

# **Electronic Supplementary Material to: How Well do CMIP6 and CMIP5 Models Simulate the Climatological Seasonal Variations of Ocean Salinity?\***

Yuanxin LIU<sup>1,2,3</sup>, Lijing CHENG<sup>2,3,4</sup>, Yuying PAN<sup>2,3,4</sup>, Zhetao TAN<sup>2,3,4</sup>, John ABRAHAM<sup>5</sup>,  
Bin ZHANG<sup>3,6</sup>, Jiang ZHU<sup>2,3,4</sup>, and Junqiang SONG<sup>1</sup>

<sup>1</sup>*College of Meteorology and Oceanography, College of Computer Science and Technology,  
National University of Defense Technology, Changsha 410073, China*

<sup>2</sup>*Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China*

<sup>3</sup>*Center for Ocean Mega-Science, Chinese Academy of Sciences, Qingdao 266071, China*

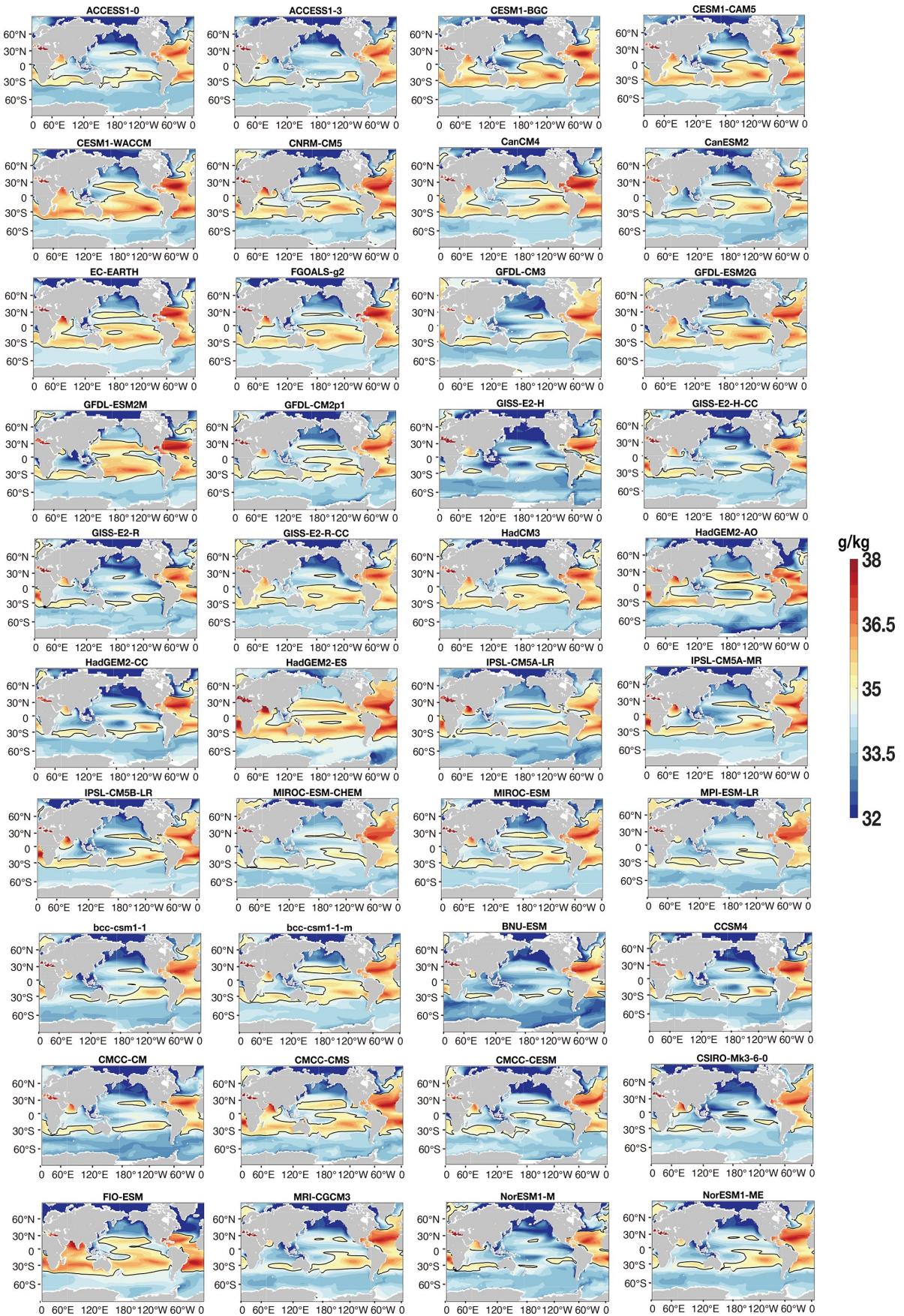
<sup>4</sup>*University of Chinese Academy of Sciences, Beijing 100049, China*

