

Sources and land capacitor effects driving Arctic moistening and warming

Ian Baxter

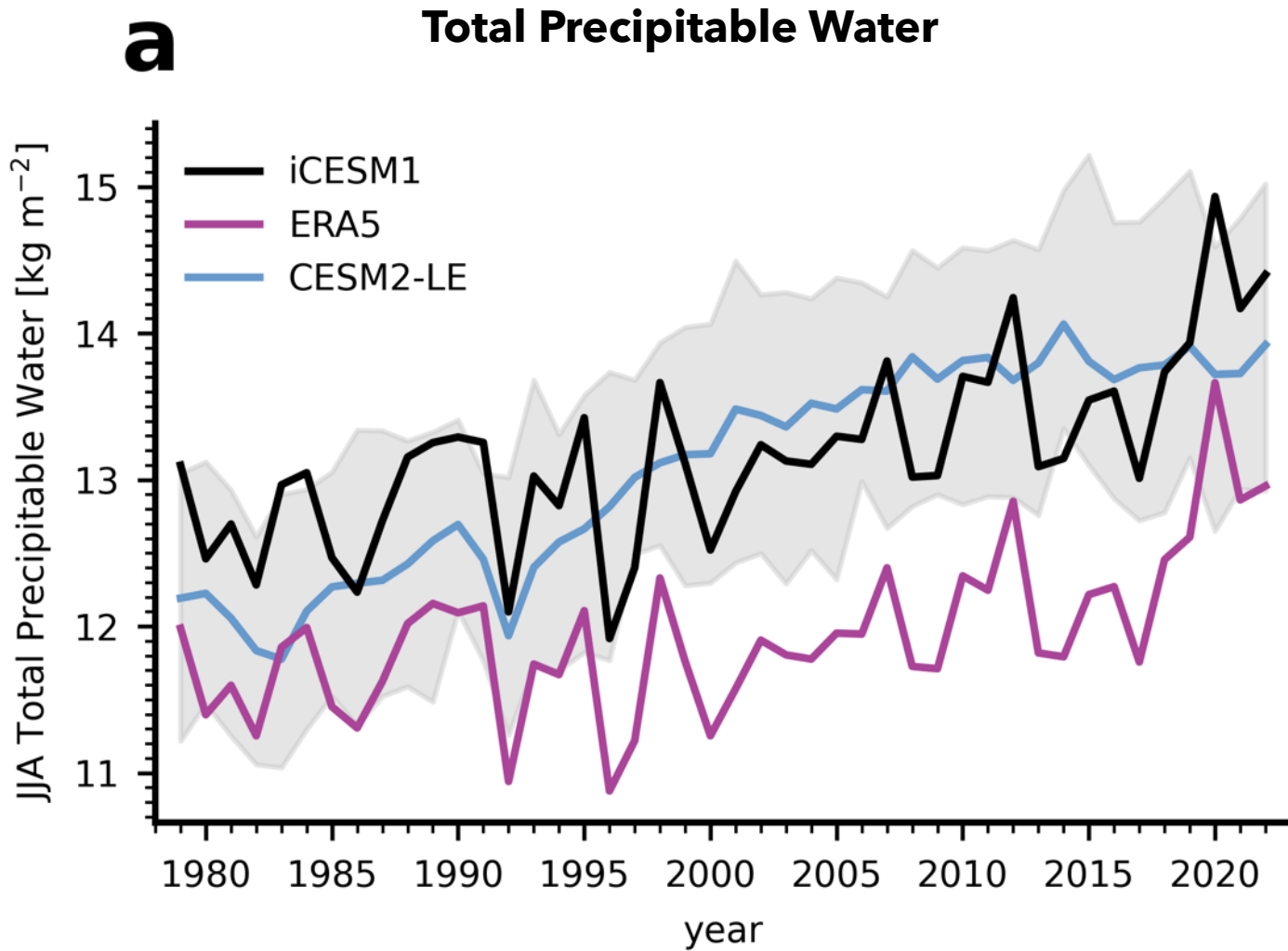
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Yutian Wu, Nicole Feldl, Jennifer E. Kay, Bin Guan, Jiang Zhu

