CMIP6 captures the satellite-era jet slowdown and Arctic amplification - yet projects future jet speedup and tropical amplification

Climate Dynamics

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Supplementary Text

Figures S1-S5 show each individual CMIP6 model's ensemble of satellite-era warming differences vs. jet speed changes, with the reanalyses overlaid. These are the same as Figs. 4a-c in the main text, but for all of the models used in this study.

Also, in preliminary work for this study (Golden 2020), analyses paralleling Figs. 1, 2, 3a-b, and 3d of the main text (but without observations) were performed using 42 models from the Coupled Model Intercomparison Project phase 5 (CMIP5; Taylor et al. 2012), which was the immediate predecessor of CMIP6. These models are listed in Table S1, and the CMIP5 counterparts of Figs. 3b and 3d from the main text are plotted as Figures S6 and S7.

The scenario used is CMIP5 historical concatenated to CMIP5 RCP8.5 (Riahi et al. 2011). The satellite-era change (Figure S6) is defined as 1999-2018 minus 1979-1998. The future change (Figure S7) is defined as 2070-2099 minus 1975-2004. The latitude-pressure boxes used to define the subtropical, Arctic and jet-stream domains are the same as in the main text.

References

Golden, N. C., 2020: Robust correlation between northern hemisphere jet response and Arctic-minus-subtropical warming across CMIP5 models. M.S. thesis, Dept. of Geography & Earth Sciences, University of North Carolina Charlotte, 136 pp., https://proquest.com/docview/2471471267.

Riahi, K., and Coauthors, 2011: RCP 8.5—A scenario of comparatively high greenhouse gas emissions. *Climatic Change*, **109**, 33–57, https://doi.org/10.1007/s10584-011-0149-y.

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Taylor, K. E., R. J. Stouffer, and G. A. Meehl, 2012: An Overview of CMIP5 and the Experiment Design. *Bulletin of the American Meteorological Society*, **93**, 485–498, https://doi.org/10.1175/BAMS-D-11-00094.1.

Table S1 CMIP5 models used and labeled in Figures S1-S2. Model 42 was only available for the satellite-era analysis (Figure S1)