<sup>5</sup>*School of Engineering, University of St. Thomas, 2115 Summit Ave., St Paul, MN 55105, USA*

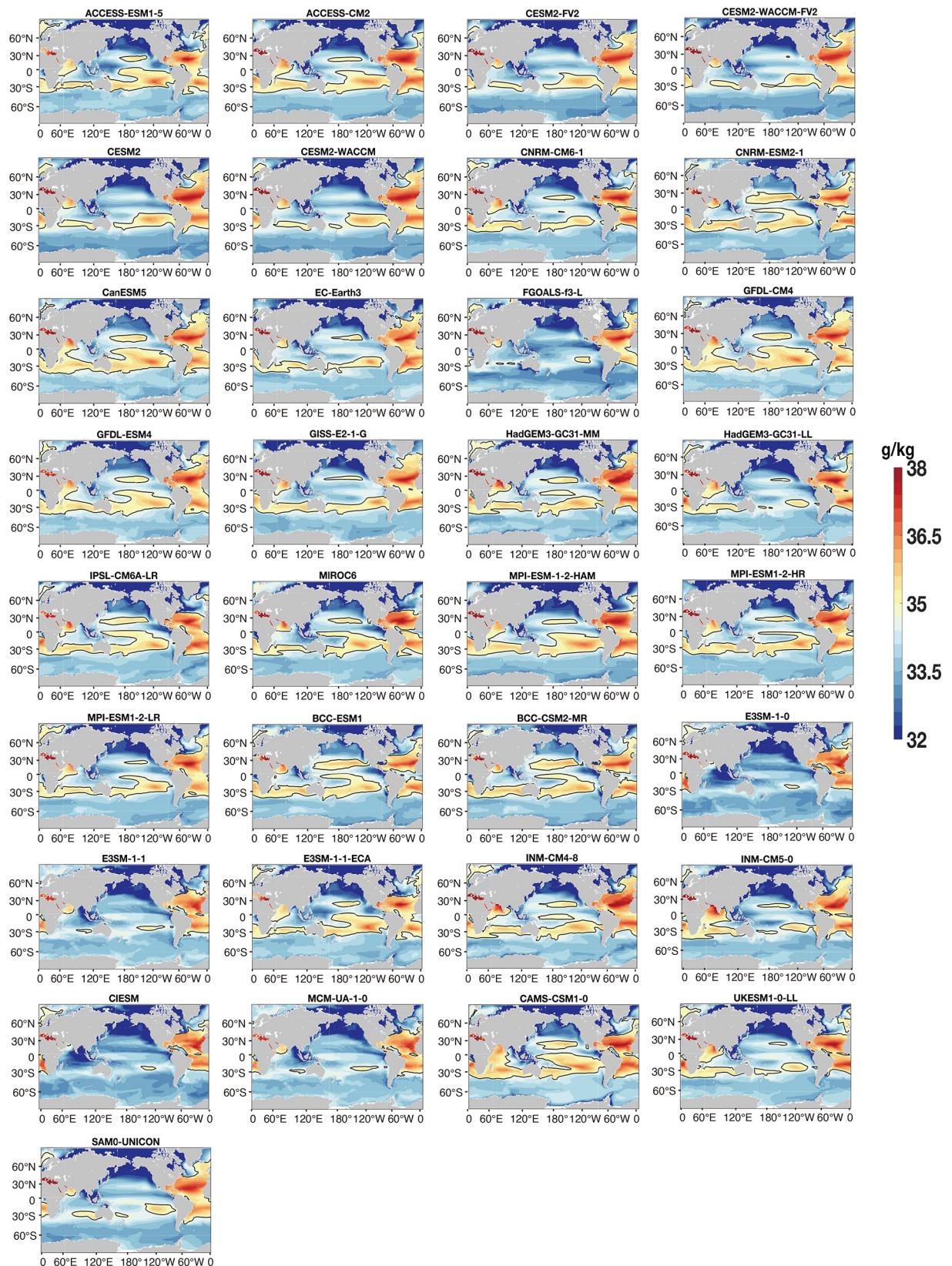
<sup>6</sup>*Marine Science Data Center, Institute of Oceanology, Chinese Academy of Sciences, Qingdao 266071, China*

**ESM to:** Liu, Y. X., L. J. Cheng, Y. Y. Pan, Z. T. Tan, J. Abraham, B. Zhang, J. Zhu, and J. Q. Song, 2022: How well do CMIP6 and CMIP5 models simulate the climatological seasonal variations of ocean salinity? *Adv. Atmos. Sci.*, **39**(10), 1650–1672, <https://doi.org/10.1007/s00376-022-1381-2>.