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CESM Workshop 2024

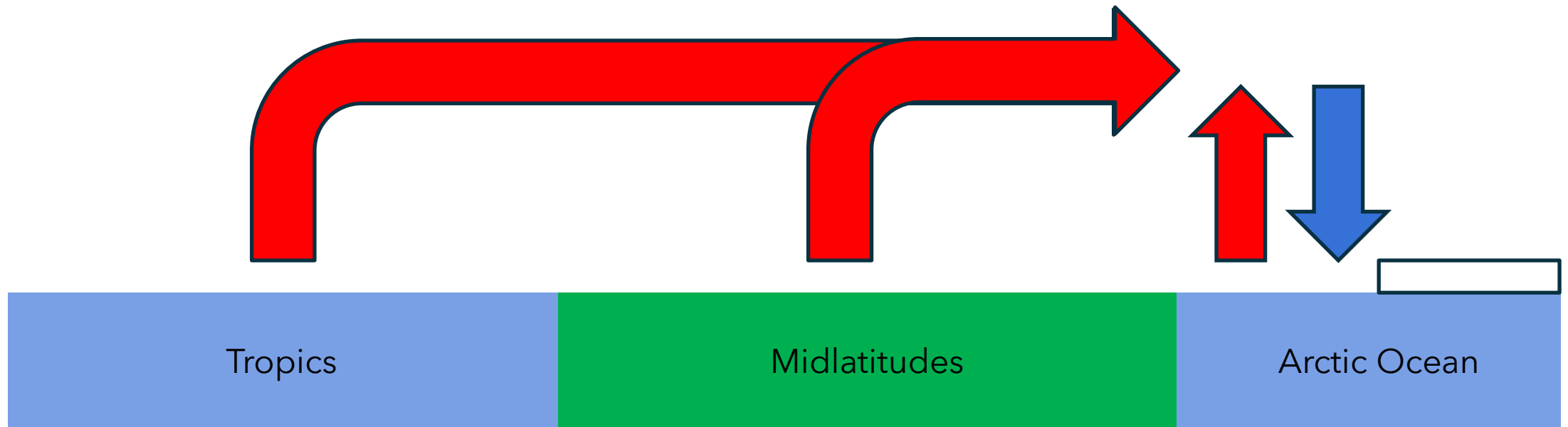
June 12, 2024

Increasing water vapor in Arctic (70-90N)

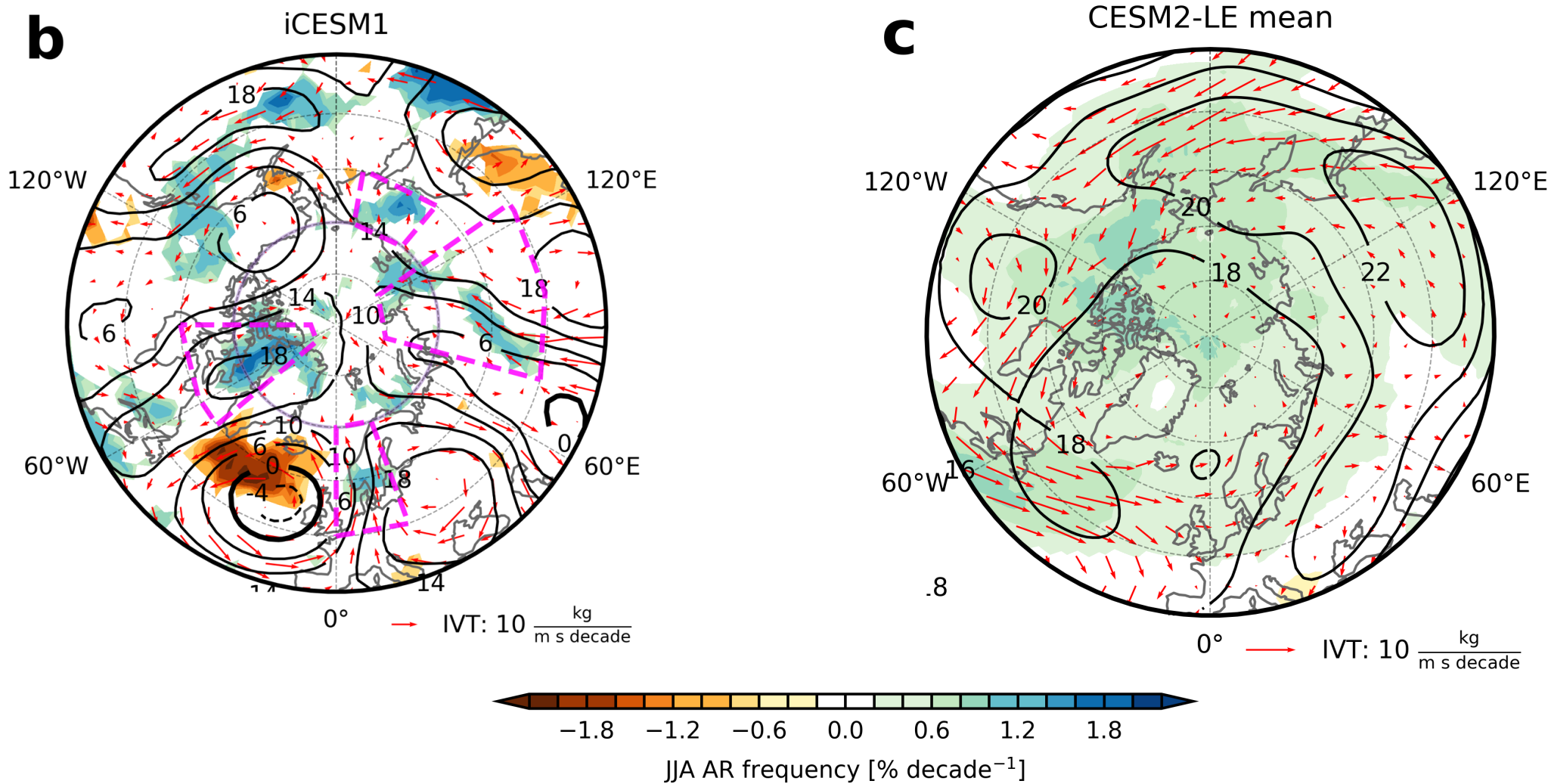


Water tagging in the isotope-enabled CESM (iCESM1) + Nudging (u,v,T)

