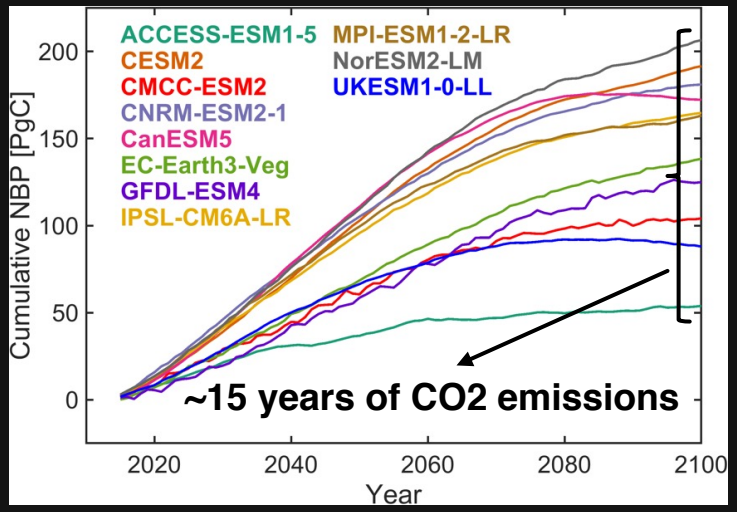
CONTROLS OF INTERMODEL UNCERTAINTY IN LAND CARBON SINK PROJECTIONS

RYAN S. PADRÓN, L. GUDMUNDSSON, L. LIU, V. HUMPHREY, S. I. SENEVIRATNE

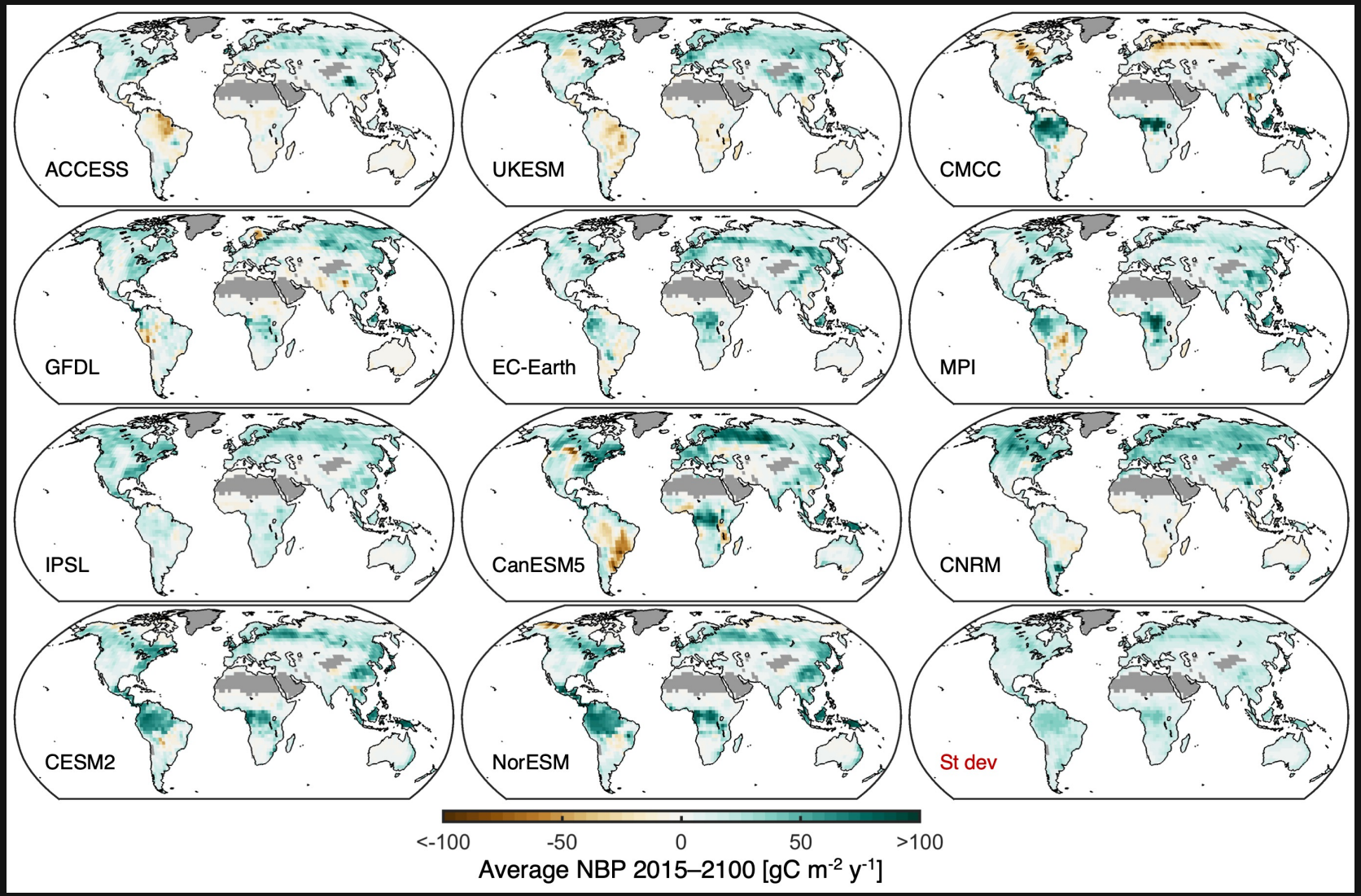
Padrón et al., in Biogeosciences Discuss.