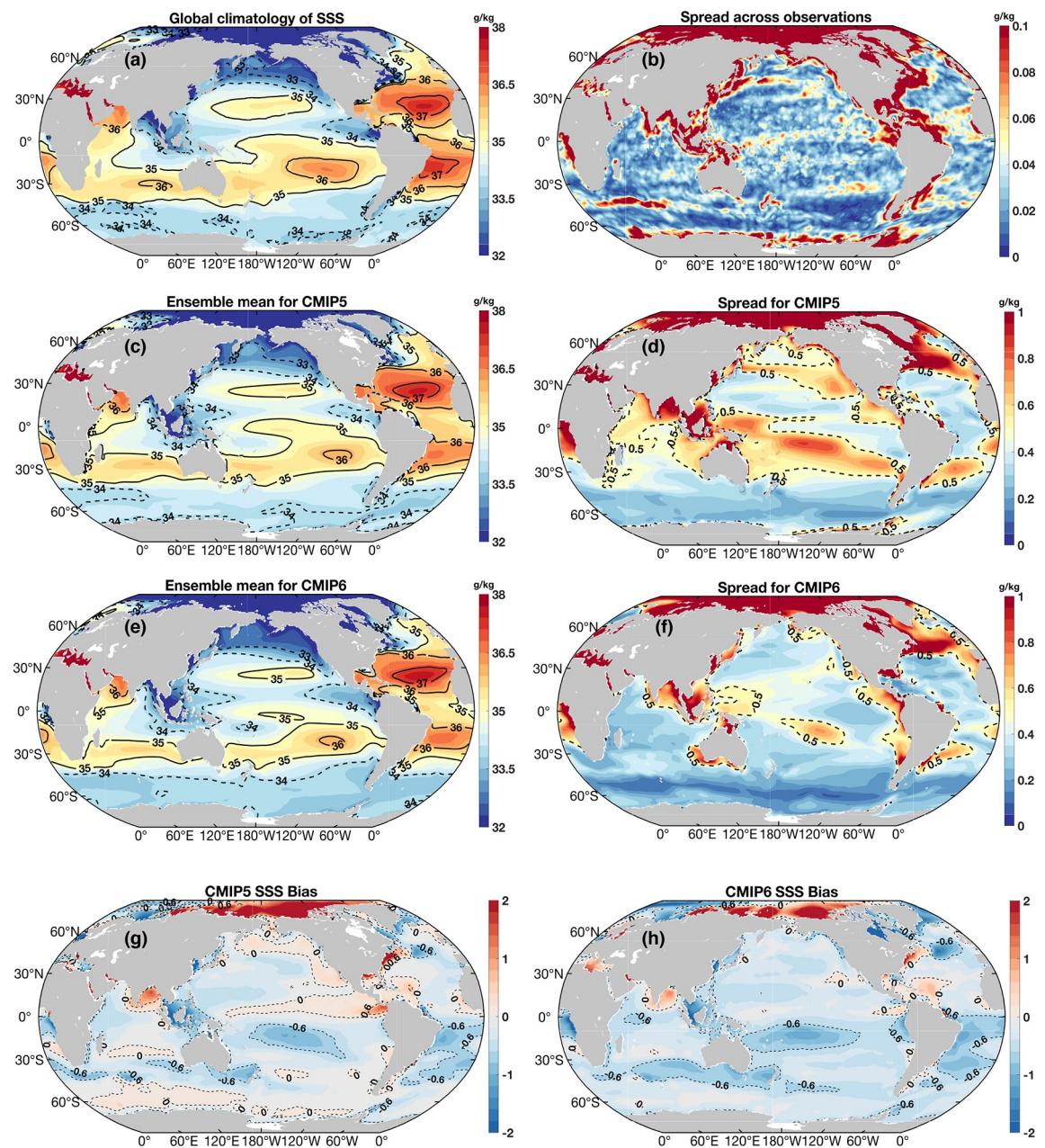
---



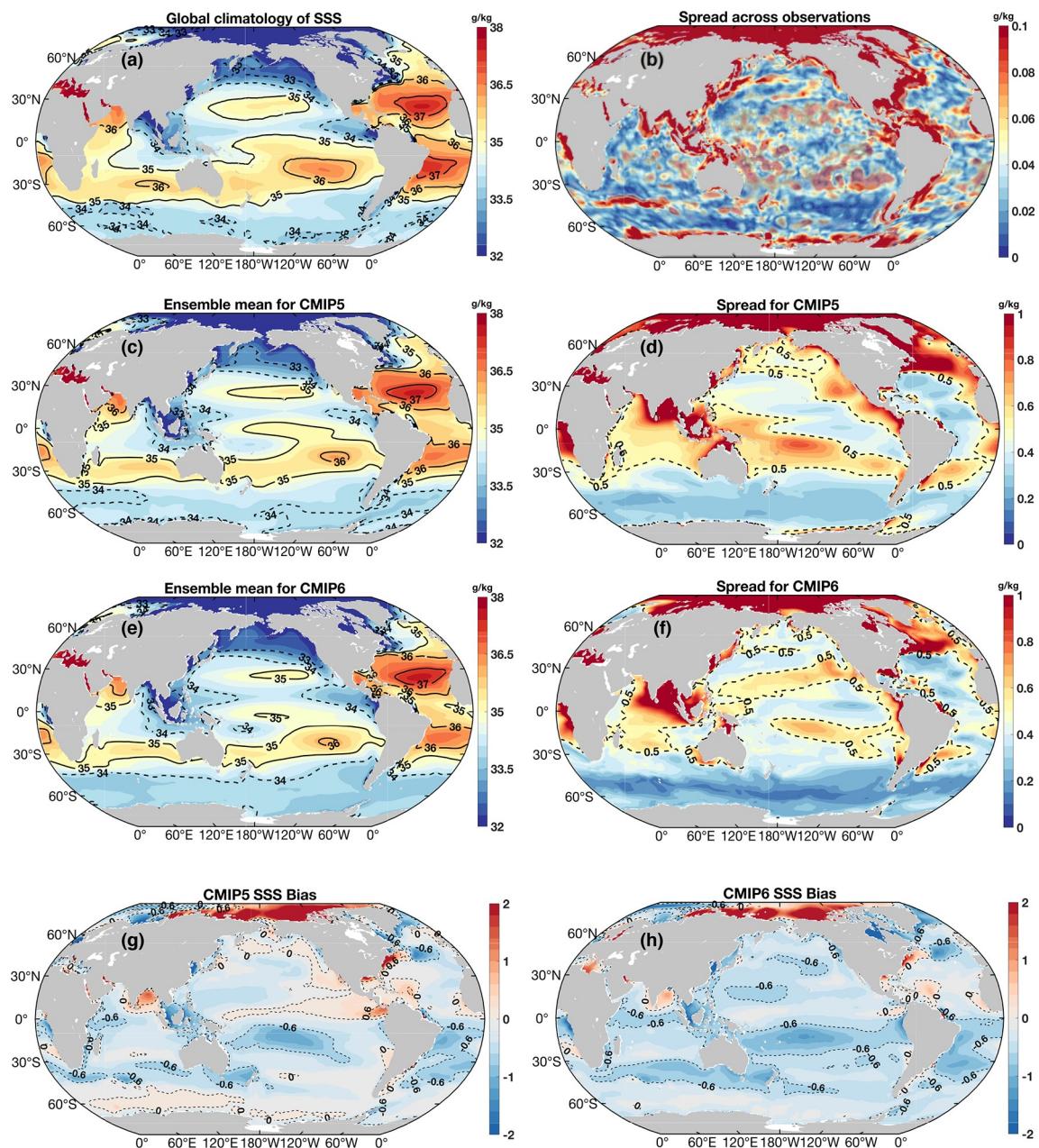
**Fig. S1.** Global climatology of SSS for individual CMIP5 models. The black countour line shows the  $35 \text{ g kg}^{-1}$  salinity.