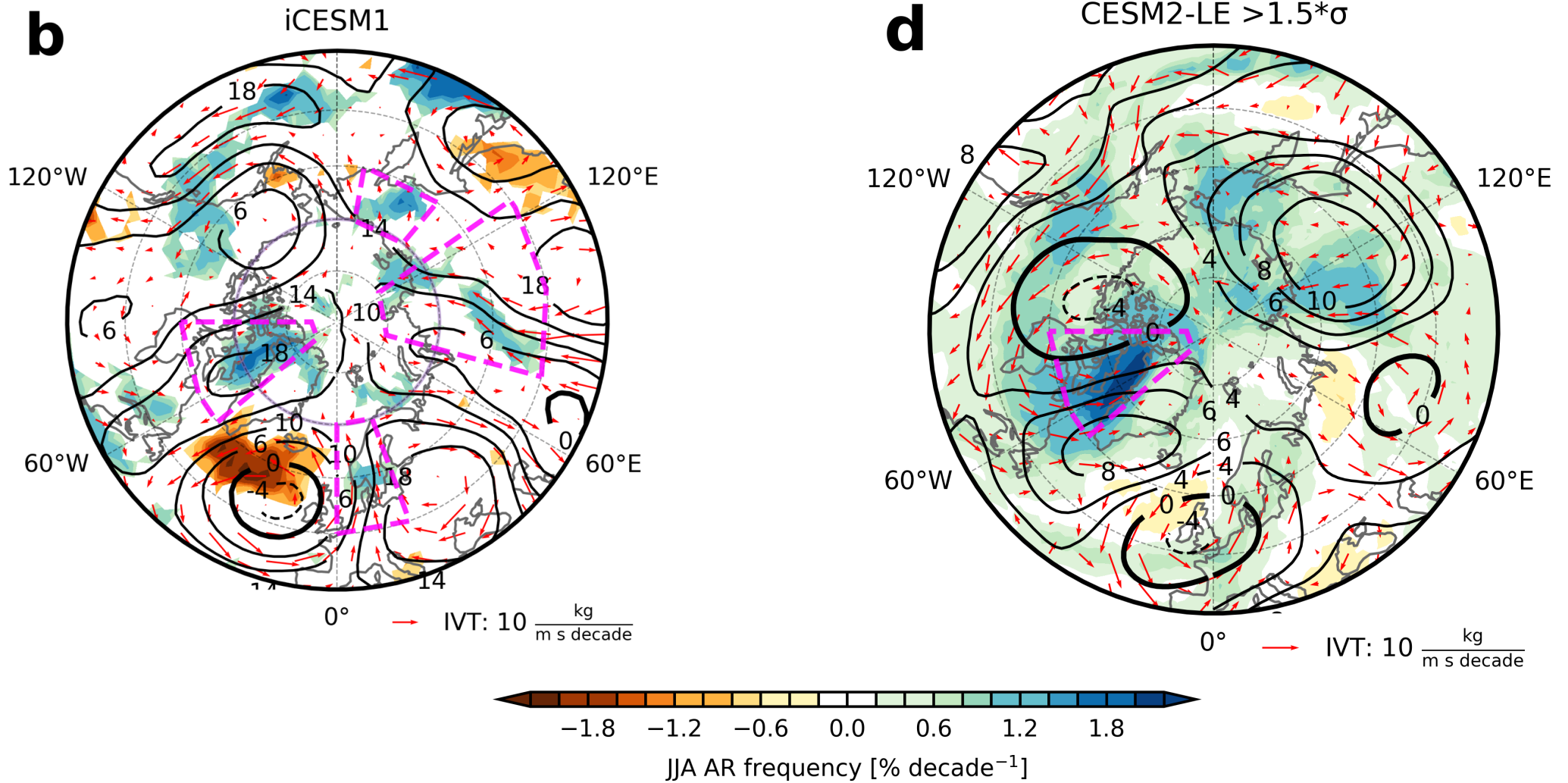
Poleward Moisture Transport



