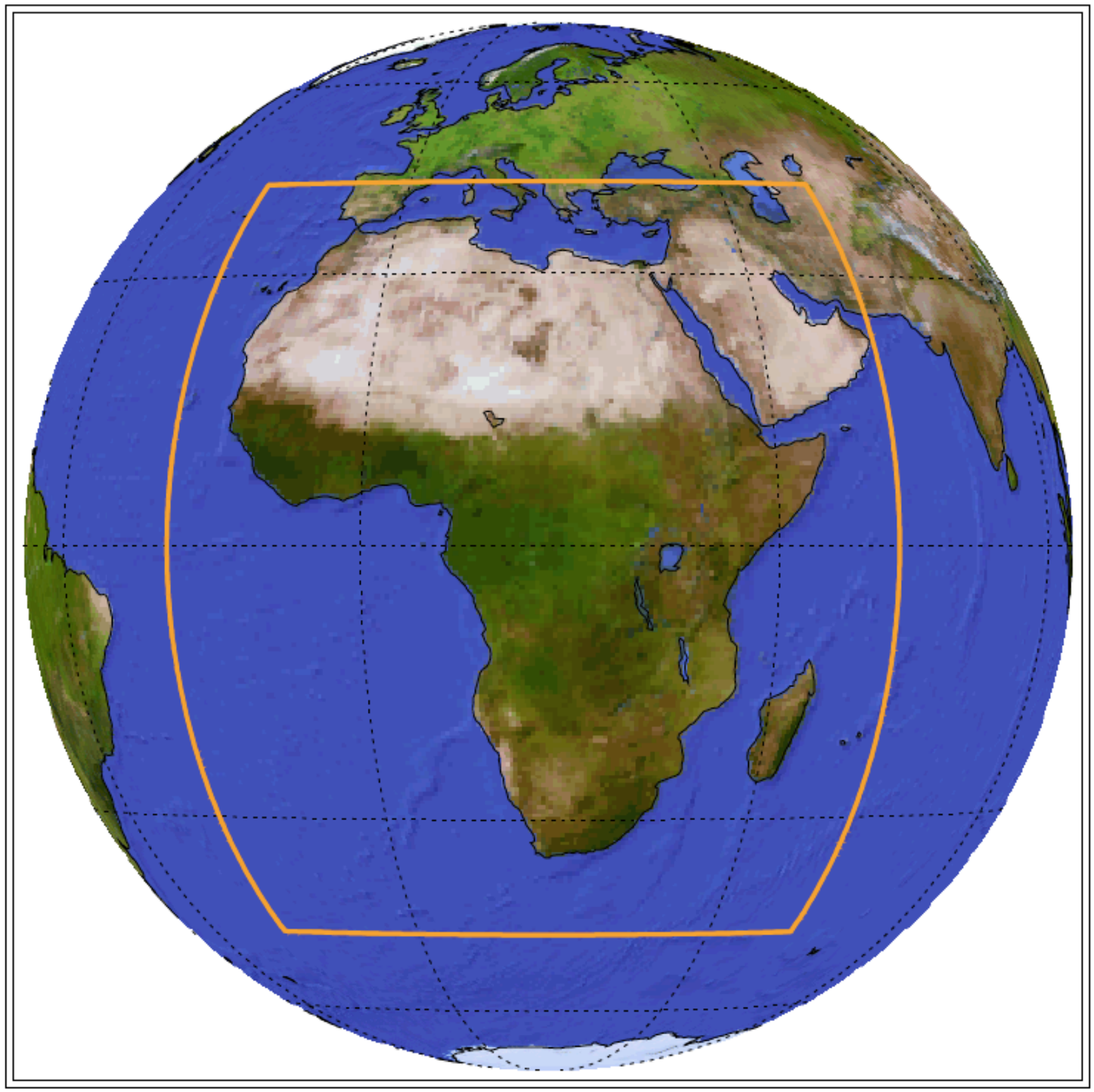

Analyse 1.5, 2, 3 and 4°C

Atlas, sector-specific indices

When: 2017, 2020

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Low C emissions scenarios in CMIP6:

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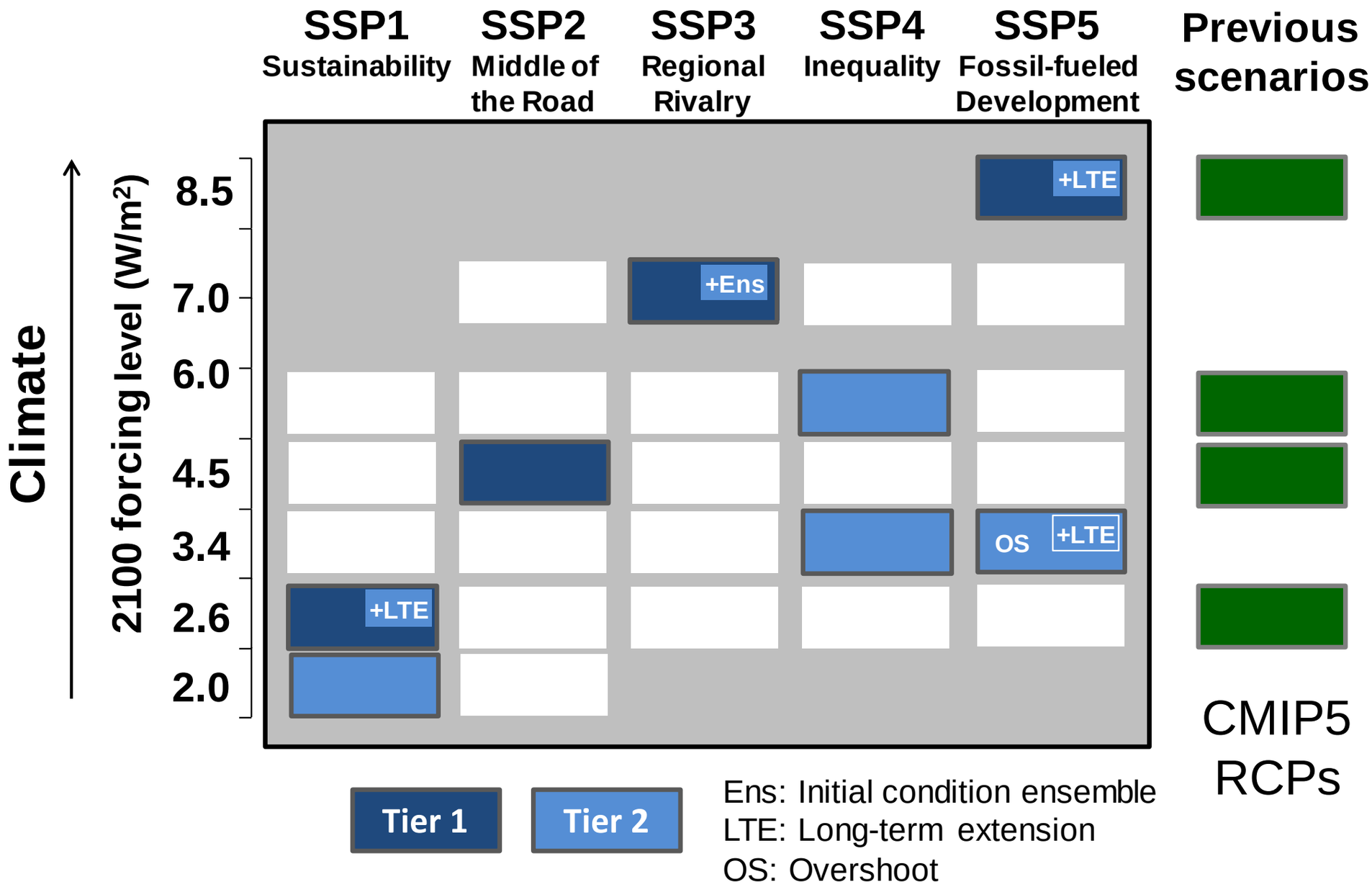
Shared Socioeconomic Pathways



