



Supplement of

Implementation and validation of a supermodeling framework into Community Earth System Model version 2.1.5

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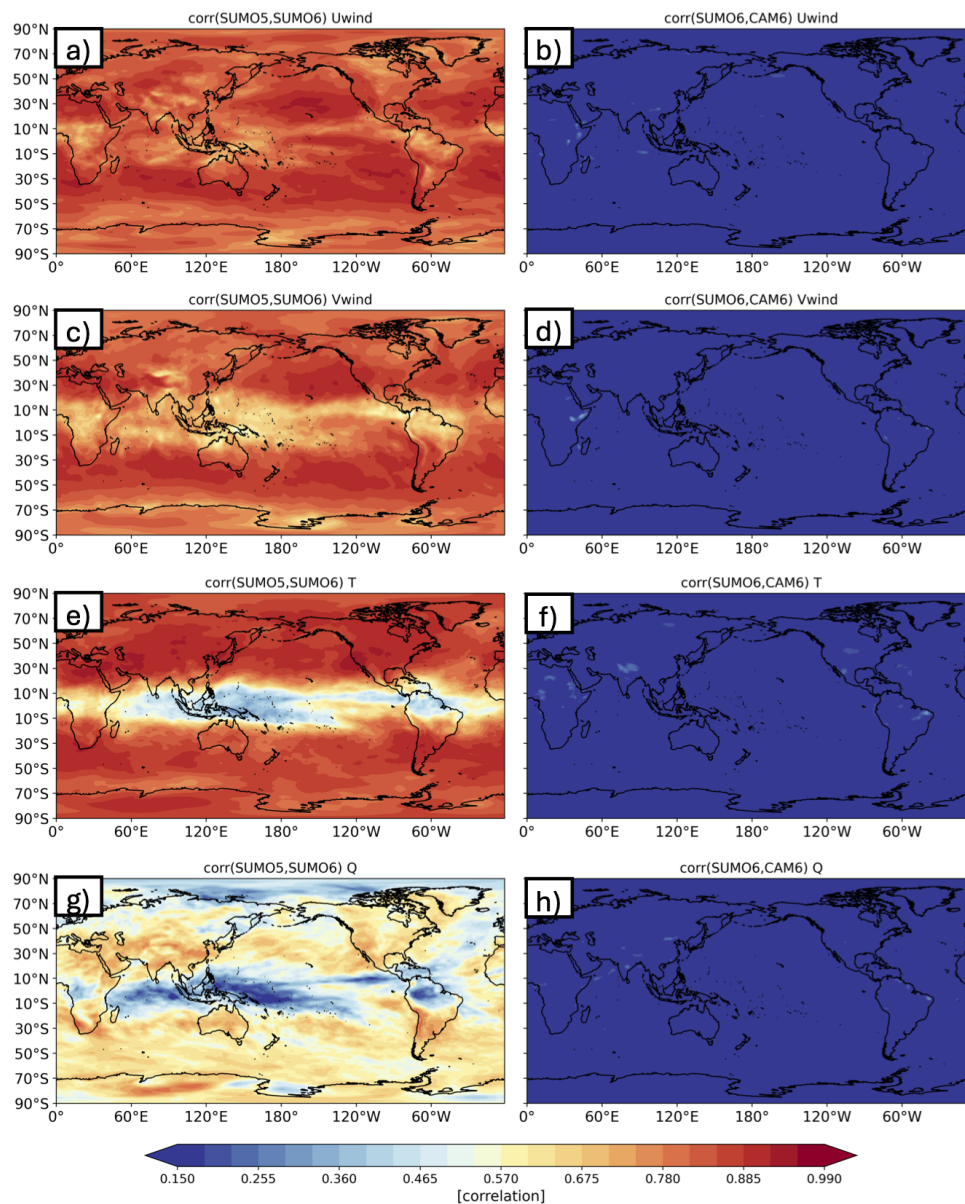


Figure S1. As in Fig. 3. but 750mb

Abstract. Here we present supplemental information for the manuscript: Implementation and validation of a supermodelling framework into CESM version 2.1.5. All figures are referenced in the main manuscript.