| Number	Model	Number	Model
1	ACCESS1-0	22	GFDL-ESM2M
2	ACCESS1-3	23	GISS-E2-H
3	CMCC-CESM	24	GISS-E2-R
4	CMCC-CM	25	HadGEM2-AO
5	CMCC-CMS	26	HadGEM2-CC
6	CNRM-CM5	27	HadGEM2-ES
7	CSIRO-Mk3-6-0	28	IPSL-CM5A-LR
8	GFDL-CM3	29	IPSL-CM5A-MR
9	MIROC-ESM-CHEM	30	IPSL-CM5B-LR
10	bcc-csm1-1	31	MIROC5
11	bcc-csm1-1-m	32	MIROC-ESM
12	BNU-ESM	33	MPI-ESM-LR
13	CanESM2	34	MPI-ESM-MR
14	CCSM4	35	MRI-CGCM3
15	CESM1-BGC	36	MRI-ESM1
16	CESM1-CAM5	37	GISS-E2-H-CC
17	FGOALS-g2	38	GISS-E2-R-CC
18	FGOALS-s2	39	inmcm4
19	EC-EARTH	40	NorESM1-M
20	FIO-ESM	41	NorESM1-ME
21	GFDL-ESM2G	42*	CESM1-WACCM
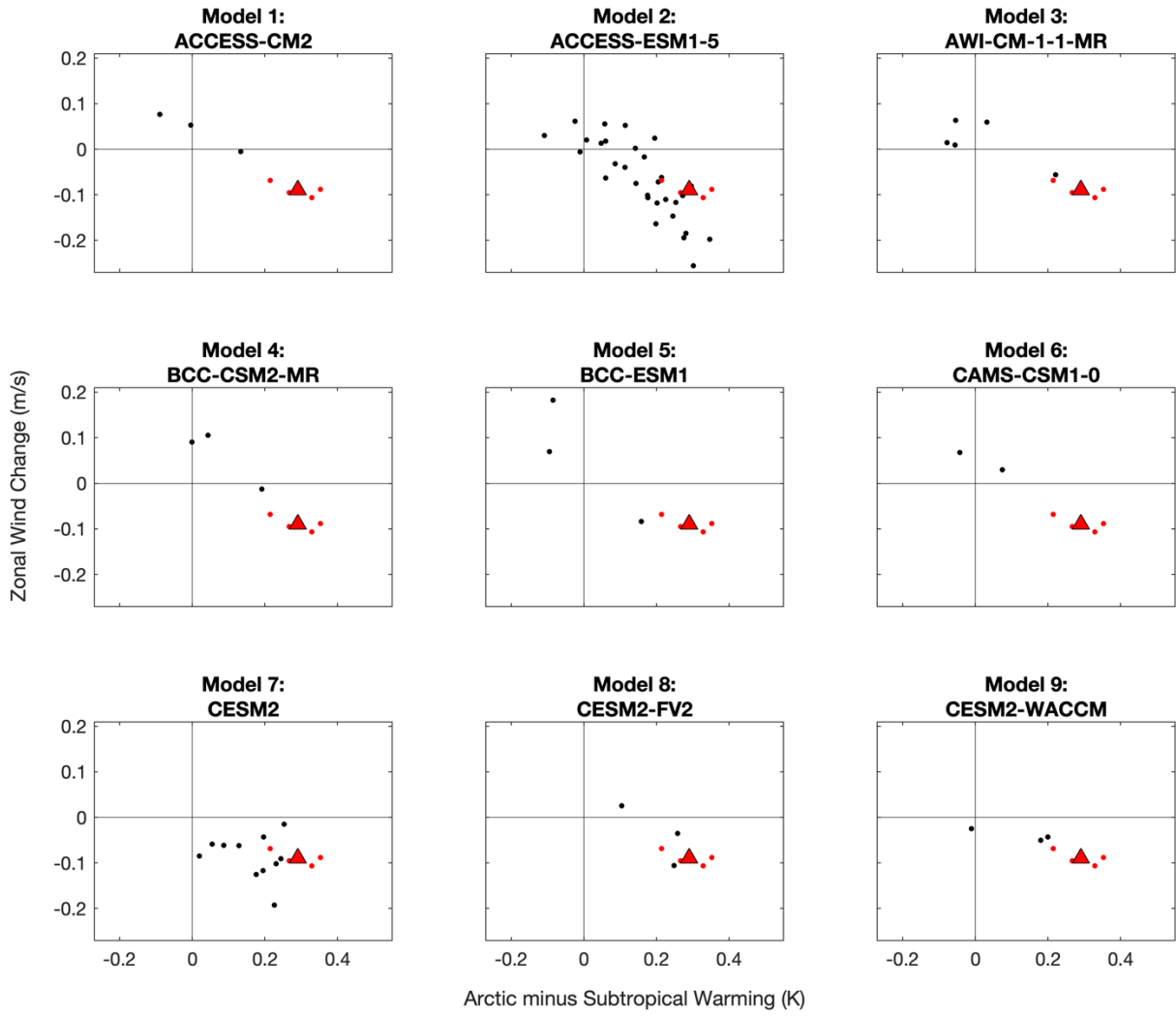
