How does internal variability influence the ability of CMIP5 models to reproduce the recent trend in Southern Ocean sea ice extent?

V. Zunz[1], **H. Goosse**[1], **and F. Massonnet**[1]

[1]Université catholique de Louvain, Earth and Life Institute, Georges Lemaître Centre for Earth and Climate Research, Louvain-la-Neuve, Belgium.

SUPPLEMENTARY MATERIAL

Supplement table

Model Name	Atmosphere Component	Ocean Component	Sea Ice Component	References
BCC-CSM1.1	BCC_AGCM2.1; 26 vertical layers, T42	MOM4_L40; 40 vertical layers, tripolar grid 1°× (1-1/3)°	SIS; tripolar grid 1°× (1-1/3)°	http://www.lasg.ac.cn/C20C/UserFiles/File/C20C-xin.pdf
CanESM2	CanAM4; 35 vertical layers, T63	CanOM4; 40 vertical layers, $\sim 1.4^\circ \times 0.9^\circ$	CanSIM1; T63 Gaussian Grid	http://www.cccma.ec.gc.ca/models
CCSM4	CAM4; 26 vertical layers, $1.25^\circ \times 0.9^\circ$	POP2; 60 vertical layers, $1.11^\circ \times (0.27 - 0.54)^\circ$	CICE4; $1.11^\circ \times (0.27 - 0.54)^\circ$	Gent et al. (2011)
CNRM-CM5	ARPEGE-CLIMAT v5.2; 31 vertical layers, T127	NEMO v3.2; 42 vertical layers, ORCA-1°	GELATO v5; ORCA-1°	Voldoire et al. (2011)
CSIRO-Mk3.6.0	Mk3.6 atmosphere component; 18 vertical layers, T63	Mk3.6 ocean component; 31 vertical layers, $\sim 1.875^\circ \times 0.9375^\circ$	Sea ice sub-component of Mk3.6 (part of the AGCM); T63	Rotstayn et al. (2010)
EC-EARTH	IFS; 62 vertical layers, T159	NEMO v2; 42 vertical layers, ORCA-1°	LIM2; ORCA-1°	Hazeleger et al. (2011)
FGOALS-g2	GAMIL2; 26 vertical layers, $\sim 2.8^\circ \times 3^\circ$	LICOM2; 30 vertical layers, $\sim 1^\circ \times 1^\circ$	CICE; $\sim 1^\circ \times 1^\circ$	Zhang and Yu (2011)
FGOALS-s2	SAMIL2; 26 vertical layers, R42	LICOM2; 30 vertical layers, (0.5-1)°×(0.5-1)°	CSIM5; (0.5-1)°×(0.5-1)°	Bao et al. (submitted)
GFDL-CM3	AM3p9; 48 vertical layers, C48	MOM4p1; 50 vertical layers, tripolar grid $\sim 1^\circ \times 1^\circ$	SISp2; tripolar grid, $\sim 1^\circ \times 1^\circ$	Griffies et al. (2011)
GFDL-ESM2M	AM2p14; 24 vertical layers, M45	MOM4p1; 50 vertical layers; tripolar grid $\sim 1^\circ \times 1^\circ$	SISp2; tripolar grid $\sim 1^\circ \times 1^\circ$	Dunne et al. (2012)
GISS-E2-R	ModelE; 40 vertical layers, 2°×2.5°	Russell; 32 vertical layers, 1°× 1.25°	Russel; 1°× 1.25°	http://data.giss.nasa.gov/modelE/ar5/
HadCM3	HadAM3; 19 vertical layers, 3.75°×2.5°	HadOM3; 20 vertical layers, 1.25°×1.25°	Sea ice component of HadOM3; 1.25°×1.25°	Collins et al. (2001)
HadGEM2-CC	HadGAM2; 60 vertical layers, N96	HadGOM2; 40 vertical layers, (1-0.3)°×1°	Inspired from CICE	Martin et al. (2011)
HadGEM2-ES	HadGAM2; 38 vertical layers, N96	HadGOM2; 40 vertical layers, (1-0.3)°×1°	Inspired from CICE	Martin et al. (2011)
INM-CM4	INM-CM4 atmosphere component, 21 vertical layers, 2°×1.5°	INM-CM4 ocean component; 40 vertical layers, 1°×0.5°	INM-CM4 ocean component; 1°×0.5°	Volodin et al. (2010)

Model Name	Atmosphere Component	Ocean Component	Sea Ice Component	References
IPSL-CM5A-LR	LMDZ4 v5; 39 vertical layers, $\sim 2^{\circ} \times 4^{\circ}$	NEMO v2.3; 31 vertical layers, ORCA-2°	LIM2; ORCA-2°	`http://icmc.ipsl.fr/`
IPSL-CM5A-MR	LMDZ4 v5; 39 vertical layers, $\sim 1.25^{\circ} \times 2.5^{\circ}$	NEMO v2.3; 31 vertical layers, ORCA-2°	LIM2; ORCA-2°	`http://icmc.ipsl.fr/`
MIROC4h	CCSR/NIES/FRCGC AGCM v5.7; 56 vertical layers, T213	COCO v3.4; 48 vertical layers, rotated pole, $0.28^{\circ}\times$ 0.19°	COCOv3.4; rotated pole, $0.28^{\circ}\times$ 0.19°	Sakamoto et al. (2012)
MROC5	CCSR/NIES/FRCGC AGCM; 40 vertical layers, T85	COCO v4.5; 49 vertical layers, $1.4^{\circ}\times$(0.5-1.4)$^{\circ}$	COCO v4.5; $1.4^{\circ}\times$(0.5-1.4)$^{\circ}$	Watanabe et al. (2010)
MIROC-ESM	CCSR/NIES/FRCGC AGCM; 80 vertical layers, T42	COCO v3.4; 44 vertical layers, $\sim 1.4^{\circ} \times 1^{\circ}$	COCO v3.4; $\sim 1.4^{\circ} \times 1^{\circ}$	Watanabe et al. (2011)
MIROC-ESM-CHEM	CCSR/NIES/FRCGC AGCM; 80 vertical layers, T42	COCO v3.4; 44 vertical layers; $\sim 1.4^{\circ} \times 1^{\circ}$	COCO v3.4; $\sim 1.4^{\circ} \times 1^{\circ}$	Watanabe et al. (2011)
MPI-ESM-LR	ECHAM6; 47 vertical layers, T63	MPI-OM; 40 vertical layers, $\sim 1.5^{\circ}\times1.5^{\circ}$	Sea ice component of MPI-OM; $\sim 1.5^{\circ}\times1.5^{\circ}$	Raddatz et al. (2007)
MRI-CGCM3	GSMUV; 48 vertical layers, TL159	MRI.COM3; 51 vertical layers, $1^{\circ}\times0.5^{\circ}$	MRI.COM3; $1^{\circ}\times0.5^{\circ}$	Yukimoto et al. (2011)
NorESM1-M	26 vertical layers, F19	53 vertical layers	No information available to us.	No information available to us.

Table S1: Summary of the 24 models used in the analysis.

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