O'Neill et al., ScenarioMIP for CMIP6, GMDD, in rev., 2016

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Low C emissions scenarios in CMIP6:

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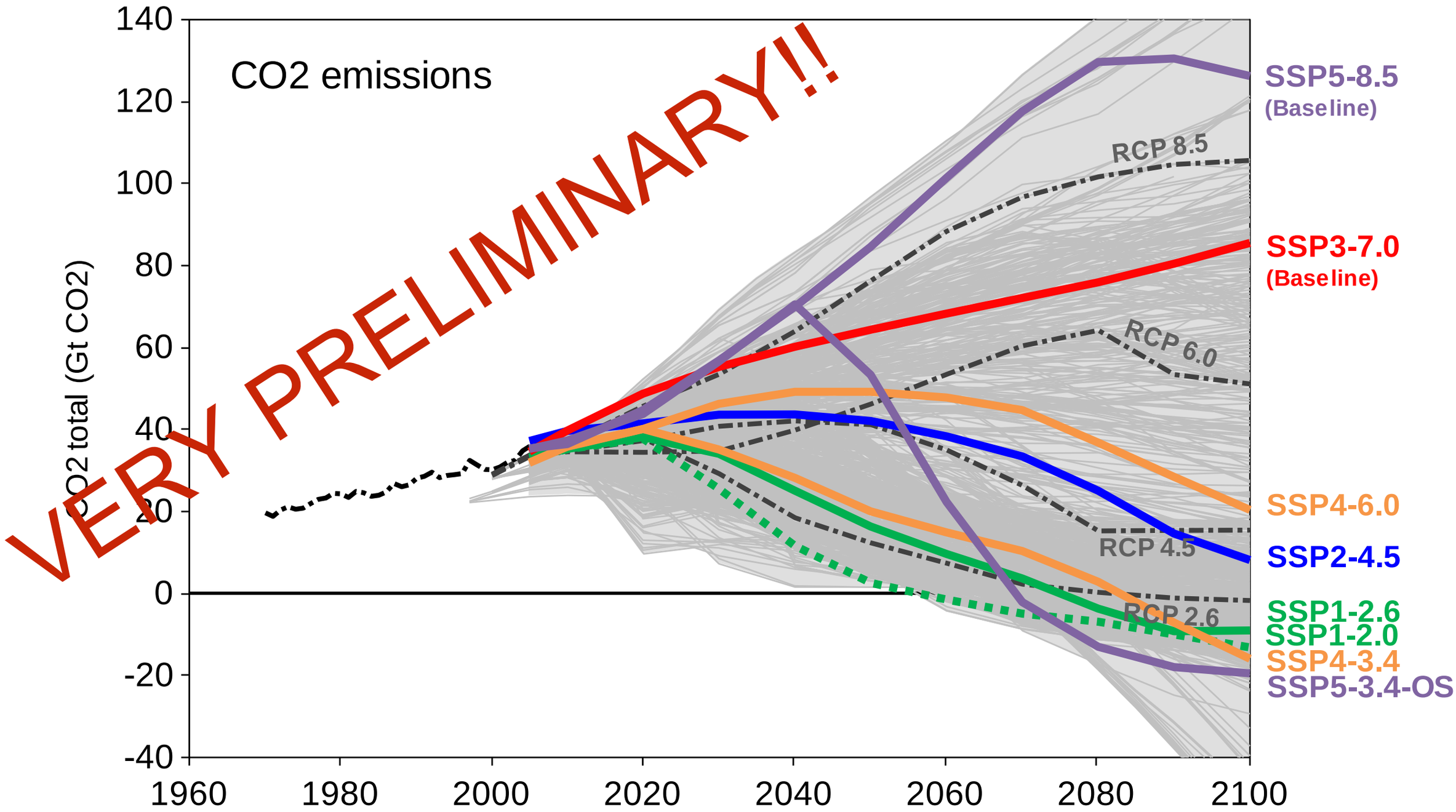

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Fast and slow impacts:

CO_2 today → Global Surface Air Temperatures

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(7 – 30)

10 years for full impact on: Global Surface Air Temperatures

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10 years for full impact on:

Fast impacts (<10 years)

Surface Ocean:

- Sea Ice
- Coral Bleaching
- Surface acidification

Land Surface:

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Weather Extremes:

- Precipitation
- Heat

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- Sea level rise
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Ocean Circulation:
- Heat
- Nutrients
- Carbon source/sink

Atmospheric Circulation:
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- Storm tracks

Ecosystem Changes

Fast and slow impacts:

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Ecosystem Changes

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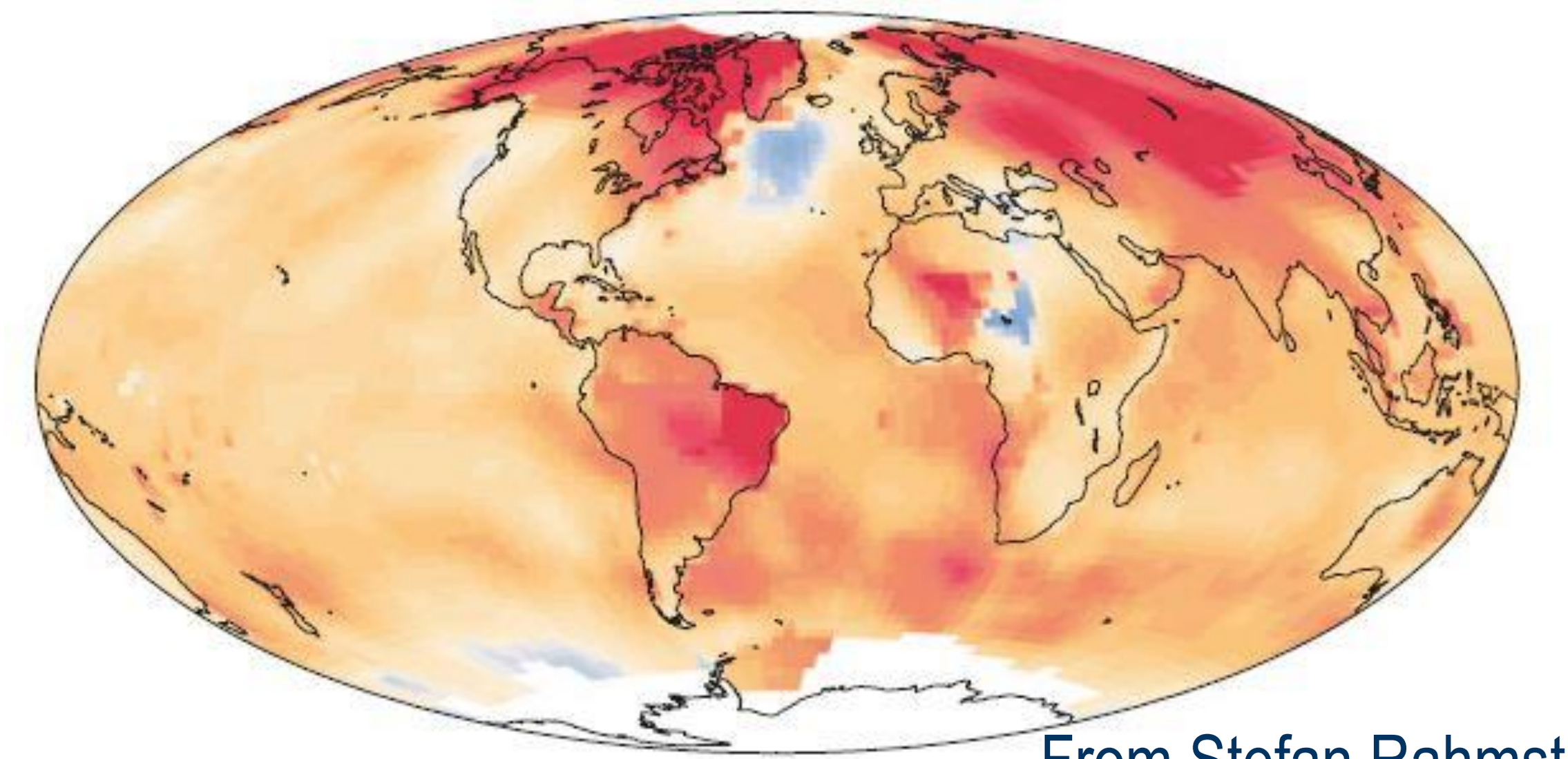
Temperature Trend 1900 to 2013:

World Climate Research Programme



From Stefan Rahmstorf

PIK

-0.8 −0.4 0.0 0.4 0.8 1.2 1.6 2.0 2.4

Linear temperature trend (°C per century)

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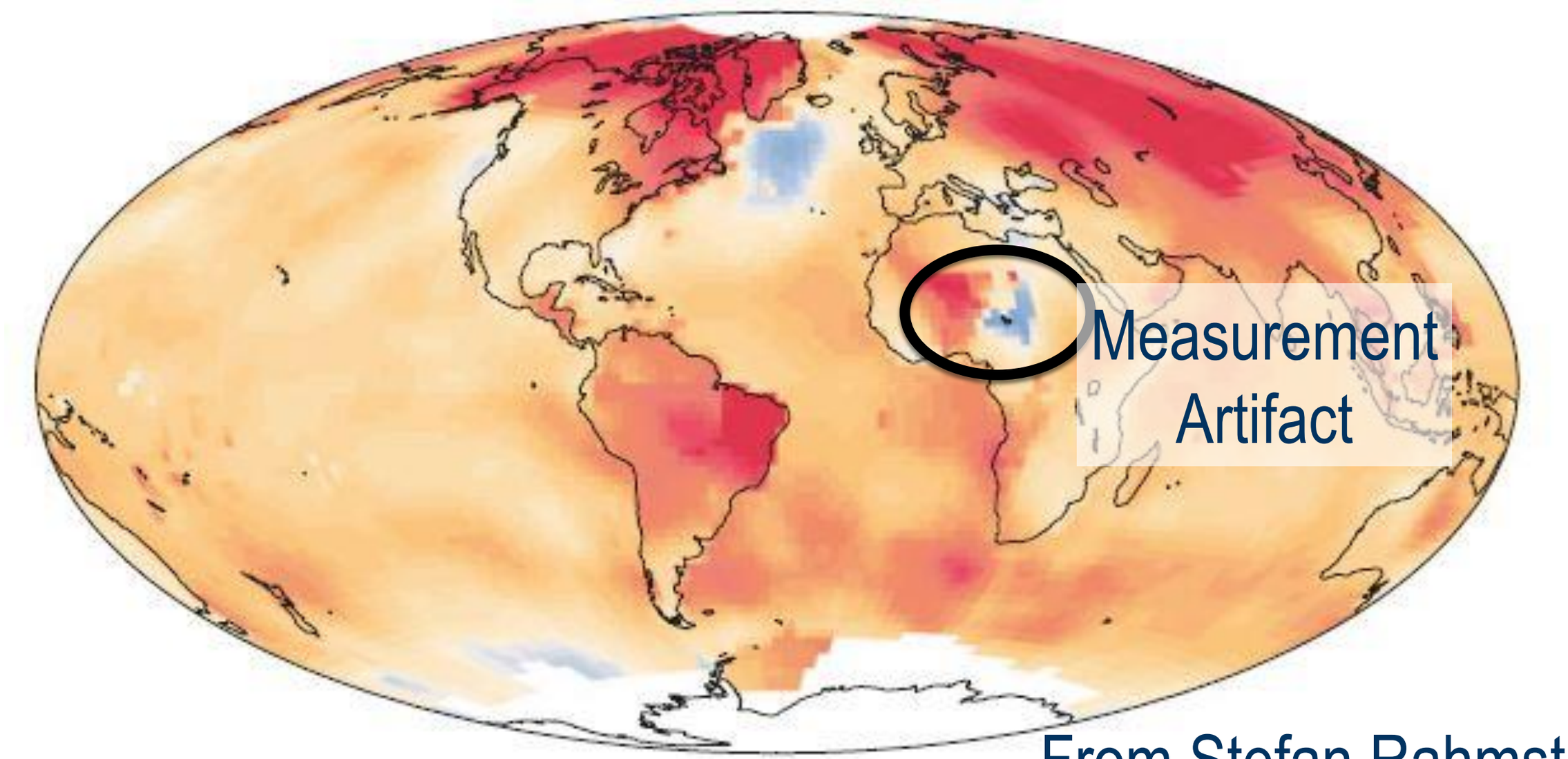

