Characterization and causes of North Atlantic cold biases in climate models

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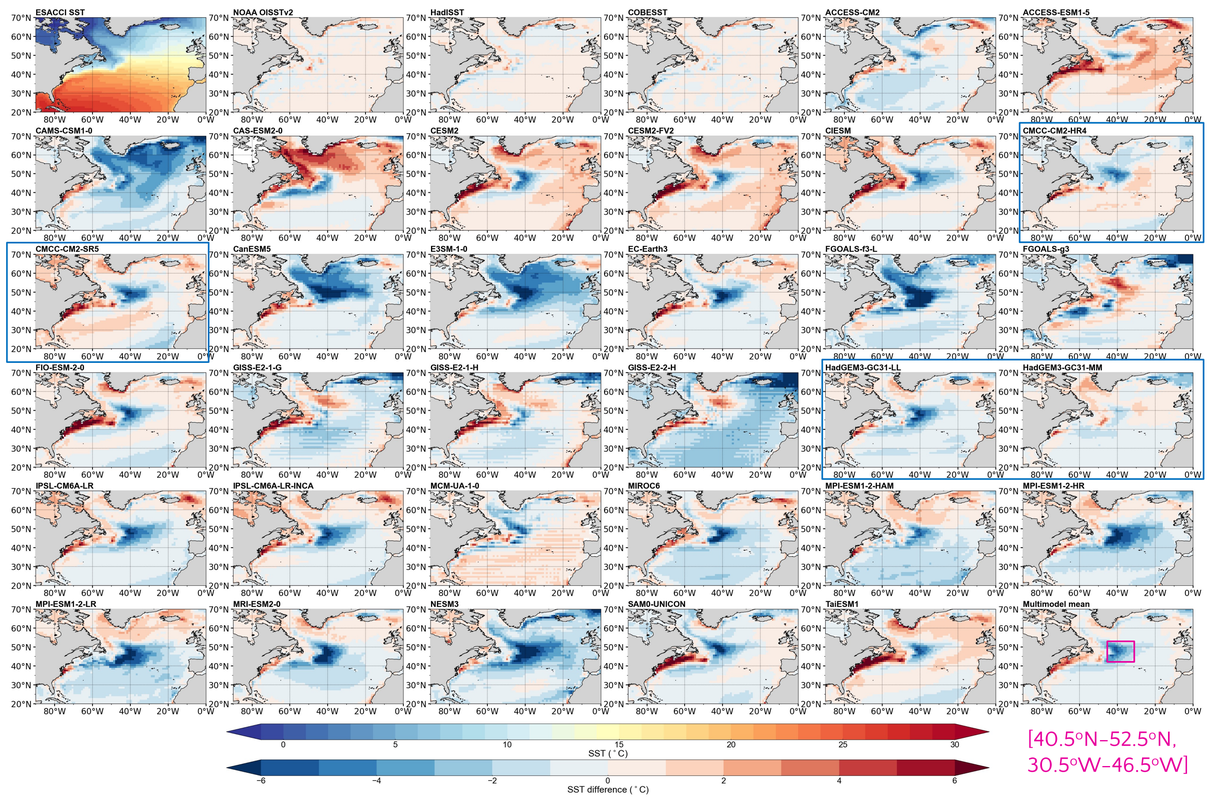
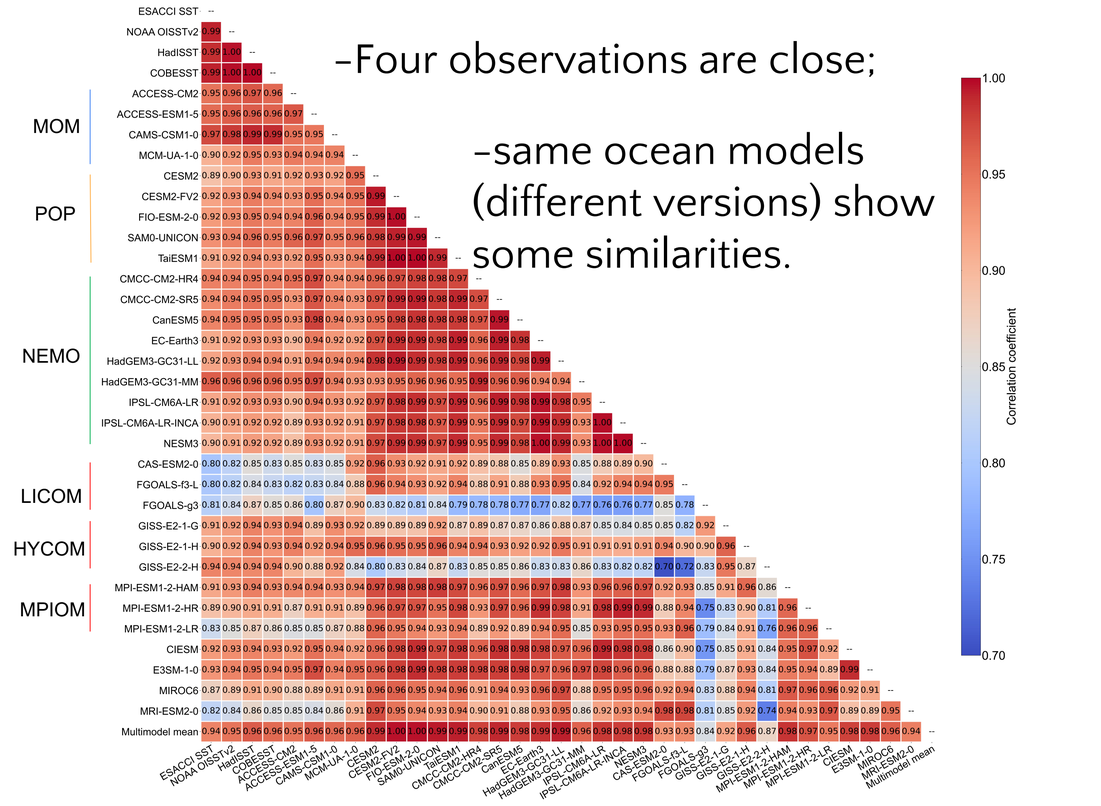
Most climate models simulate **temperatures that are too low** in the North Atlantic (NA). These biases are a primary source of concern, as they directly **affect the skill of predictions and the confidence in projections** in the NA, Europe, Pacific, and the Arctic.