~150 PGC OF SPREAD IN CUMULATIVE NBP BY 2100 WITH 2C WARMING



Even models with a similar C sink can have very different regional response.

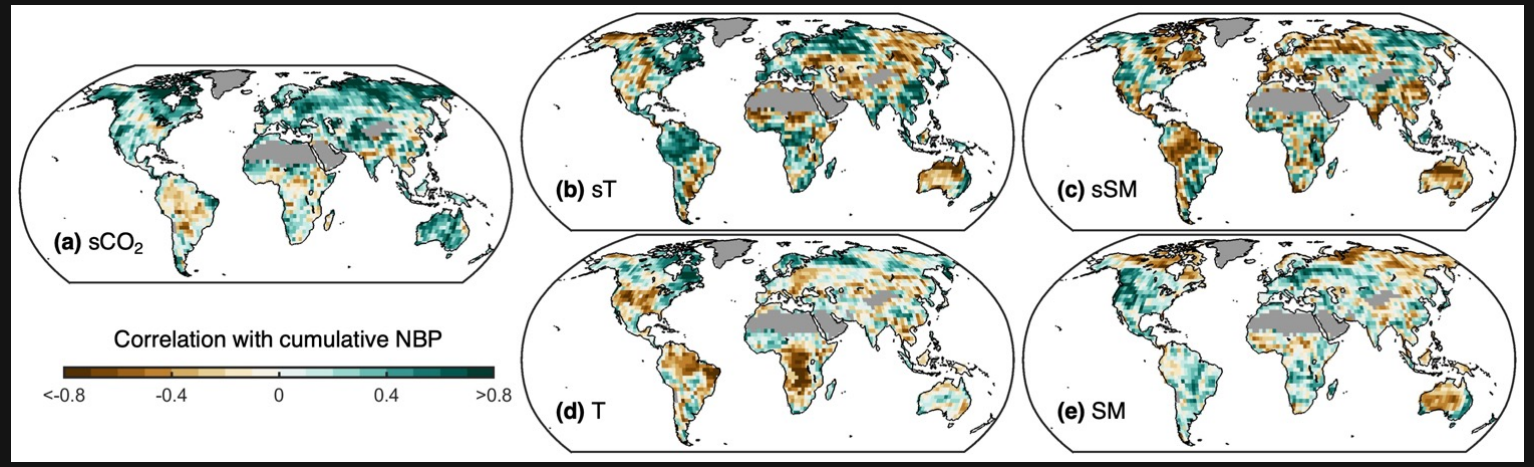
Large differences in the tropics and boreal forests.