Fig S1 As Figure 4a-c from the main text, but for each of models 1 through 9
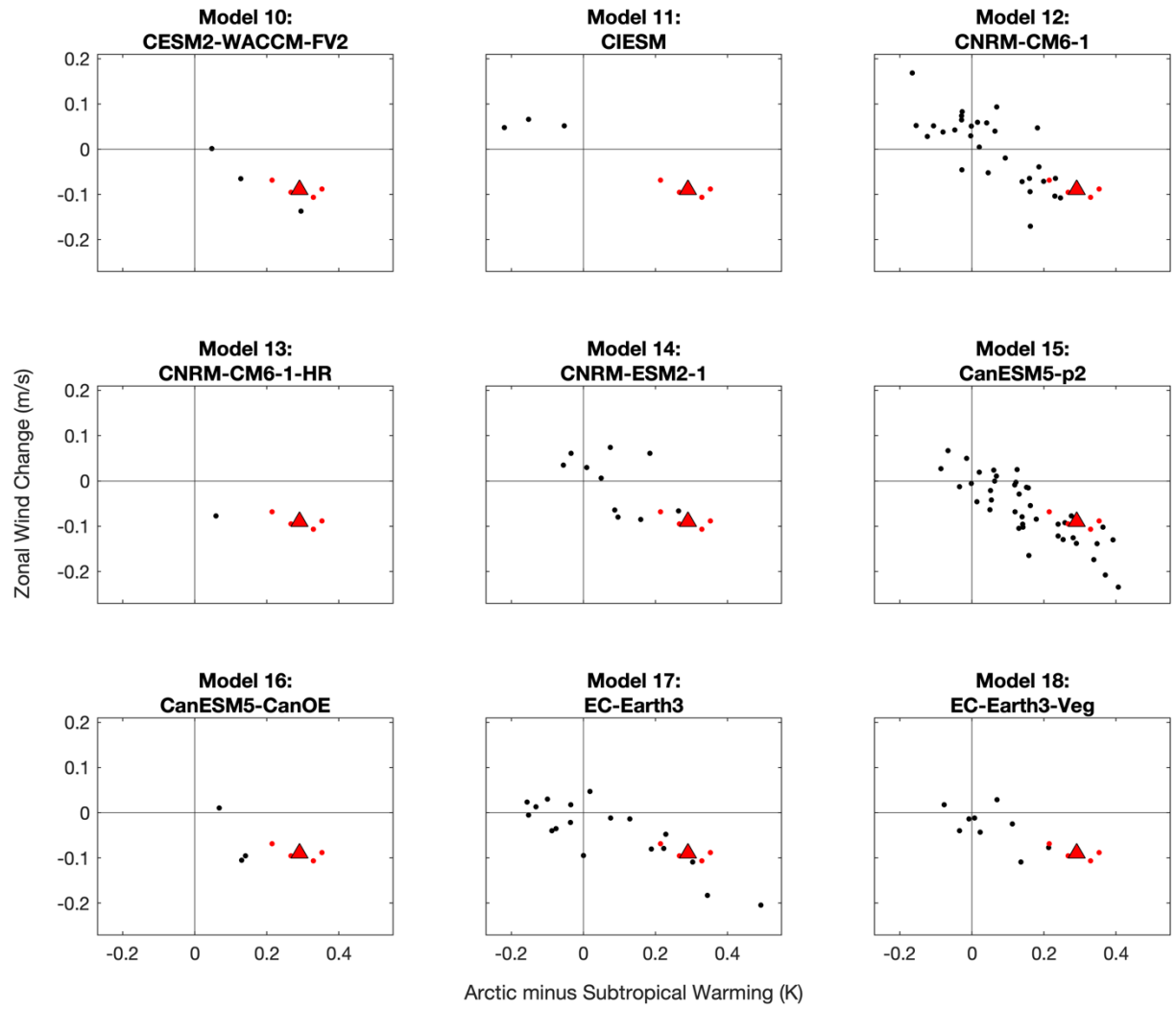
Fig S2 As Figure S1, but for models 10 through 18
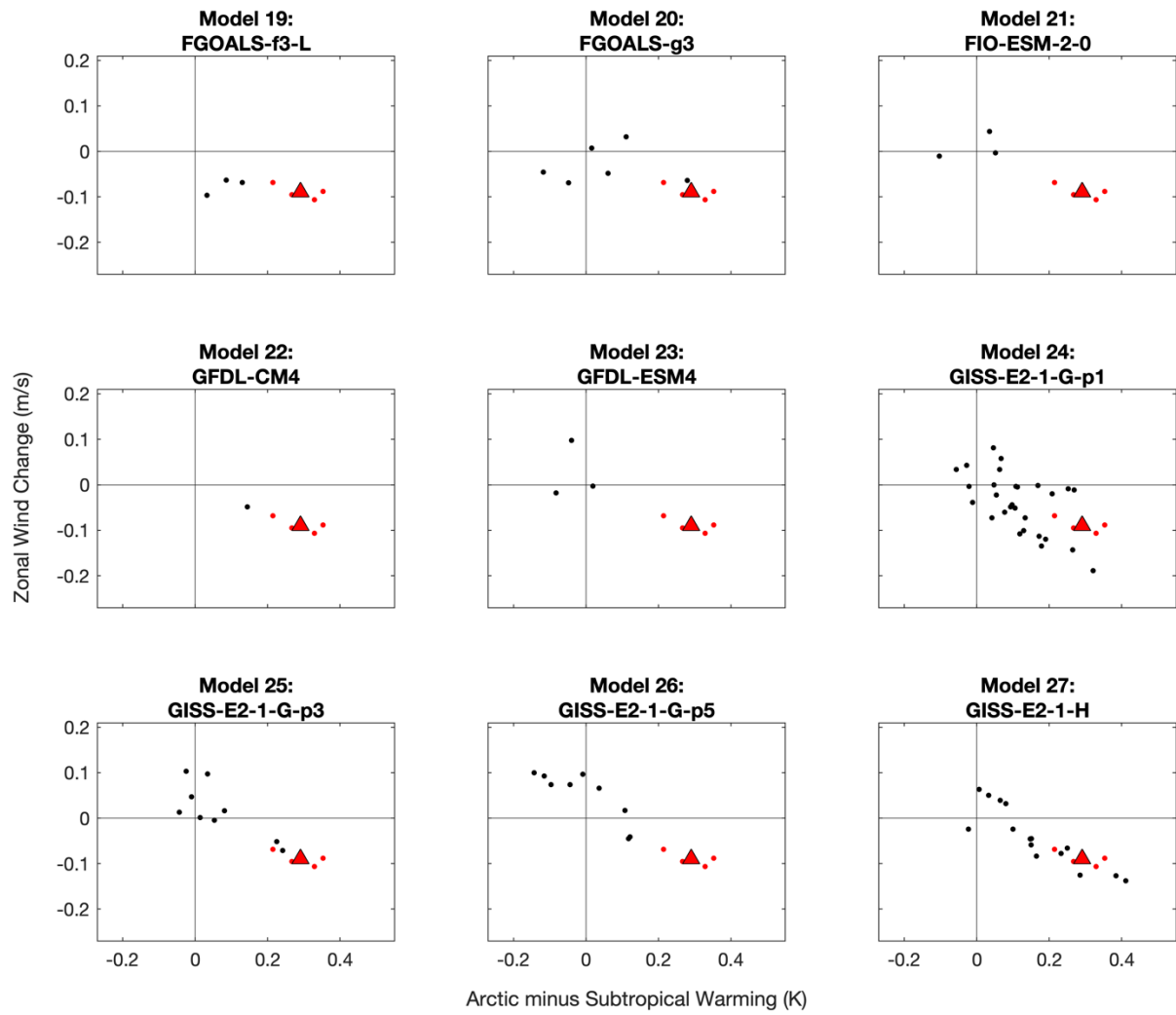
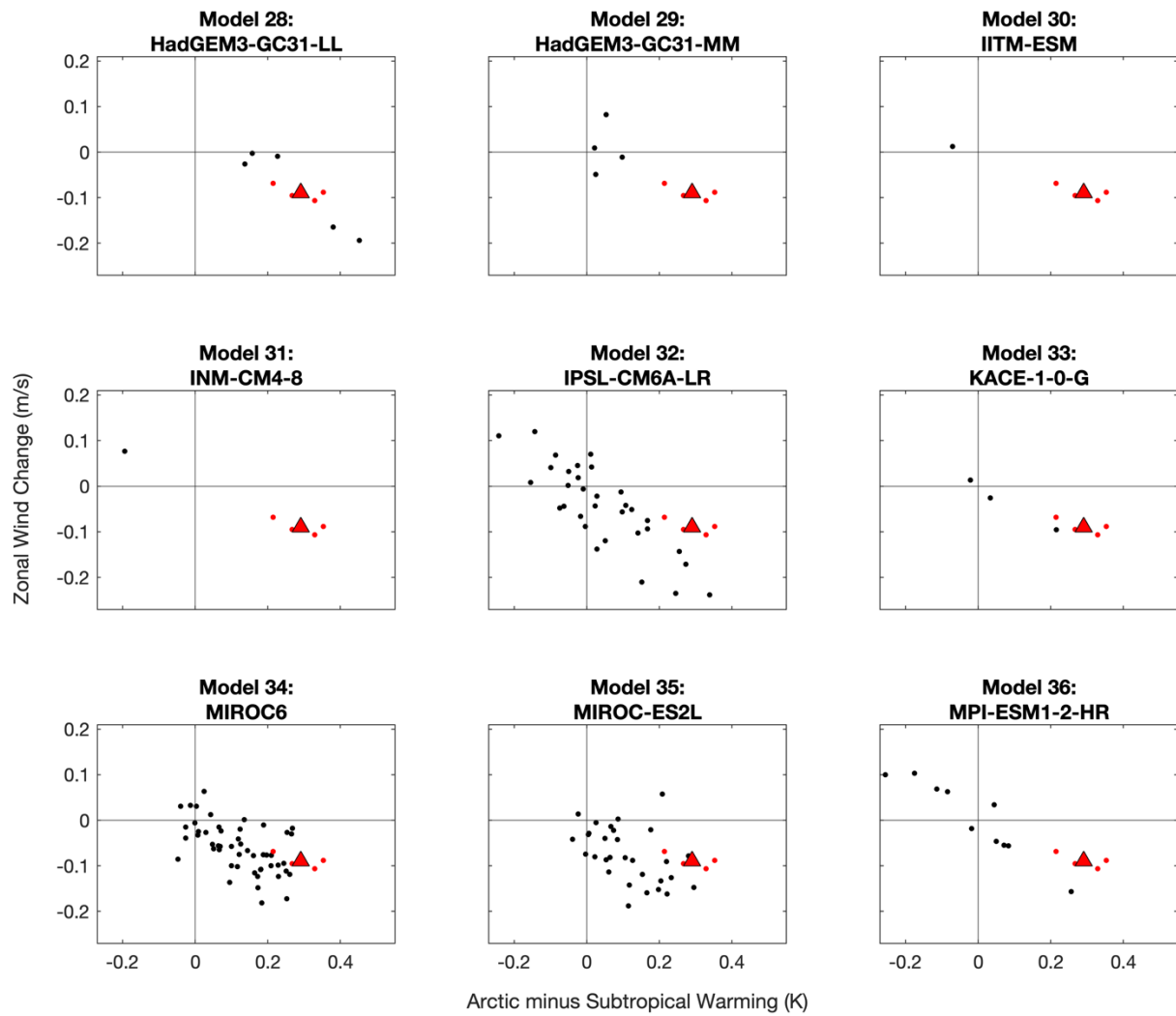**Fig S3** As Figure S1, but for models 19 through 27