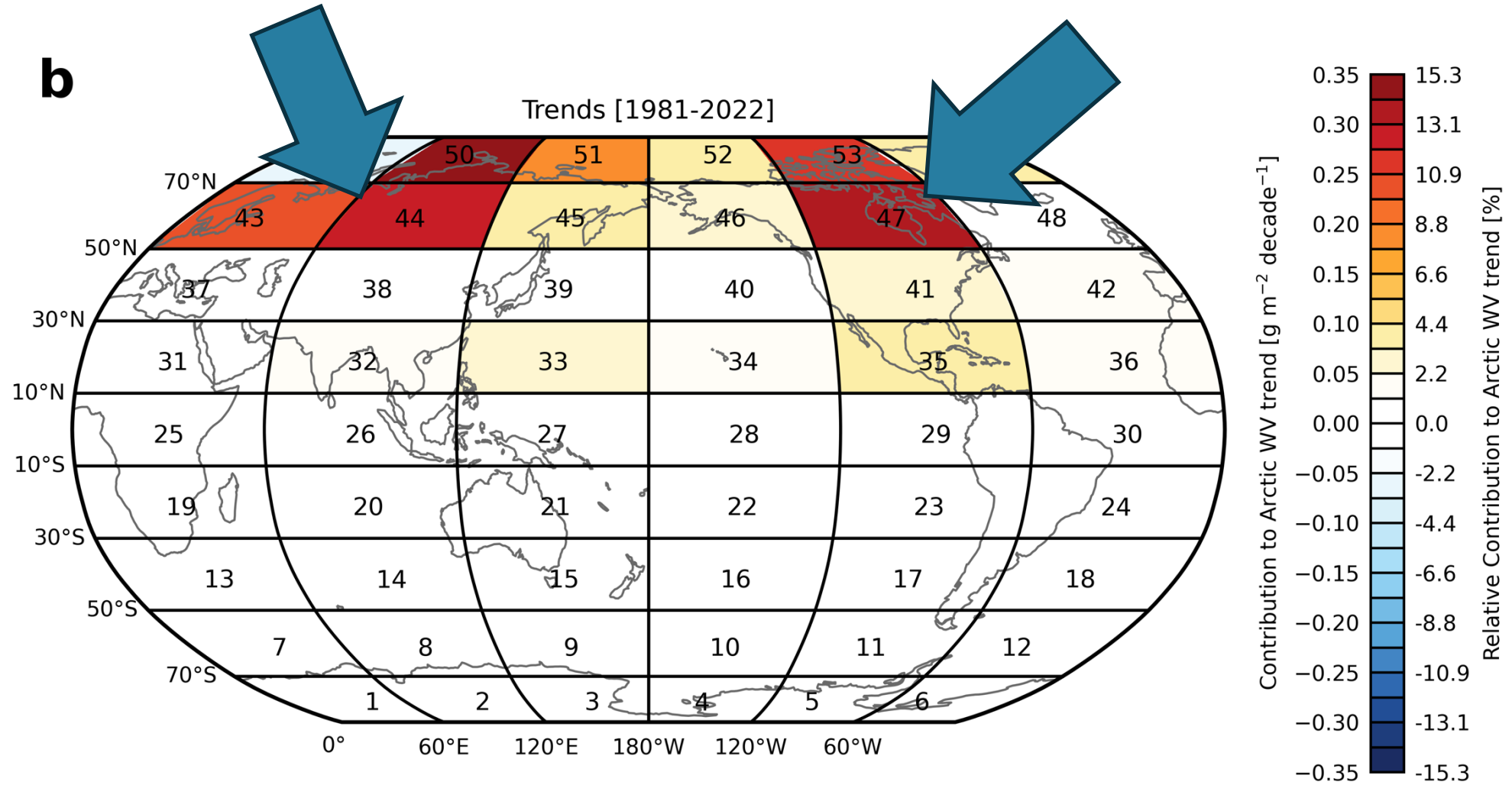
Circulation drives Atmospheric Rivers (ARs) into the Arctic