CONTROLS OF INTERMODEL DIFFERENCES IN NBP PROJECTIONS

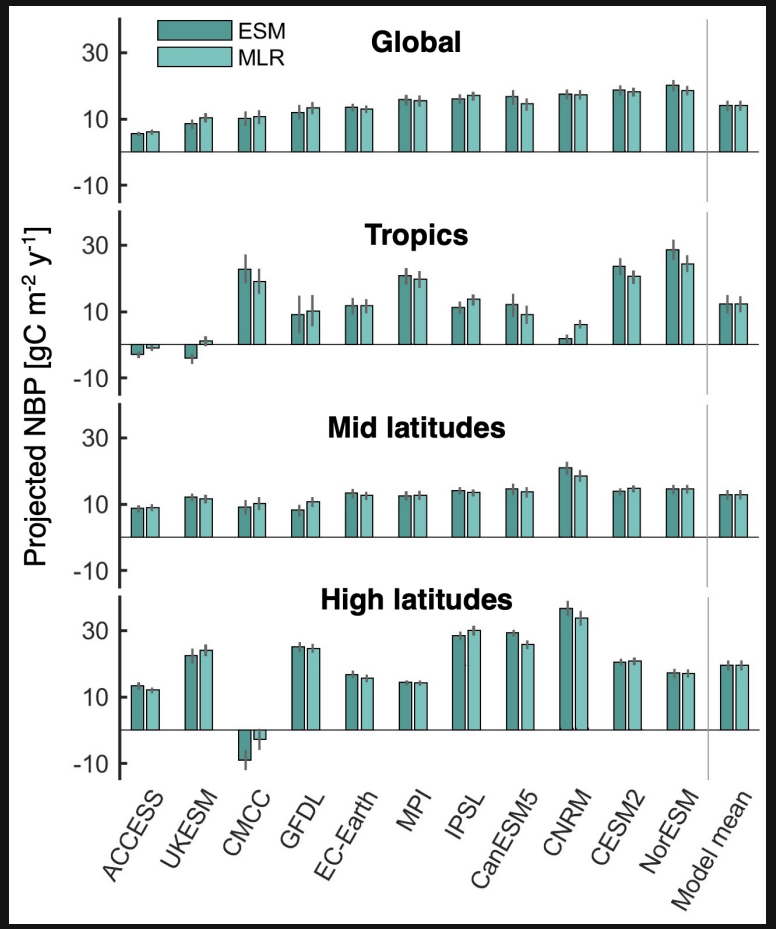
- Sensitivity of GPP to CO_2 (sCO_2)
- Sensitivity of NBP to interannual T variability (sT)
- Sensitivity of NBP to interannual SM variability (sSM)
- Long-term average T
- Long-term average SM

Higher NBP is favored in models with **higher sCO_2**, **higher sT**, **lower sSM**, **lower T**, and **higher SM**.



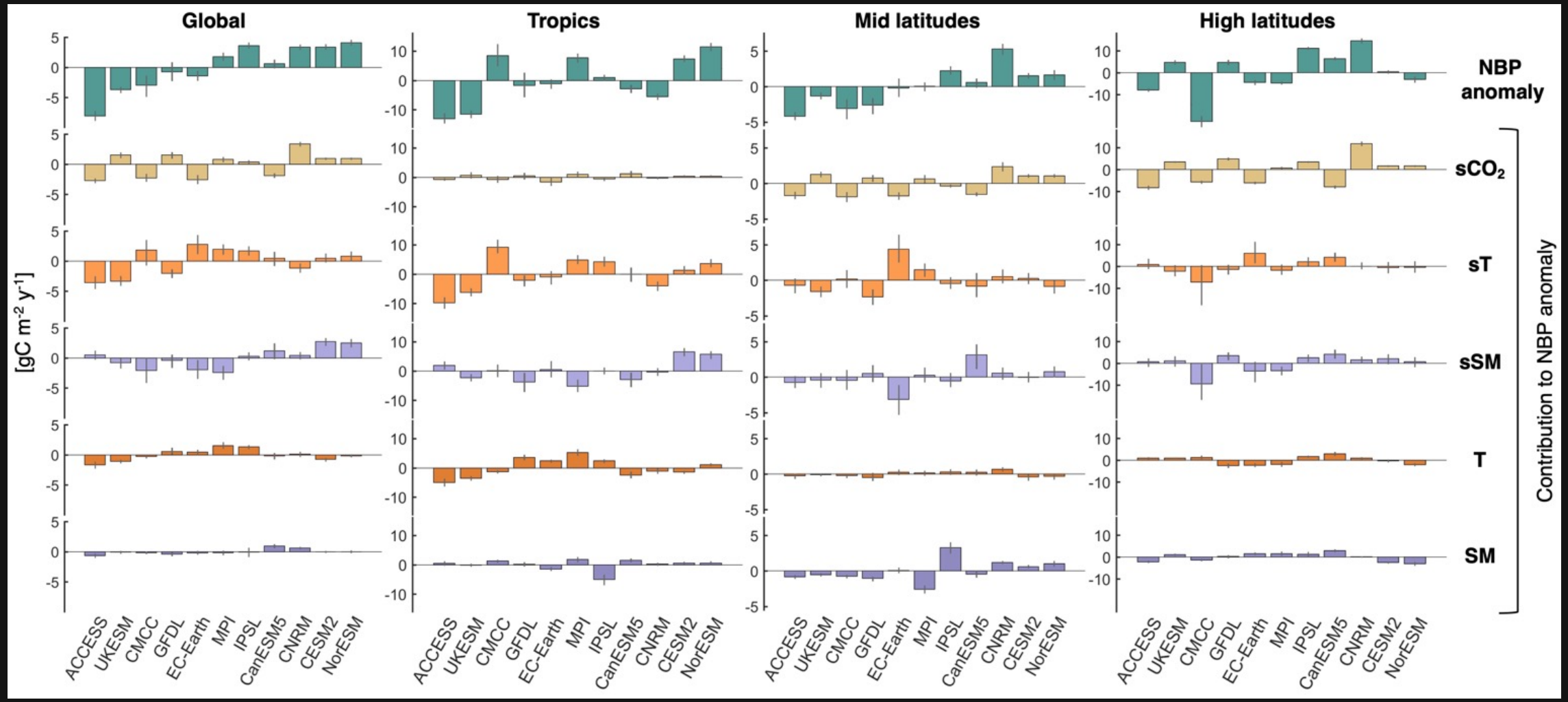
At every grid cell: multiple linear regression (MLR) to estimate cumulative NBP of every ESM *m*.