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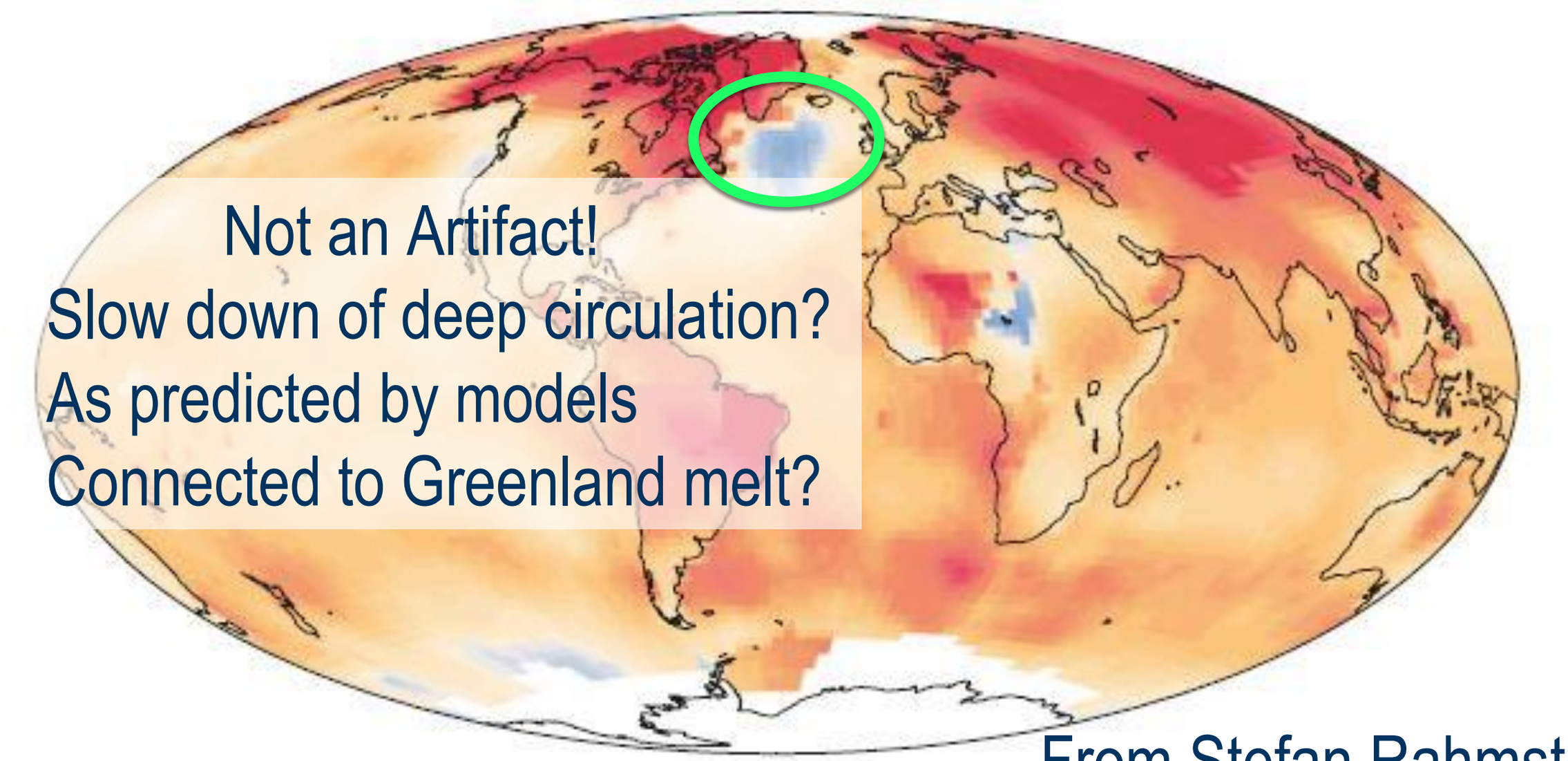
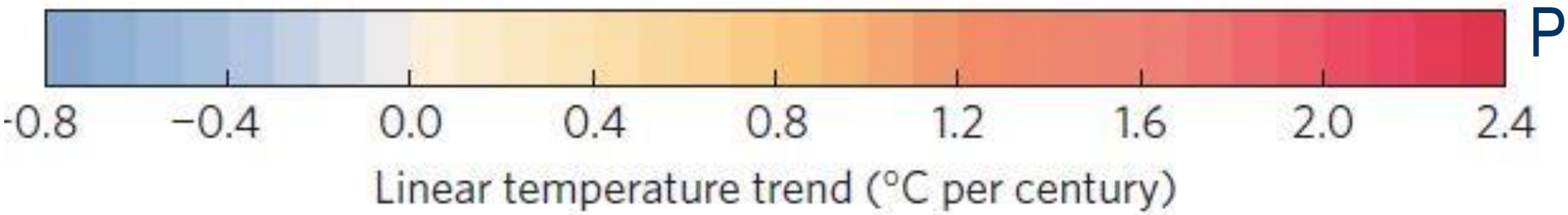


Not an Artifact!

- Slow down of deep circulation?
- As predicted by models
- Connected to Greenland melt?