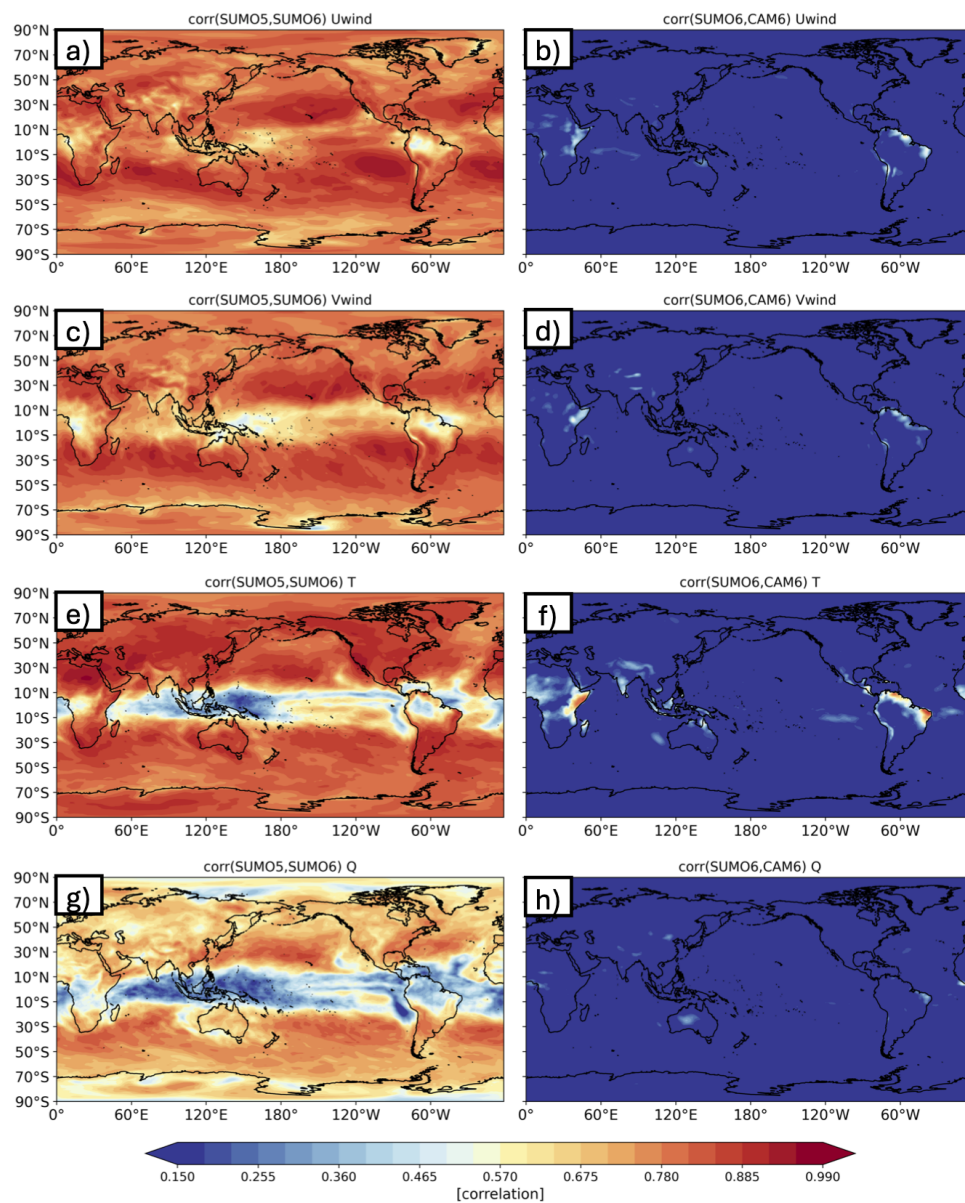


Figure S2. As in Fig. 3. but 900mb

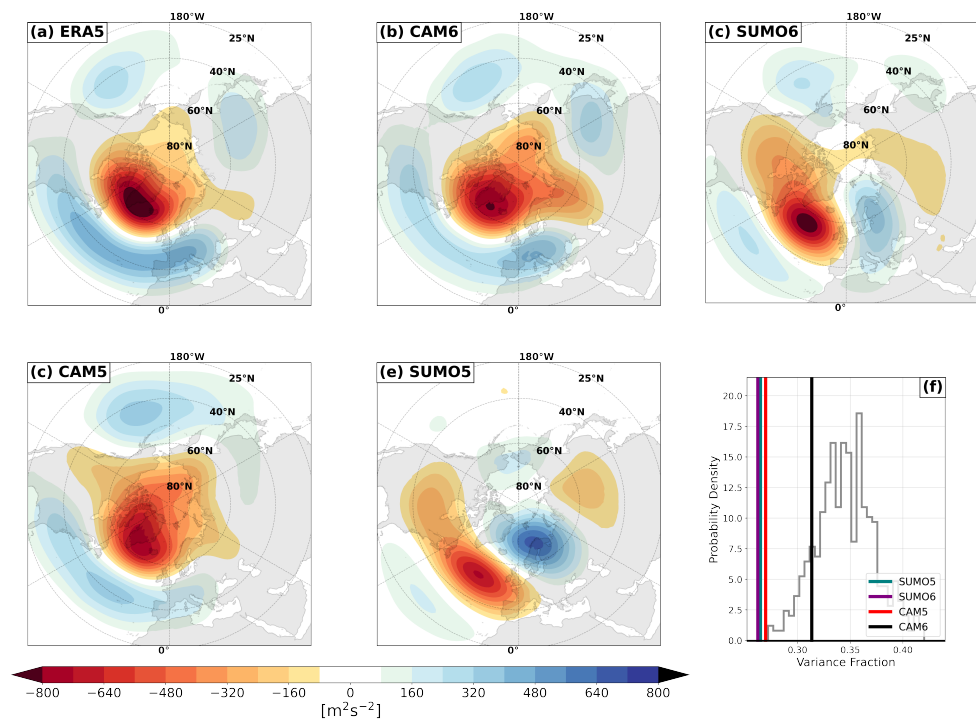


Figure S3. As in Fig. 5. but for the North Atlantic Oscillation