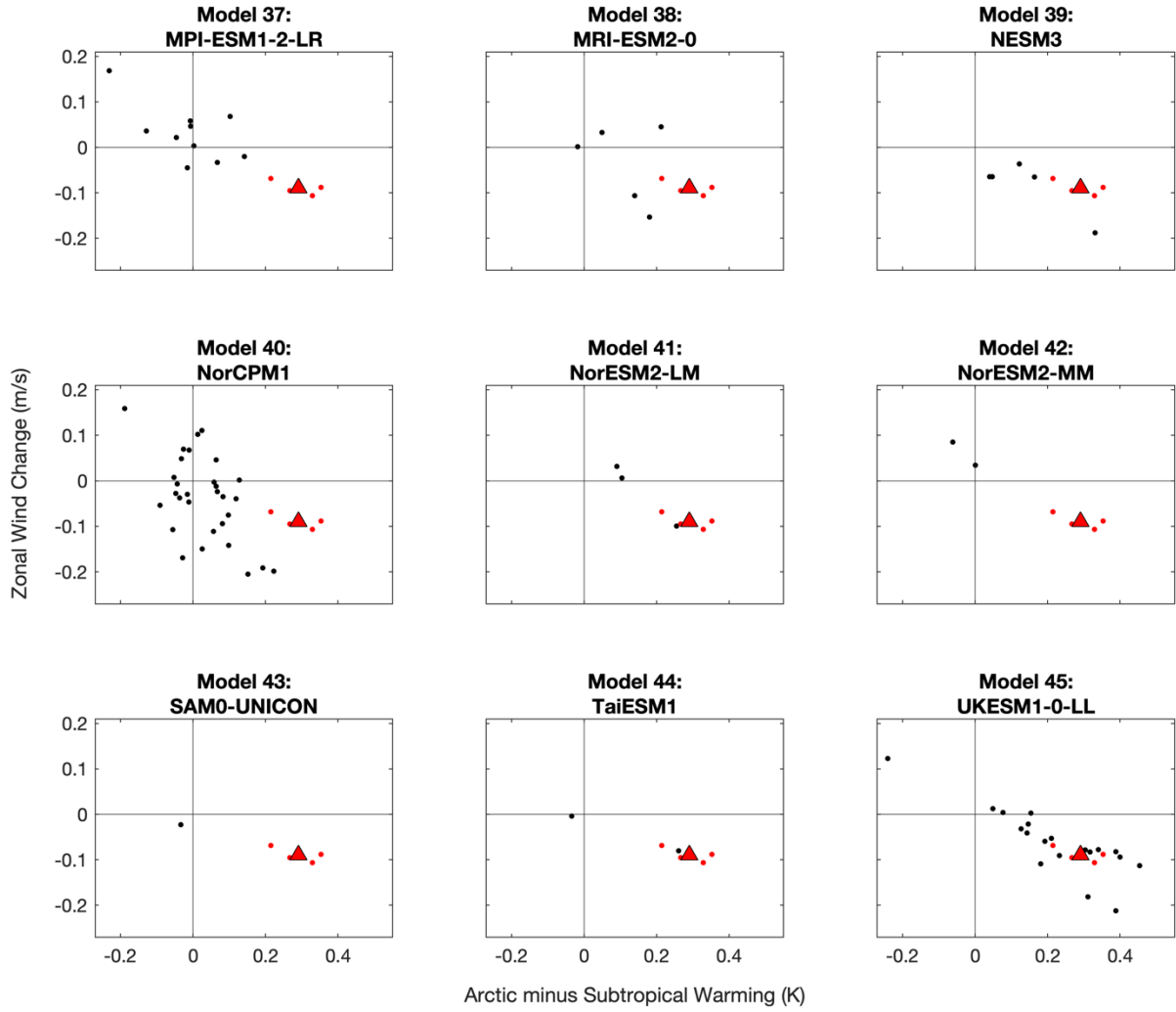**Fig S4** As Figure S1, but for models 28 through 36