From Stefan Rahmstorf

PIK



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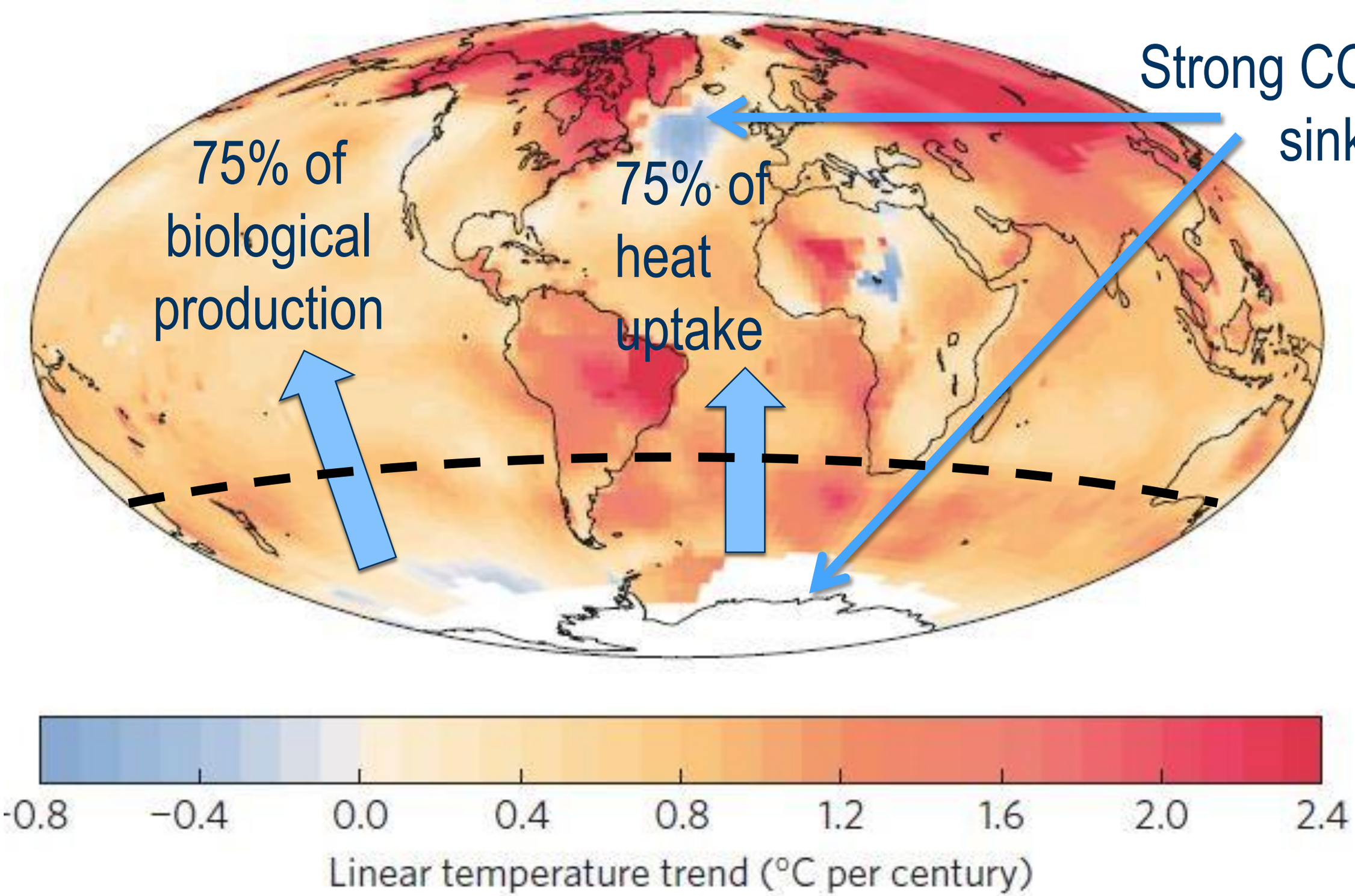
Global deep ocean circulation:



Changes in northern jet stream:

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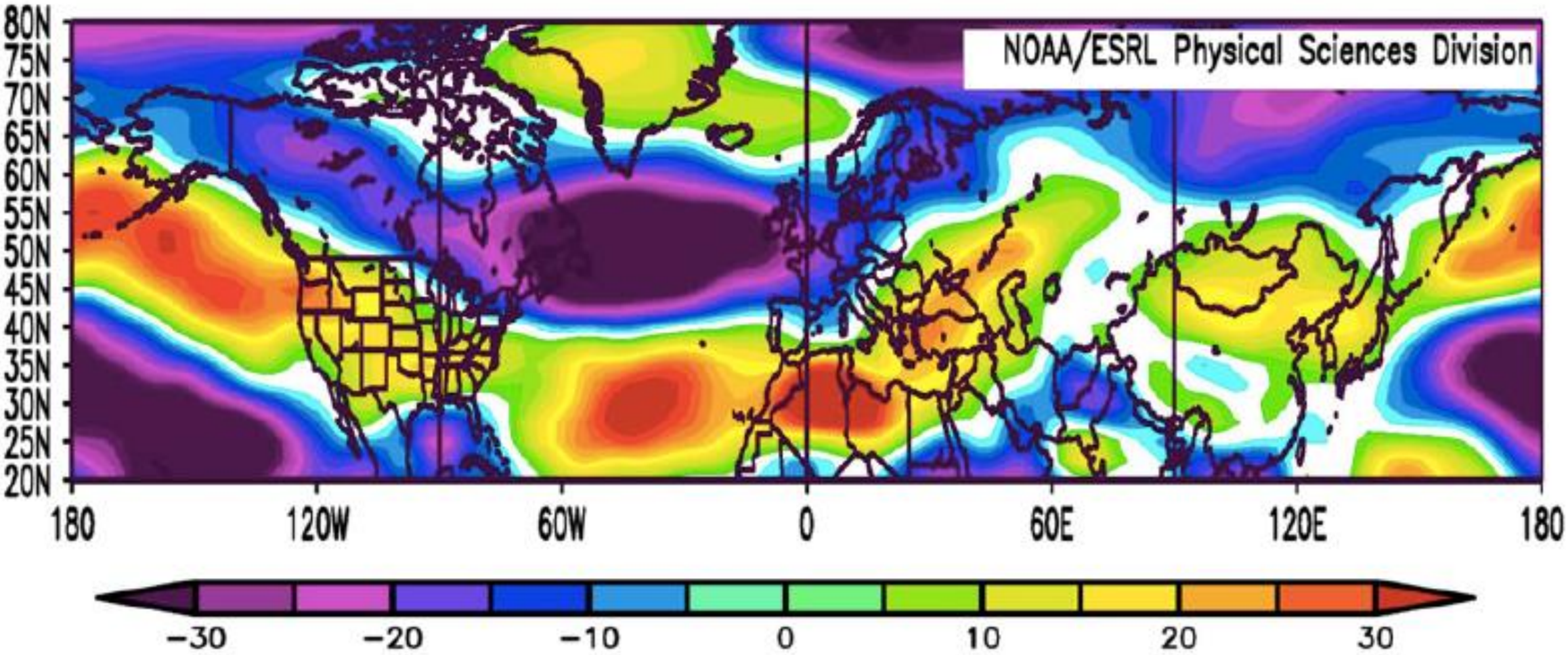