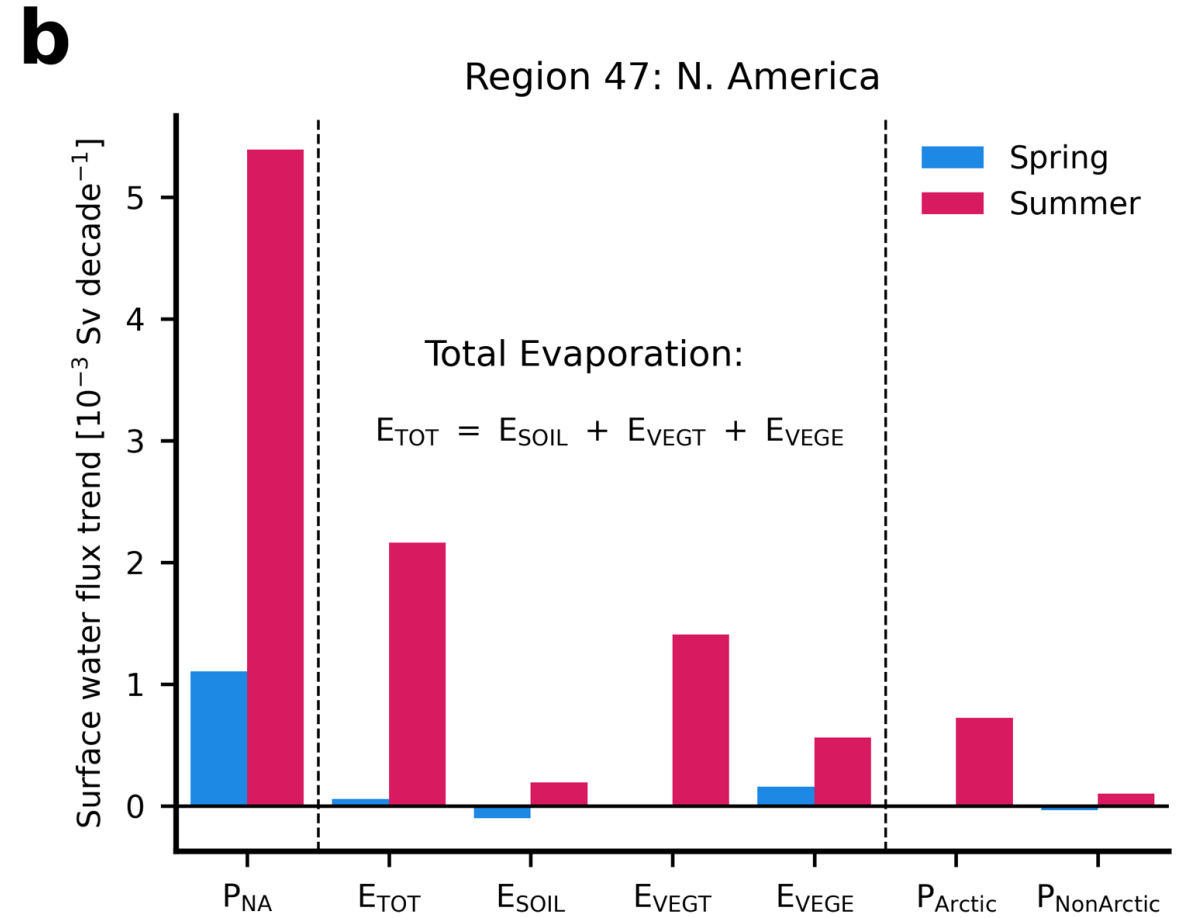
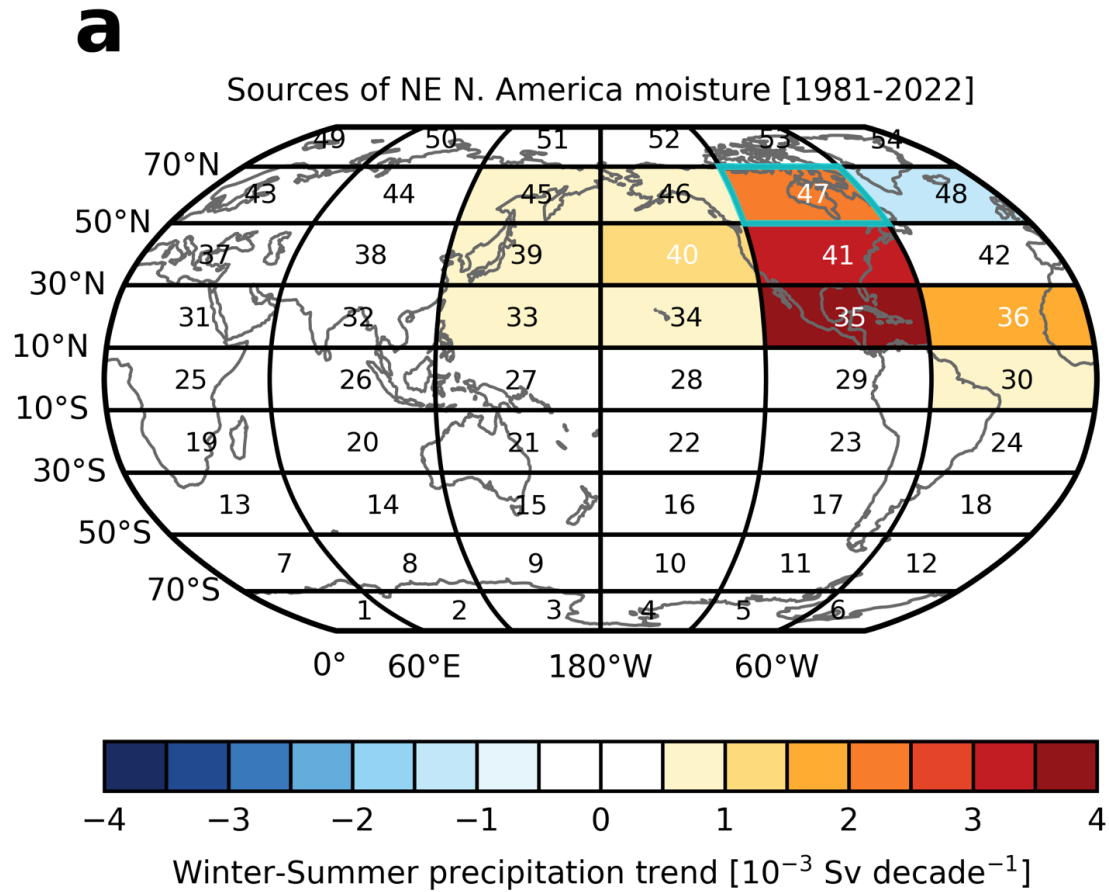
Large ensemble struggles to capture observed transport trends