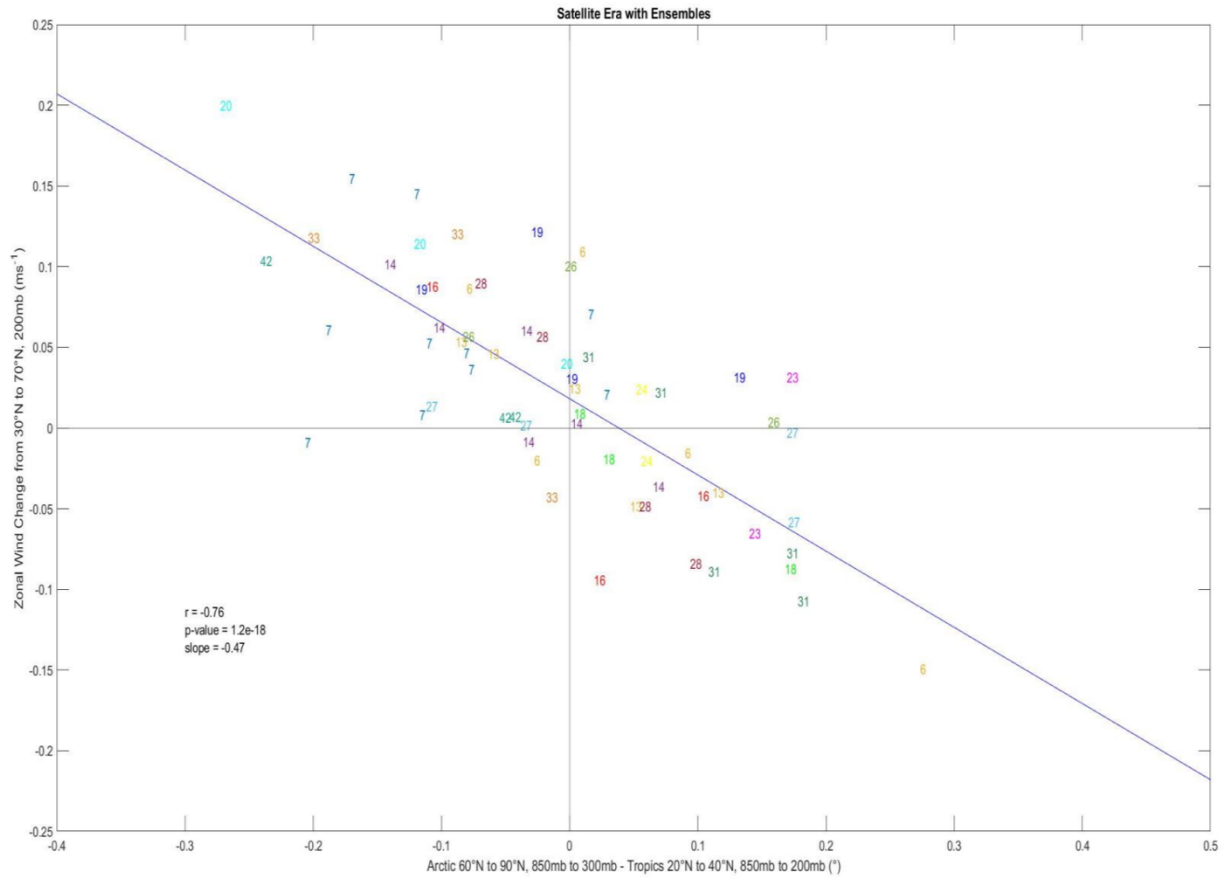**Fig S5** As Figure S1, but for models 37 through 45