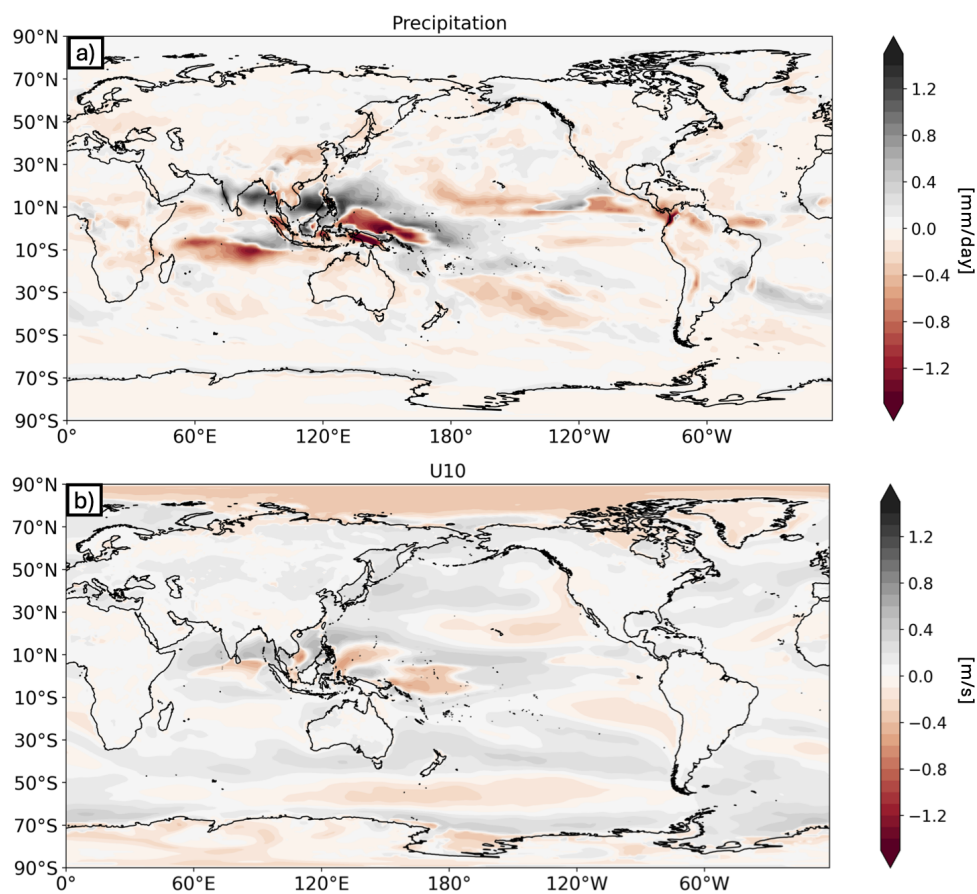


Figure S4. Climatological difference between SUMO5/6 and CAM6 for annual precipitation (a) and annual ten-meter winds (b).