% change, 1995 to 2013

From Francis & Vavrus, 2015

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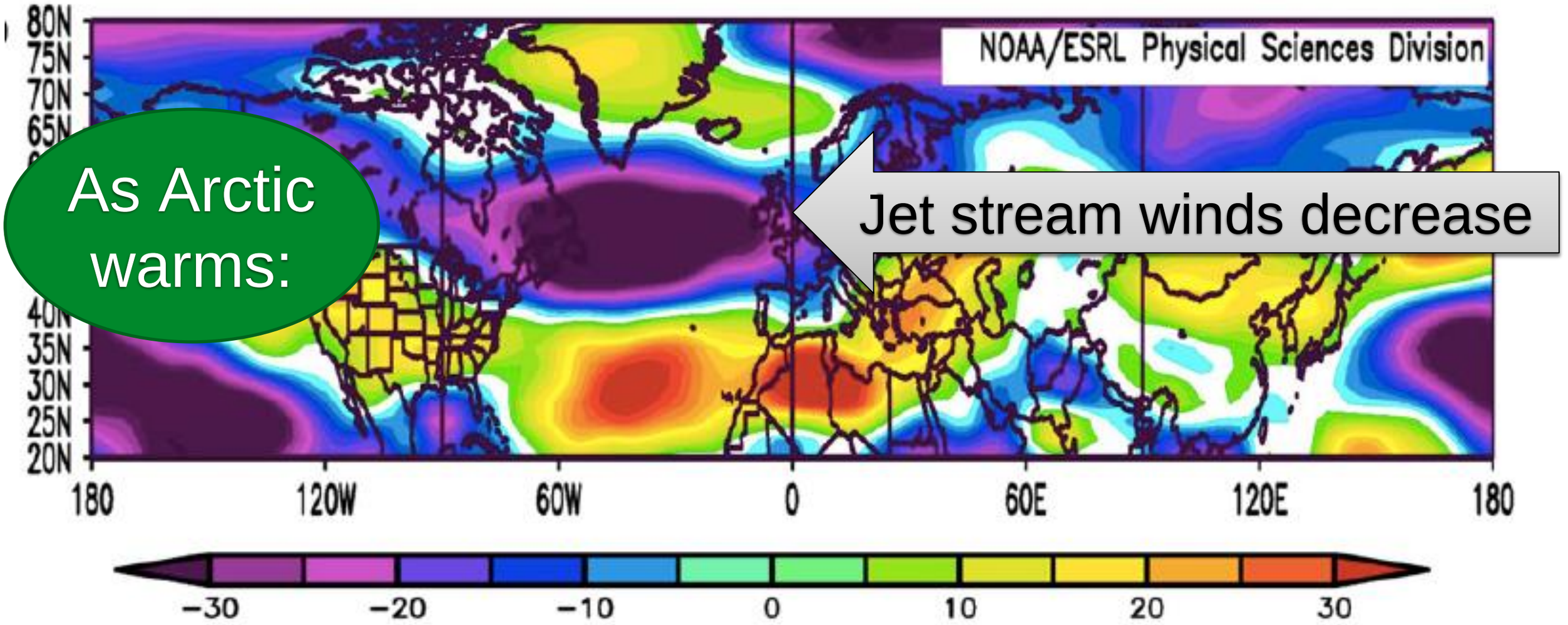


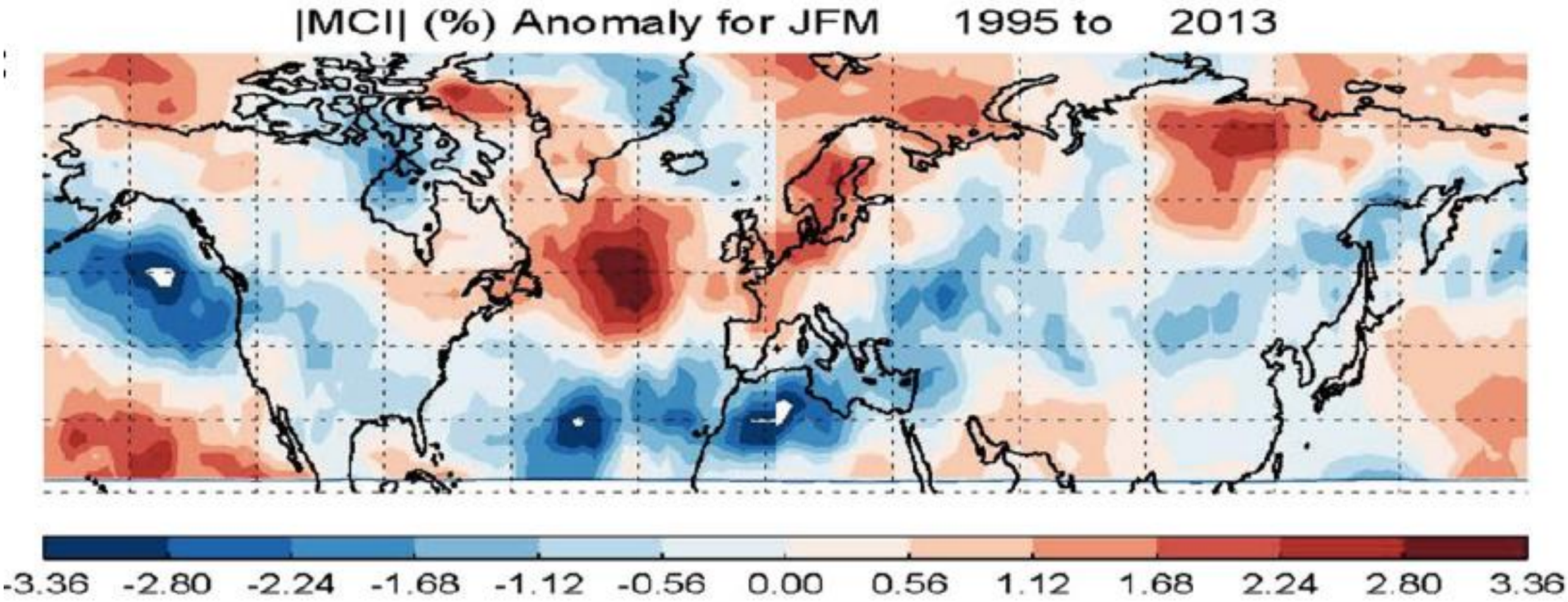
As Arctic warms:

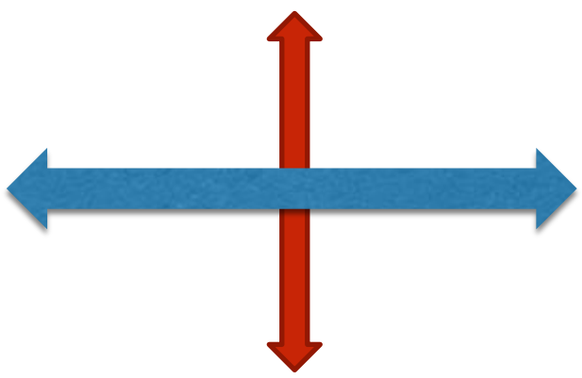
Jet stream winds decrease

% change, 1995 to 2013

From Francis & Vavrus, 2015

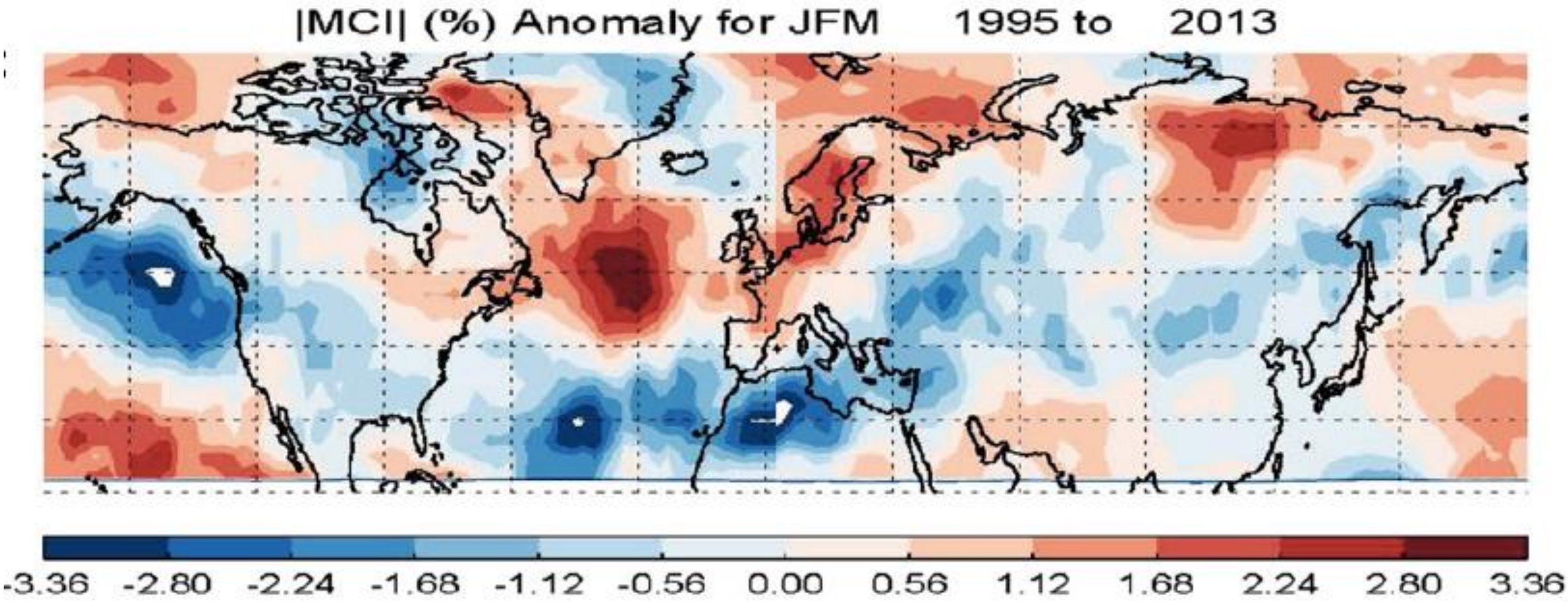
Northern circulation changes:
From Francis & Vavrus, 2015