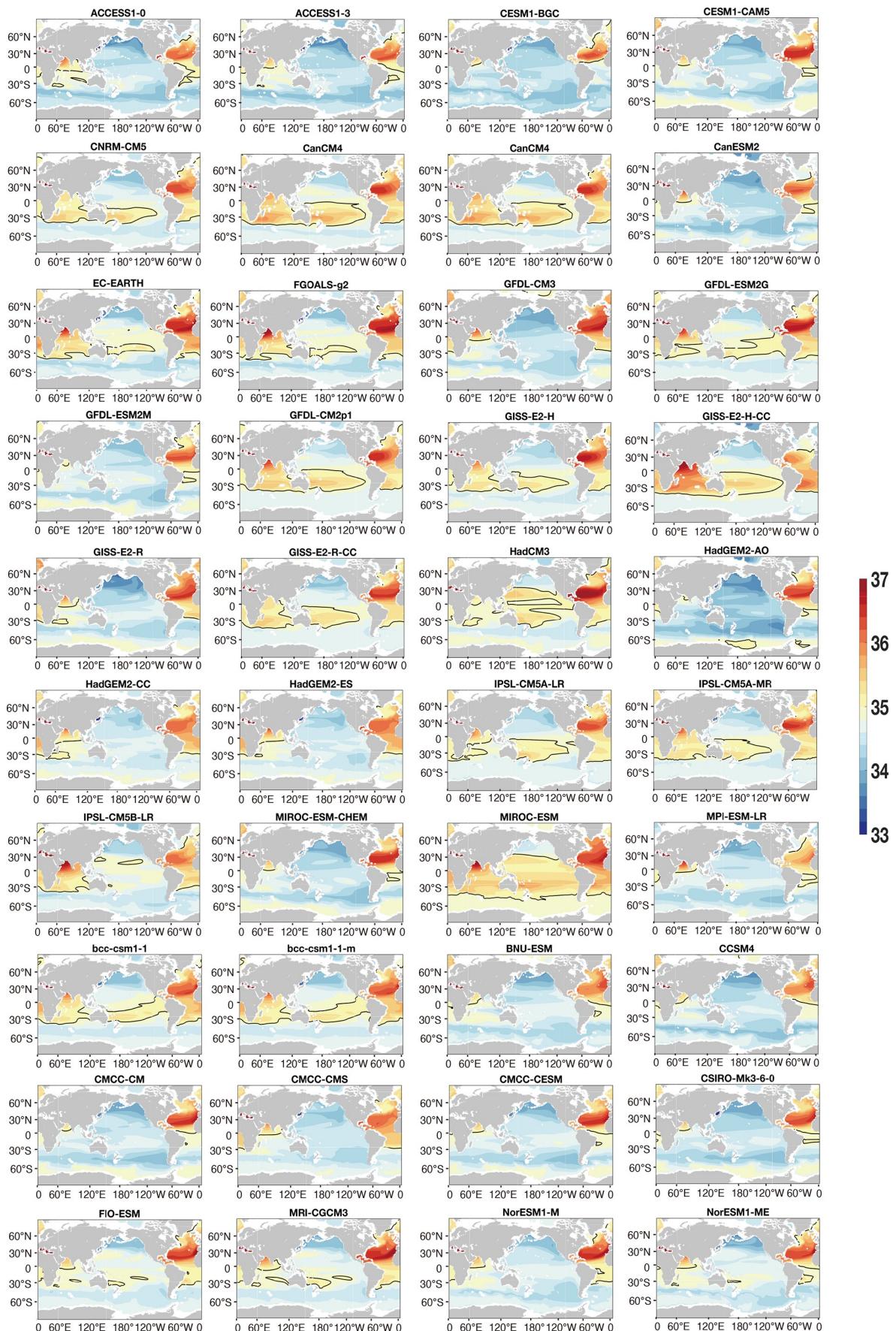
**Fig. S2.** Global climatology of SSS for individual CMIP6 models. The black contour line shows the  $35 \text{ g kg}^{-1}$  salinity.