SST and SST difference



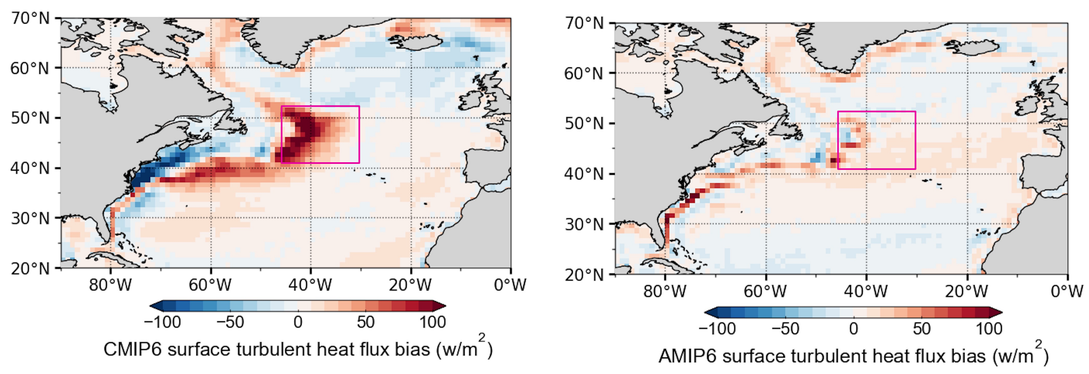
Spatial correlation coefficient



Contributions from the **Atmospheric** and **Ocean processes** are studied

surface heat flux

2001-2014 MMM CMIP6 & AMIP6 surface turbulent heat flux (THF) bias

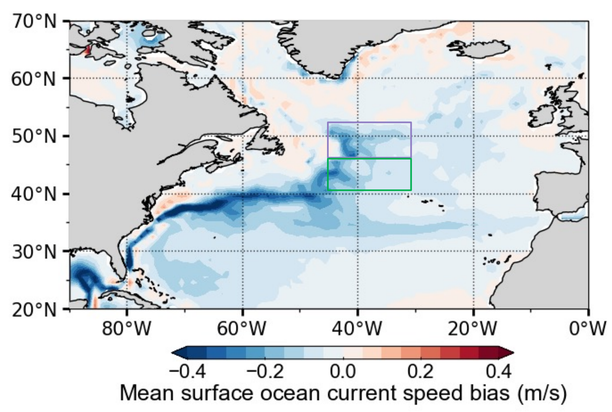


CMIP6 SST bias vs. CMIP6 & AMIP6 THF bias

SST bias induced turbulent heat flux bias

horizontal heat transport and vertical mixing

2001-2014 MMM CMIP6 surface ocean current speed bias



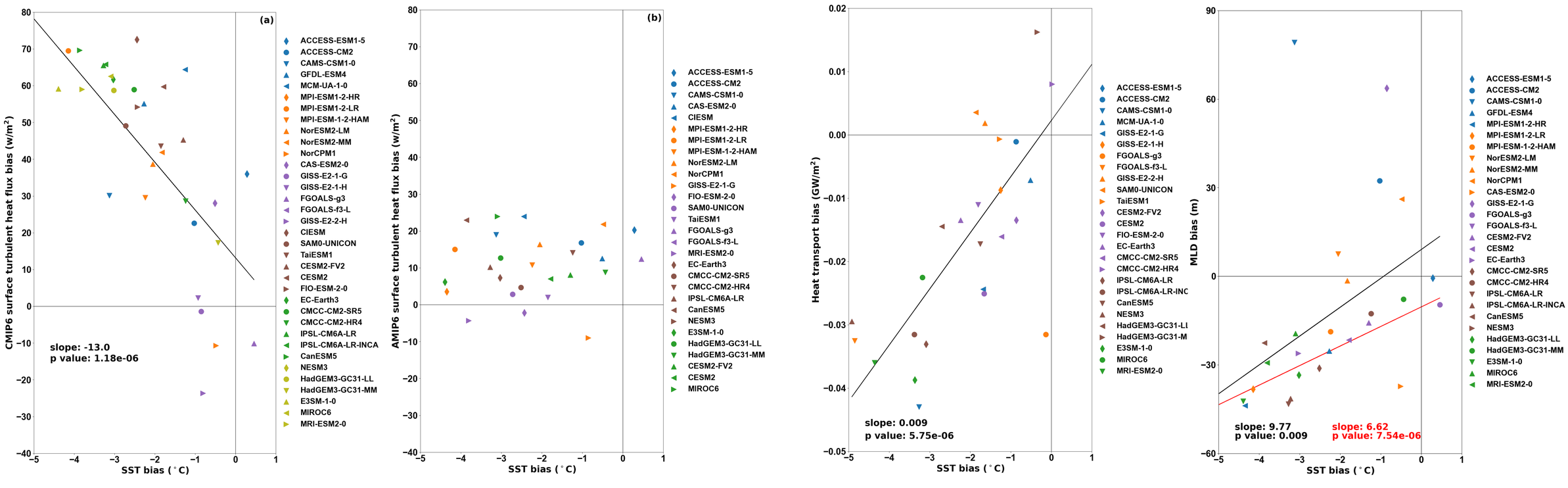
[40.5°N-46.5°N, 30.5°W-46.5°W]

Weak Gulf Stream induced weak heat transport and cold SST bias

MLD bias is a not a reason

CMIP6 SST bias vs. heat transport bias across 46.5°W

CMIP6 SST bias vs. MLD bias



Any comments/questions? Get in touch! xia.lin@uclouvain.be

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