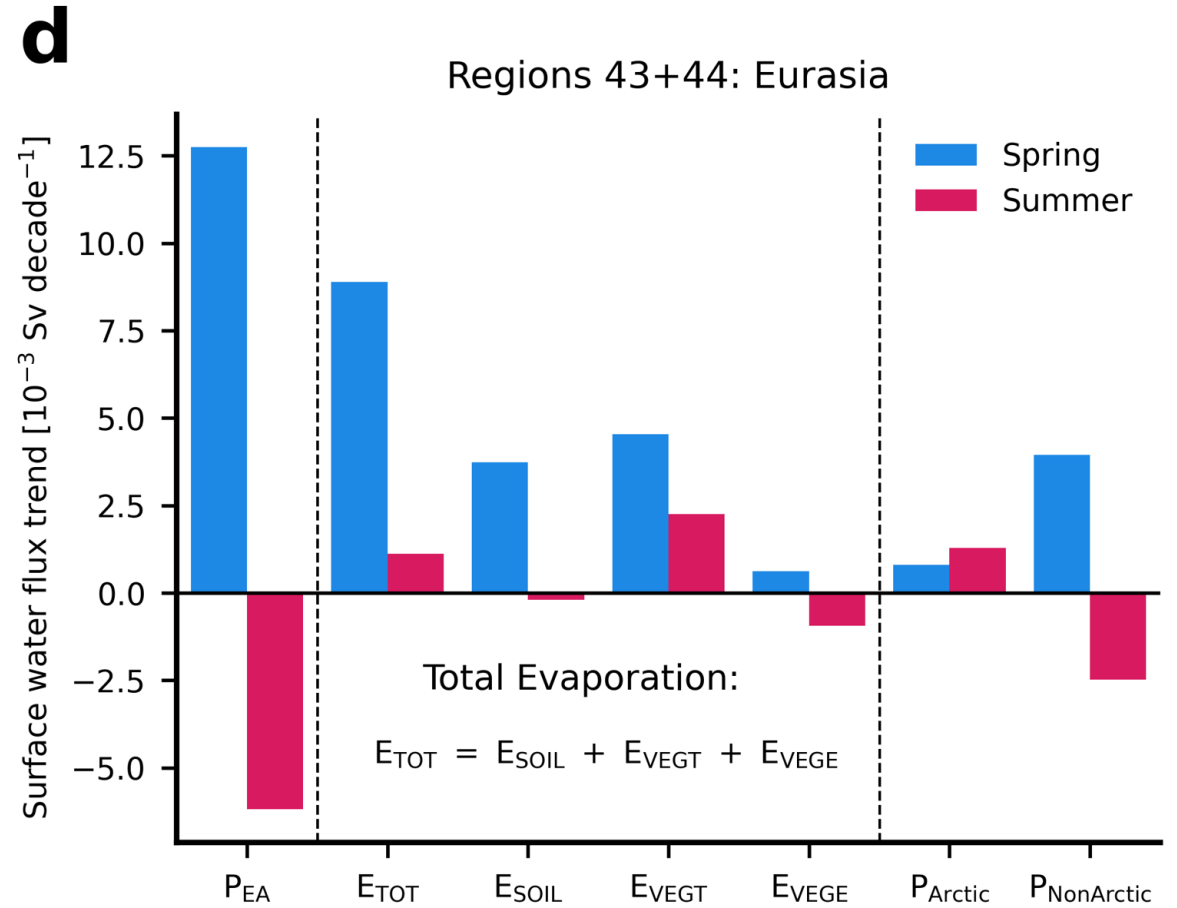
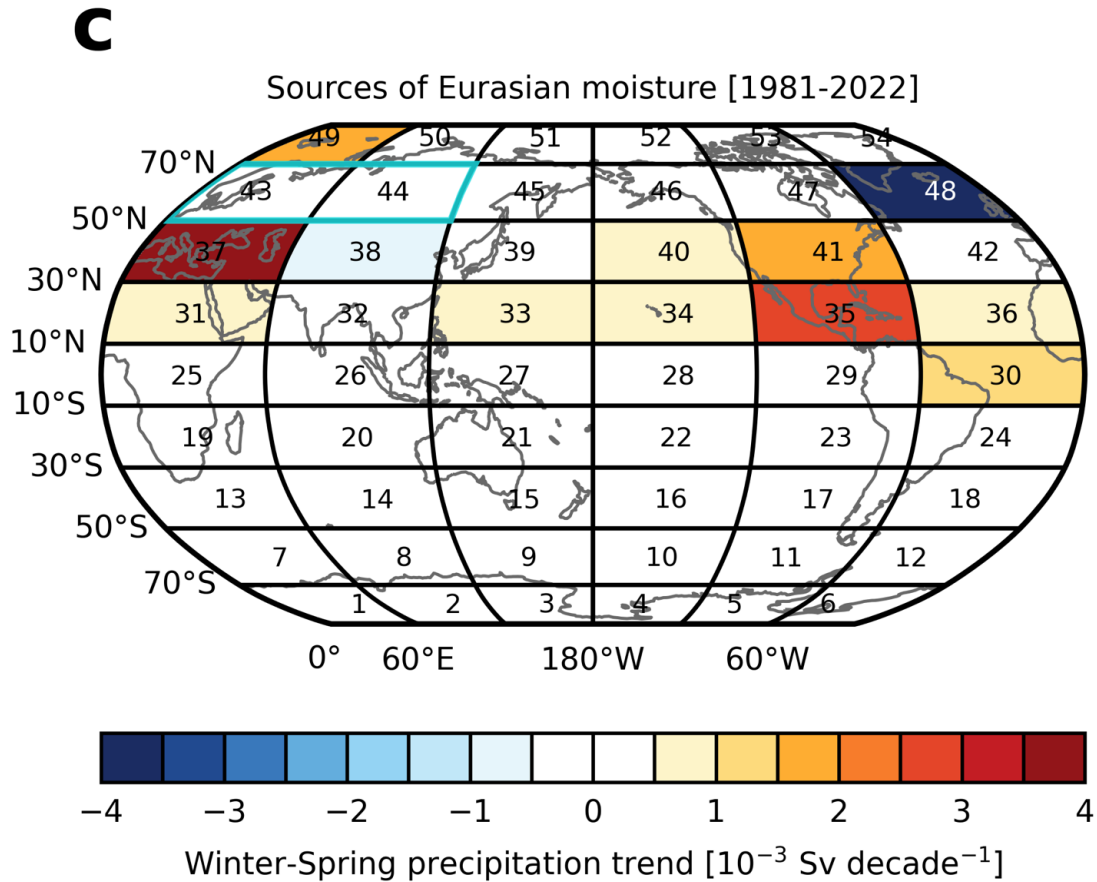
Long-term trends in contributions to JJA Arctic moistening