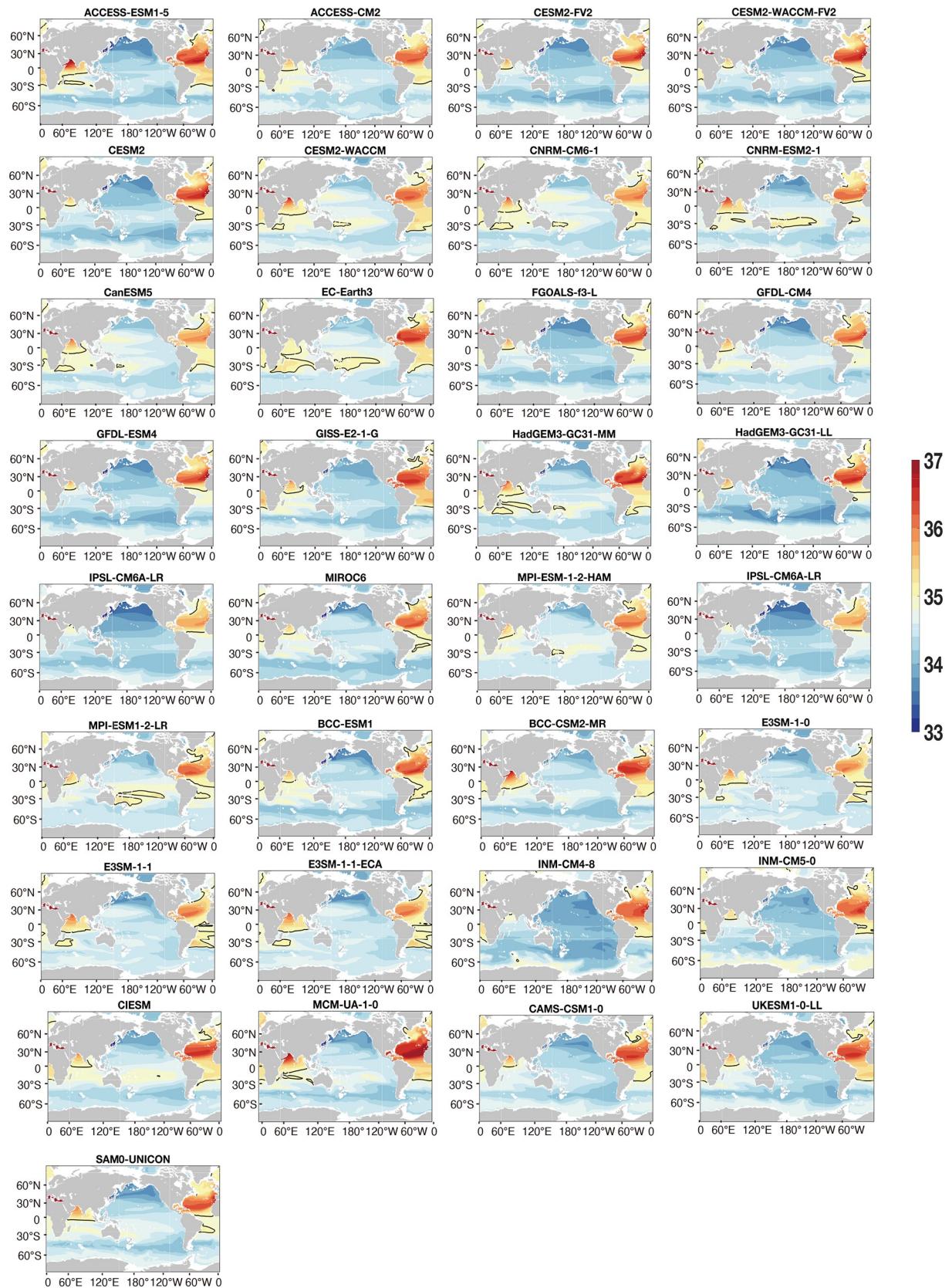
**Fig. S3.** As in Fig. 1 but using a subset of models (20 models) from the same institutes (Table S1).