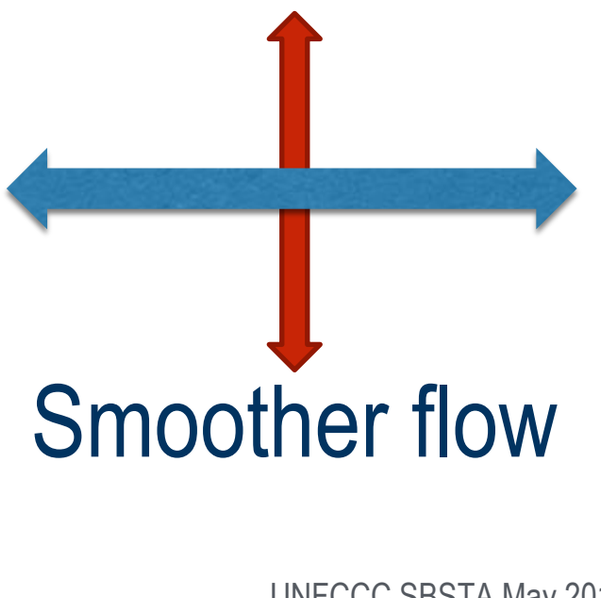




Smoother flow

Northern circulation changes:
From Francis & Vavrus, 2015





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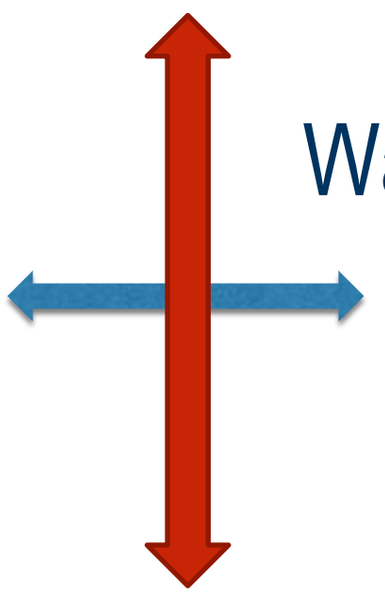
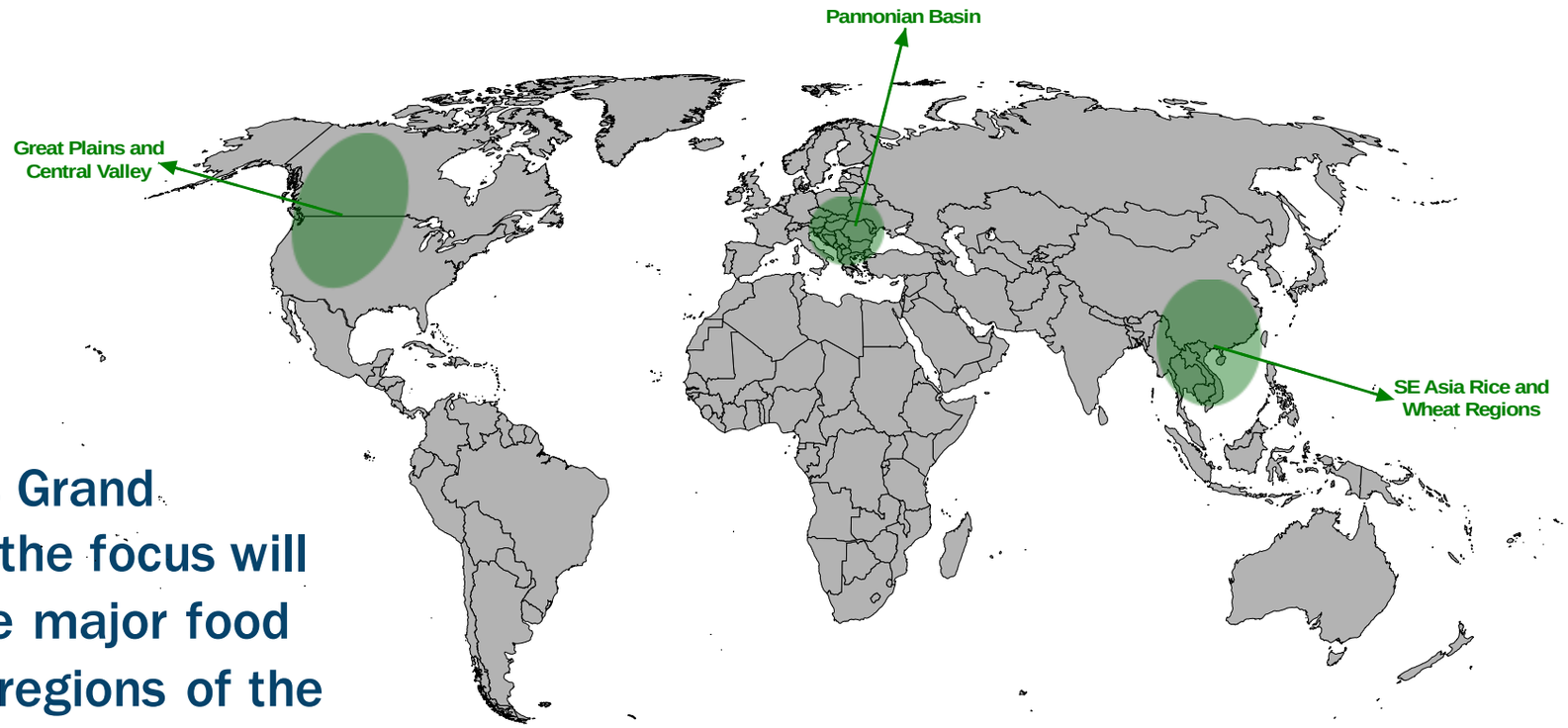


Wavier flow:

- Cold air south, warm air north
- Blocking, persistence
- Events have longer duration

The WCRP Grand Challenge on Water Availability

Water for the Food Baskets of the World

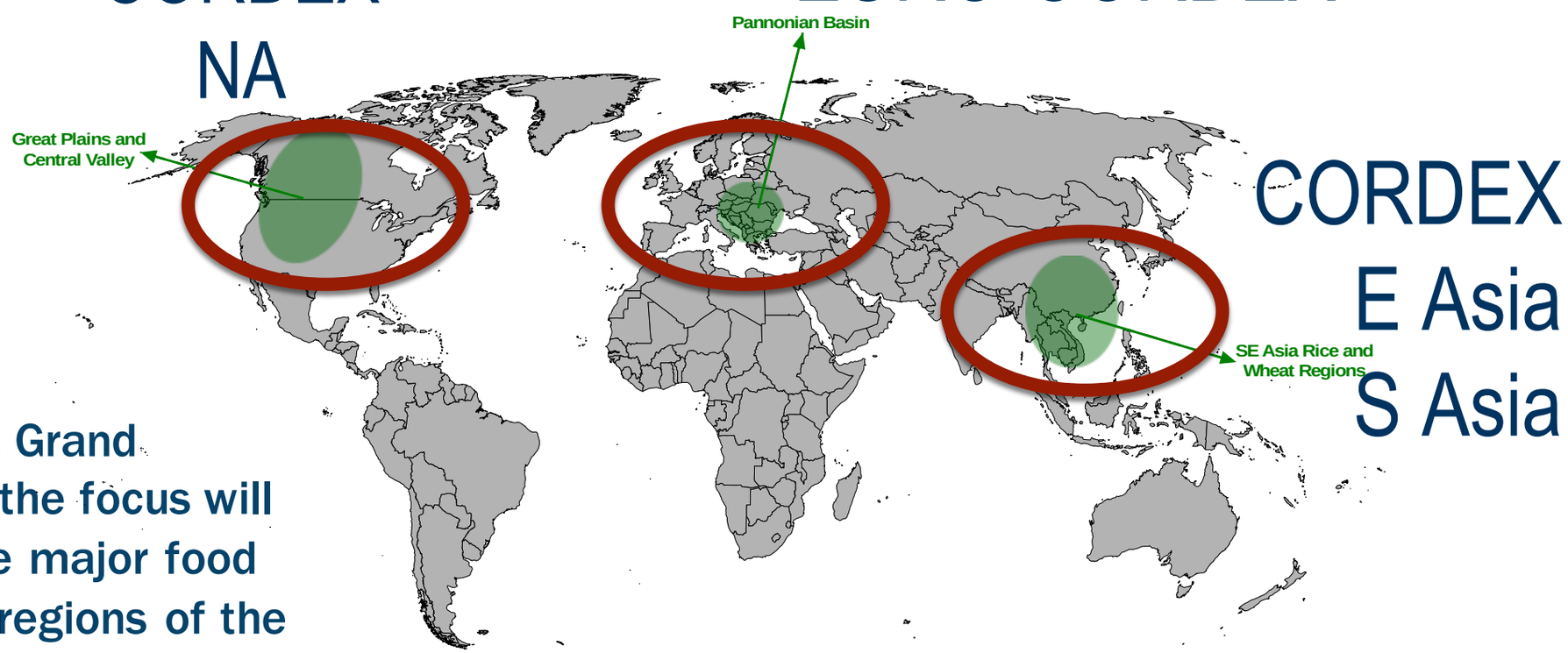


- Within this Grand Challenge the focus will be on three major food producing regions of the world in the context of climatic change

The WCRP Grand Challenge on Water Availability

Water for the Food Baskets of the World

CORDEX connections:



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