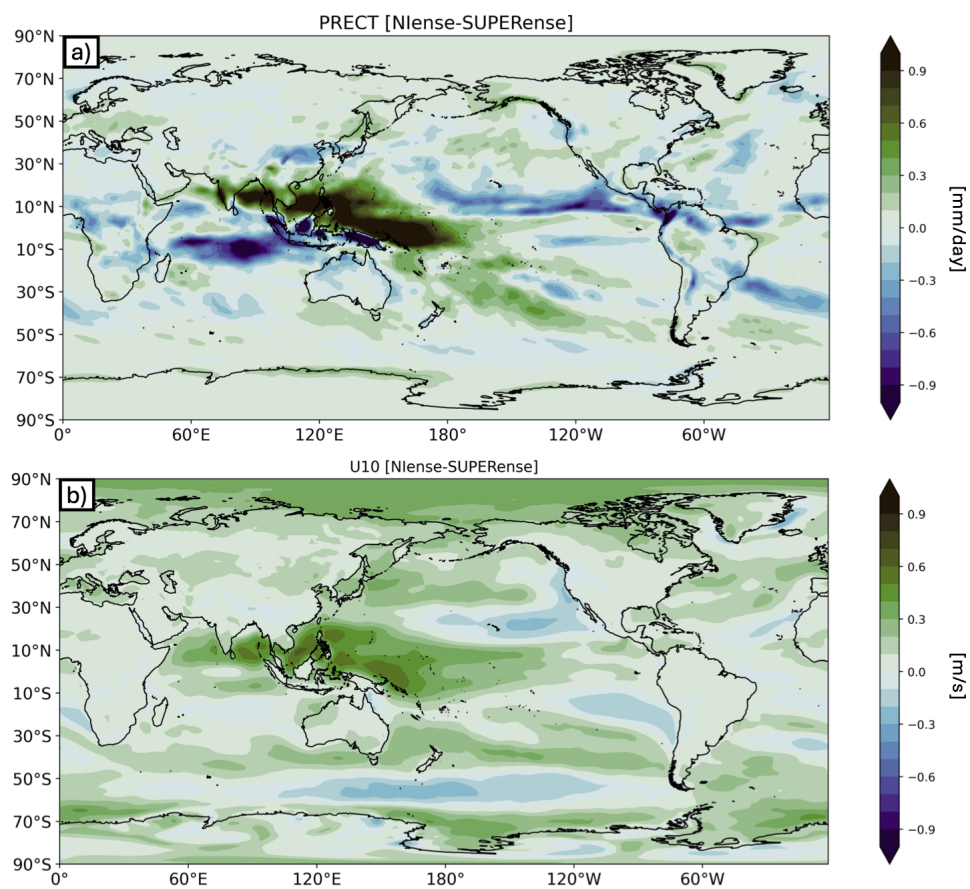


Figure S5. Climatological difference between NIense and SUPERense for annual precipitation (a) and annual ten-meter winds (b).