Fig S6 As Figure 3b in the main text, but for CMIP5 (years 1999-2018 of the historical and RCP8.5 experiments minus years 1979-1998 of the historical experiment), and without reanalysis estimates. Model numbers are given in Table S1
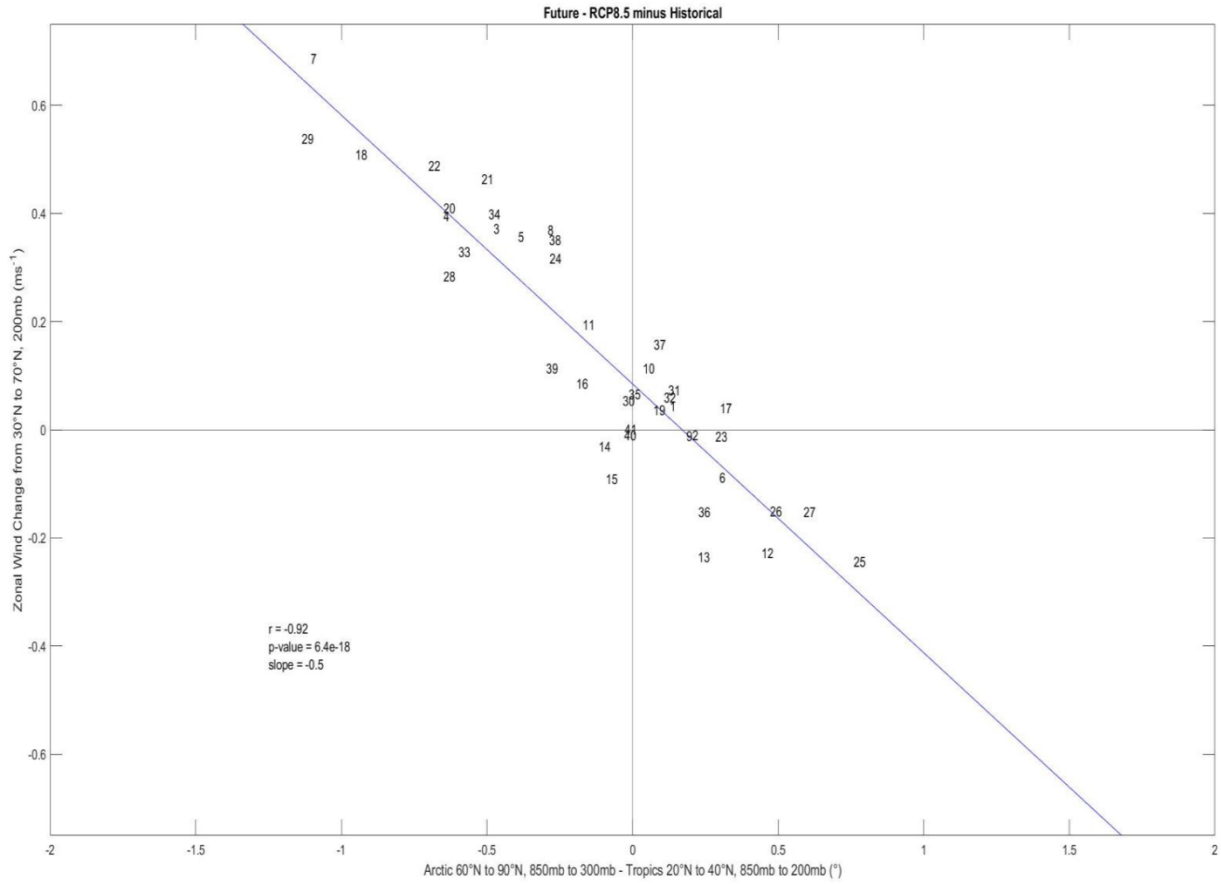
Fig S7 As Figure 3d in the main text, but for CMIP5 (years 2070-2099 of the RCP8.5 experiment minus years 1975-2004 of the historical experiment). Model numbers are given in Table S1