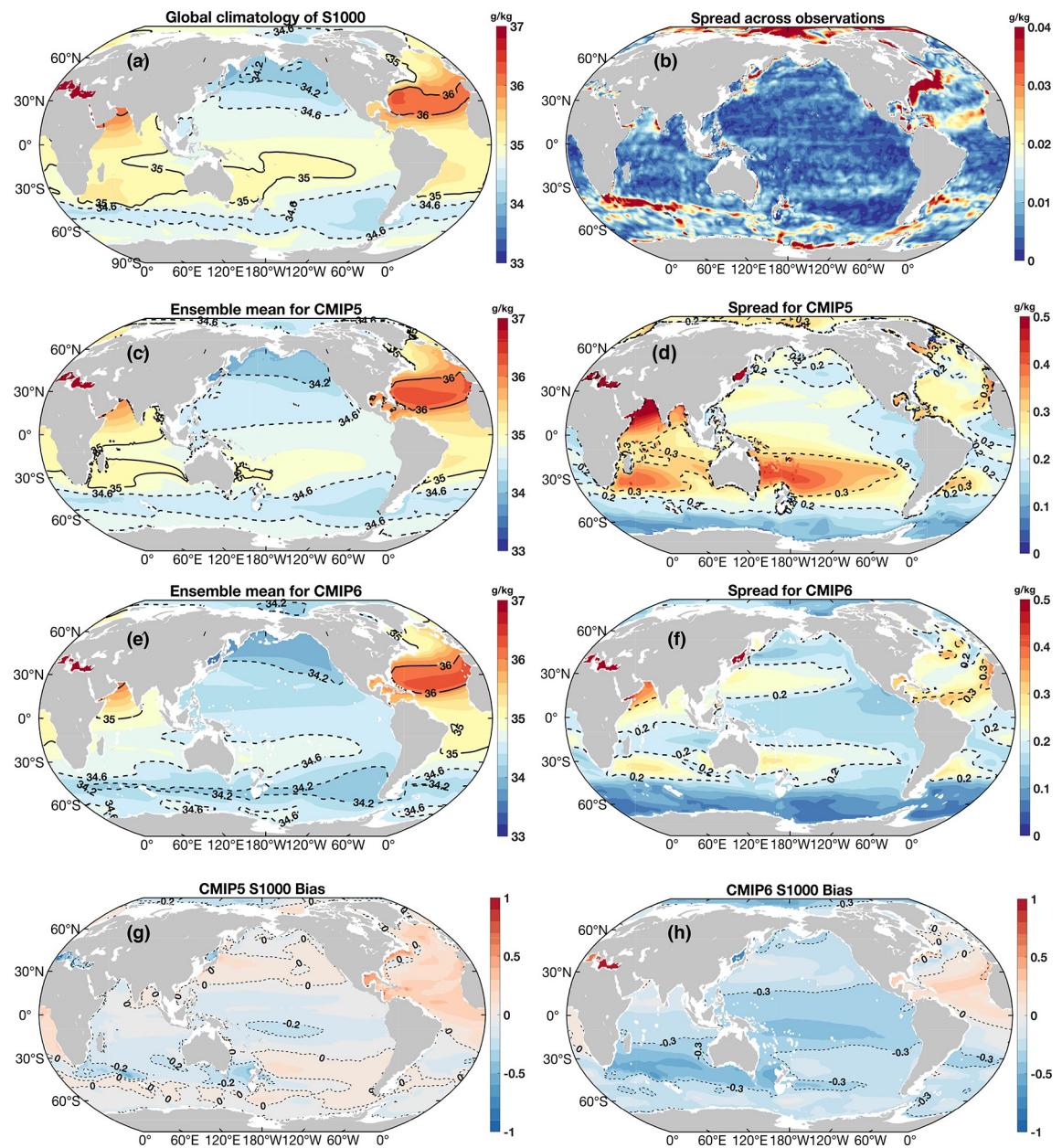
**Fig. S4.** As in Fig. 1 but using 1980–2000 climatology.