Table S1. Latitude-weighted Annual Global RMSE errors for different models. PSL in hPa, U and V in m/s, T in K, and Q in g/kg. Bold indicates the lowest RMSE.

Variable	SUPERense	SUMO5	SUMO6	CAM5	CAM6
PSL (hPa)	190.610	182.080	206.030	144.710	224.210
U (m/s) - 100mb	2.225	2.308	2.187	2.485	2.653
U (m/s) - 150mb	2.158	2.162	2.229	2.253	2.709
U (m/s) - 200mb	2.020	1.956	2.153	1.880	2.418
U (m/s) - 300mb	1.541	1.505	1.615	1.494	1.773
U (m/s) - 400mb	1.247	1.233	1.288	1.147	1.450
U (m/s) - 600mb	1.103	1.092	1.153	0.944	1.301
U (m/s) - 800mb	1.129	1.170	1.155	1.113	1.331
U (m/s) - 1000mb	1.037	1.086	1.074	0.885	1.195
V (m/s) - 100mb	0.608	0.616	0.629	0.581	0.734
V (m/s) - 150mb	0.857	0.851	0.935	0.846	1.024
V (m/s) - 300mb	0.736	0.731	0.766	0.682	0.846
V (m/s) - 400mb	0.601	0.610	0.610	0.564	0.679
V (m/s) - 600mb	0.505	0.520	0.519	0.508	0.581
V (m/s) - 800mb	0.591	0.656	0.591	0.656	0.646
V (m/s) - 1000mb	0.676	0.766	0.680	0.732	0.727
T (K) - 100mb	1.014	1.064	0.980	0.828	0.917
T (K) - 150mb	1.886	1.934	1.840	1.937	1.216
T (K) - 300mb	1.124	1.094	1.183	0.861	0.952
T (K) - 400mb	1.032	1.013	1.067	0.669	0.790
T (K) - 600mb	1.081	1.073	1.094	0.735	0.799
T (K) - 800mb	2.701	2.794	2.626	2.493	2.414
T (K) - 1000mb	4.958	5.110	4.832	4.854	4.692
Q (g/kg) - 100mb	2.94×10^{-7}	2.49×10^{-7}	3.56×10^{-7}	4.44×10^{-7}	2.20×10^{-7}
Q (g/kg) - 150mb	4.86×10^{-7}	5.32×10^{-7}	5.76×10^{-7}	6.36×10^{-7}	5.50×10^{-7}
Q (g/kg) - 200mb	3.49×10^{-6}	3.42×10^{-6}	4.10×10^{-6}	3.62×10^{-6}	3.79×10^{-6}
Q (g/kg) - 300mb	2.85×10^{-5}	3.55×10^{-5}	2.90×10^{-5}	3.97×10^{-5}	2.81×10^{-5}
Q (g/kg) - 400mb	9.90×10^{-5}	1.40×10^{-4}	8.17×10^{-5}	1.64×10^{-4}	8.25×10^{-5}
Q (g/kg) - 600mb	3.48×10^{-4}	4.83×10^{-4}	2.42×10^{-4}	5.11×10^{-4}	2.56×10^{-4}
Q (g/kg) - 800mb	4.86×10^{-4}	5.89×10^{-4}	4.86×10^{-4}	5.93×10^{-4}	4.85×10^{-4}
Q (g/kg) - 1000mb	4.81×10^{-4}	4.84×10^{-4}	5.07×10^{-4}	4.79×10^{-4}	5.33×10^{-4}