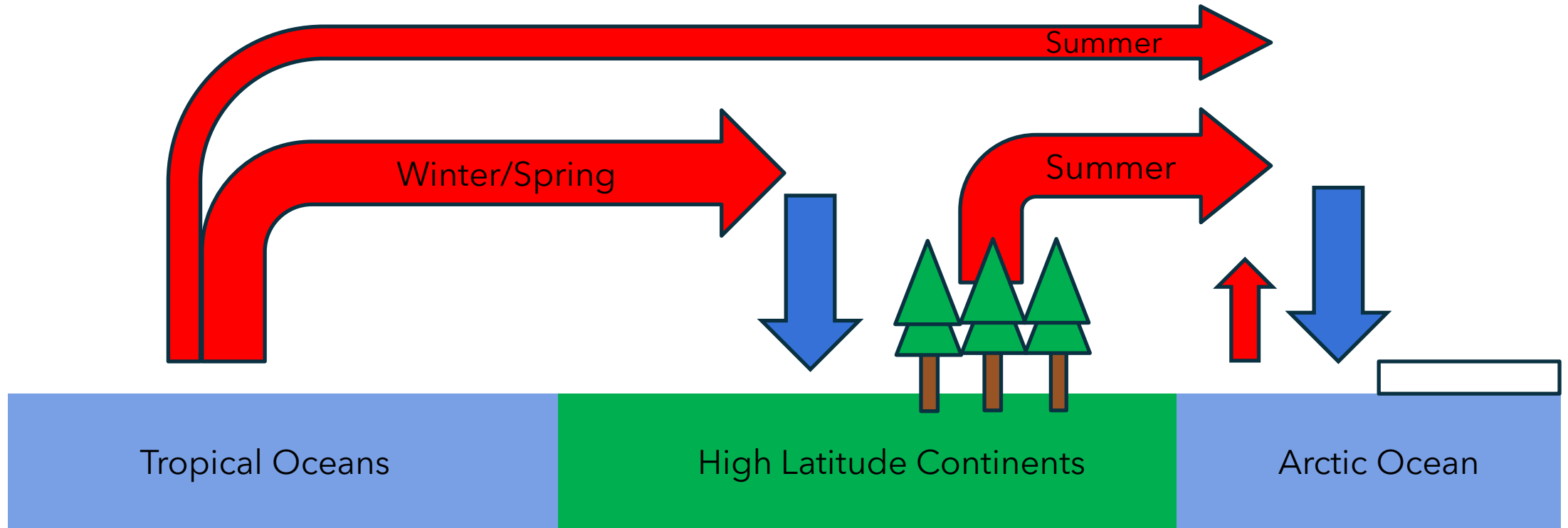
Land capacitor effect: North America



Land capacitor effect: Eurasia

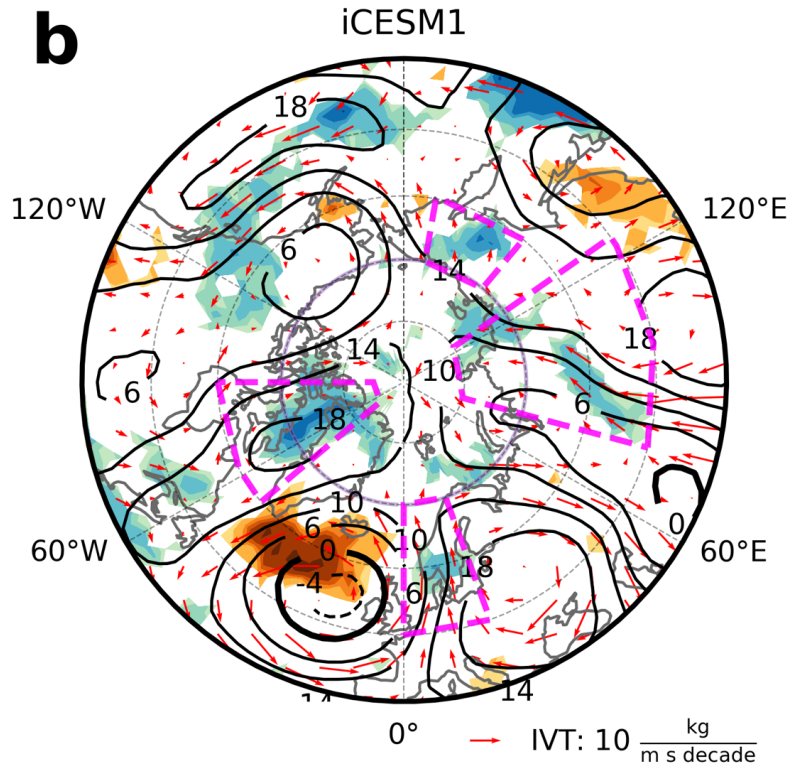


Poleward Moisture Transport: Land capacitor effect



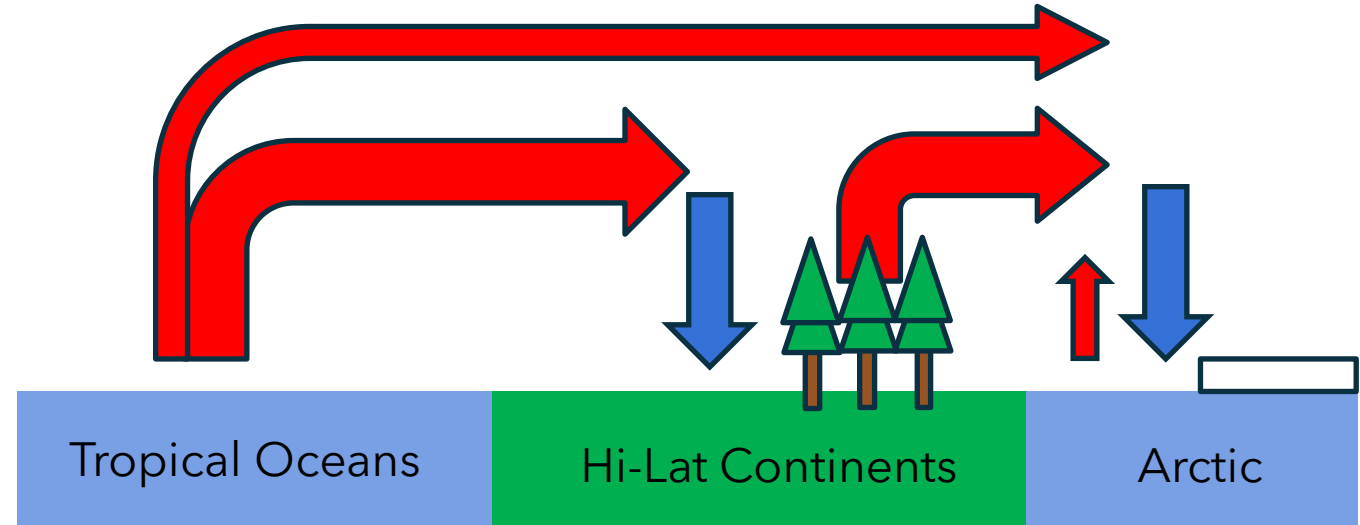
Summary:

Sources and land capacitor effects driving Arctic moistening and warming



1. Storage & Transport:

Circulation drives ARs over N. America and Eurasia pathways that are not well captured in CESM2-LE



2. Sources: Land capacitor effects mediate poleward moisture transport from tropical Atlantic and Mediterranean