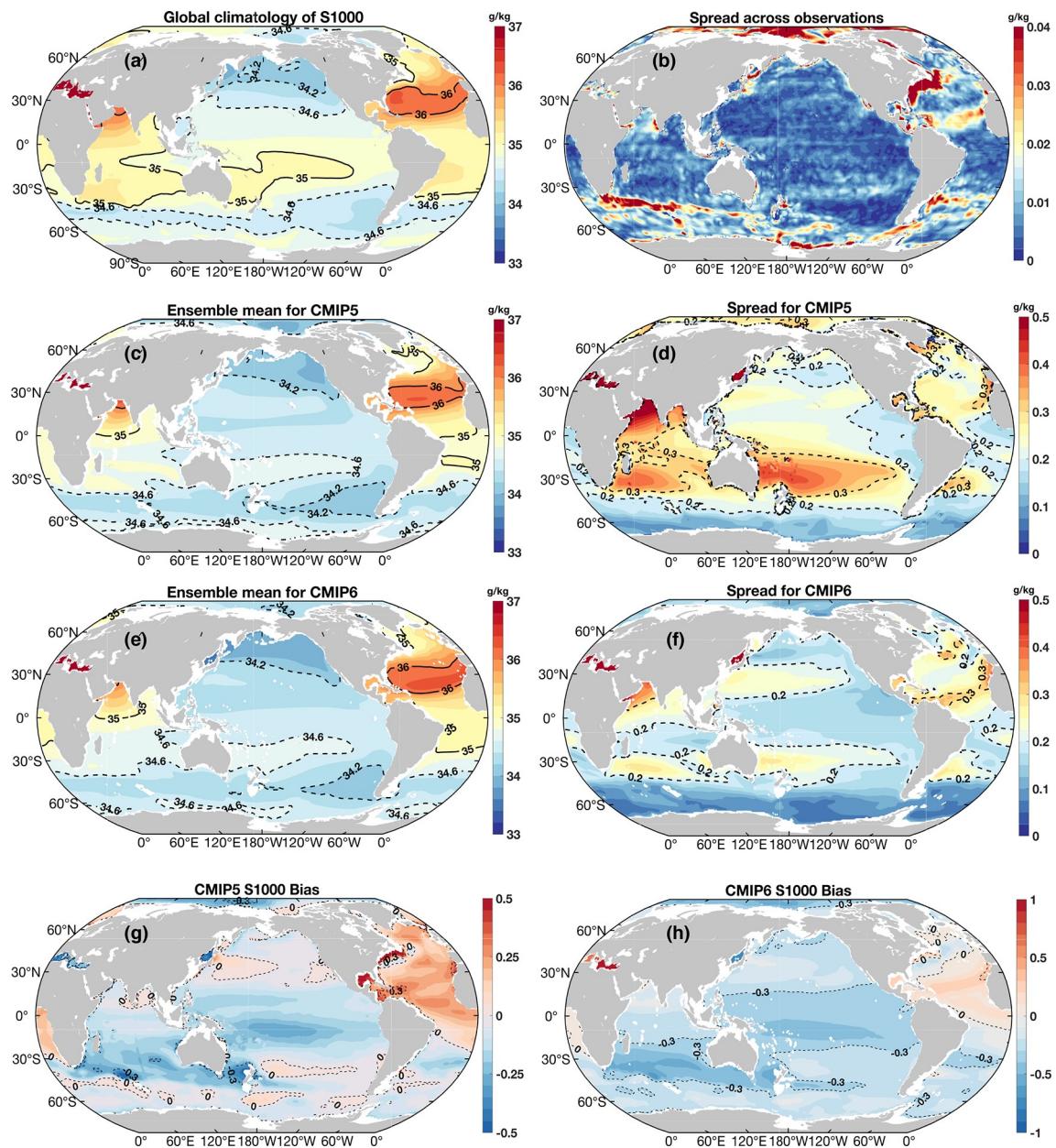
**Fig. S5.** Global climatology of S1000 for all individual CMIP5 models. The black contour shows the  $35 \text{ g kg}^{-1}$  salinity.