$$NBP_m = b_0 + b_1*sCO2_m + b_2*sT_m + b_3*sSM_m + b_4*T_m + b_5*SM_m$$



Global and regional intermodel differences in NBP are well represented by the regression estimate

CONTRIBUTIONS OF THE CONTROLS TO EXPLAIN DIFFERENCES IN NBP



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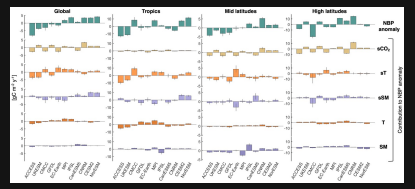

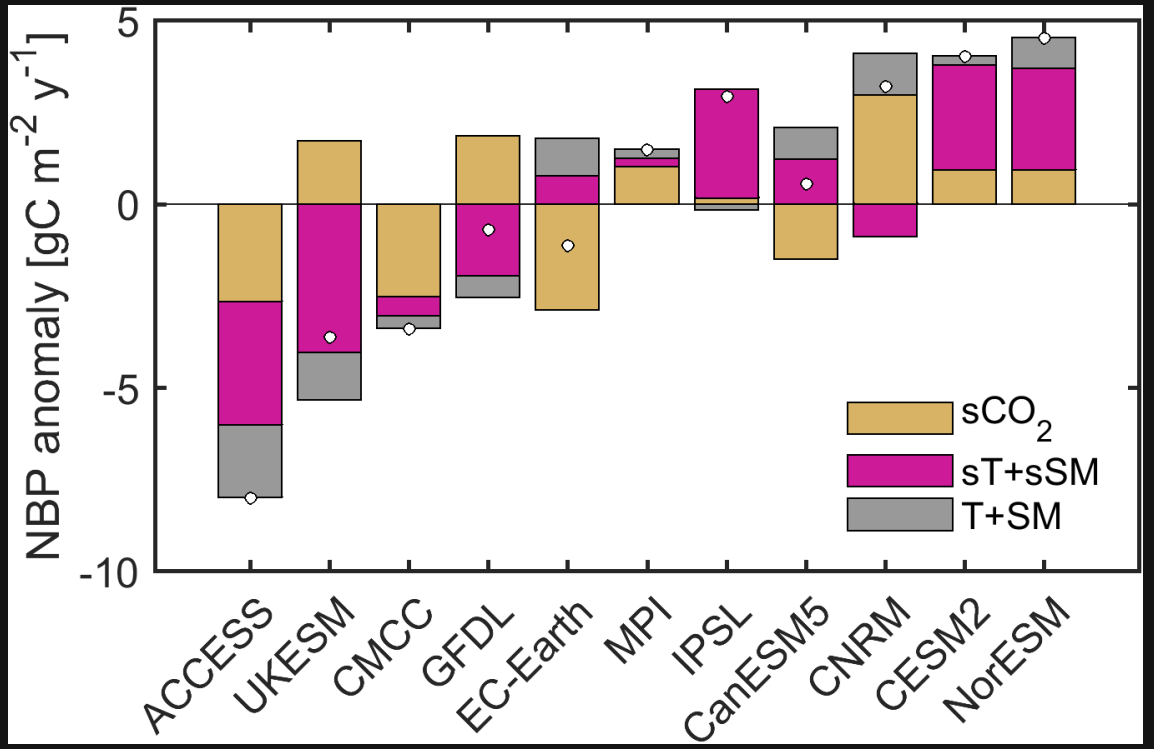

Dominant role of the response of NBP to interannual temperature and soil moisture variability over that of the CO2 fertilization effect and average climate conditions.

SOIL MOISTURE IS THE MAIN CONTROL OF INTERANNUAL VARIABILITY OF NBP