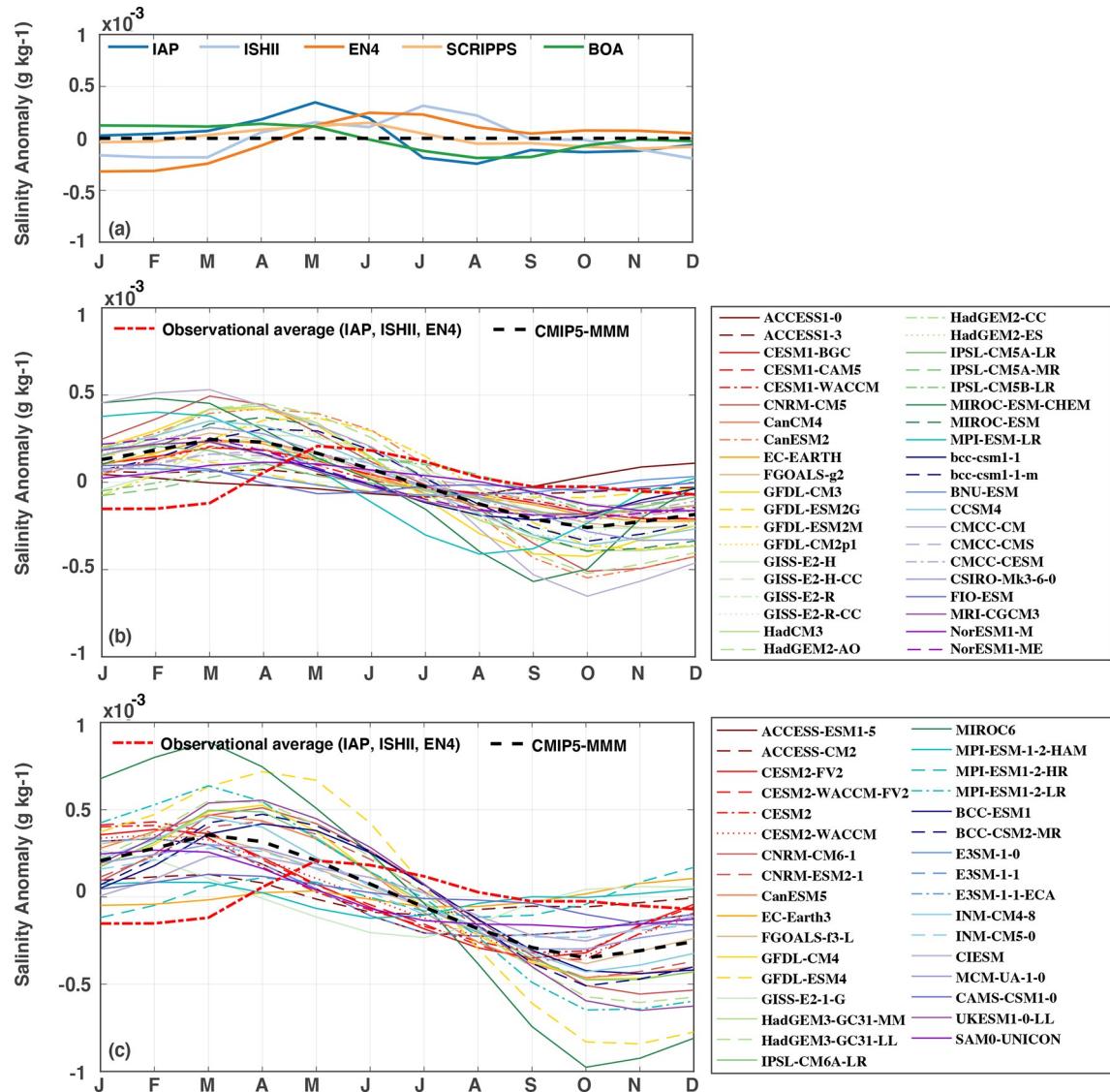
**Fig. S6.** Global climatology of S1000 for all individual CMIP6 models. The black contour shows the  $35 \text{ g kg}^{-1}$  salinity.



**Fig. S7.** As in Fig. 2 but using a subset of models (20 models) from the same institutes (Table S1).



**Fig. S8.** As in Fig. 2 but using 1980–2000 climatology.



**Fig. S9.** Same as Fig. 11 but for SSS change within 60°S–60°N.

**Table S1.** Correspondence of CMIP5 models with CMIP6 models from the same institutes.

Index	CMIP5 model	CMIP6 model
1	ACCESS1-0	ACCESS-ESM1-5
2	ACCESS1-3	ACCESS-CM2
3	CESM1-BGC	CESM2-FV2
4	CESM1-CAM5	CESM2
5	CESM1-WACCM	CESM2-WACCM
6	CNRM-CM5	CNRM-CM6-1
7	CanESM2	CanESM5
8	EC-EARTH	EC-Earth3
9	FGOALS-g2	FGOALS-f3-L
10	GFDL-CM3	GFDL-CM4
11	GFDL-ESM2G	GFDL-ESM4
12	GISS-E2-H	GISS-E2-1-G
13	GISS-E2-H-CC	GISS-E2-1-H
14	HadCM3	HadGEM3-GC31-MM
15	HadGEM2-AO	HadGEM3-GC31-LL
16	IPSL-CM5A-LR	IPSL-CM6A-LR
17	MIROC-ESM-CHEM	MIROC6
18	MPI-ESM-LR	MPI-ESM1-2-LR
19	BCC-CSM1-1	BCC-ESM1
20	BCC-CSM1-1-M	BCC-CSM2-MR