Supplements to "Conservation of heat and mass in P-SKRIPS version 1: the coupled atmosphere-ice-ocean model of The Ross Sea"

Alena Malyarenko[1,2,*], Alexandra Gossart[2,*], Rui Sun[3], and Mario Krapp[4,2]

[1]National Institute of Water and Atmospheric Research | Taihoro Nukurangi , 301 Evans Bay Parade, Hataitai, Wellington, New Zealand
[2]Antarctic Research Centre | Te Puna Pātiotio, Victoria University of Wellington, CO 549, Cotton Building, Gate 7, Kelburn Parade, Wellington, 6012, New Zealand
[3]Scripps Institution of Oceanography, La Jolla, California, USA
[4]GNS Science | Te Pū Ao, 30 Gracefield Rd, Gracefield, Lower Hutt 5010, New Zealand
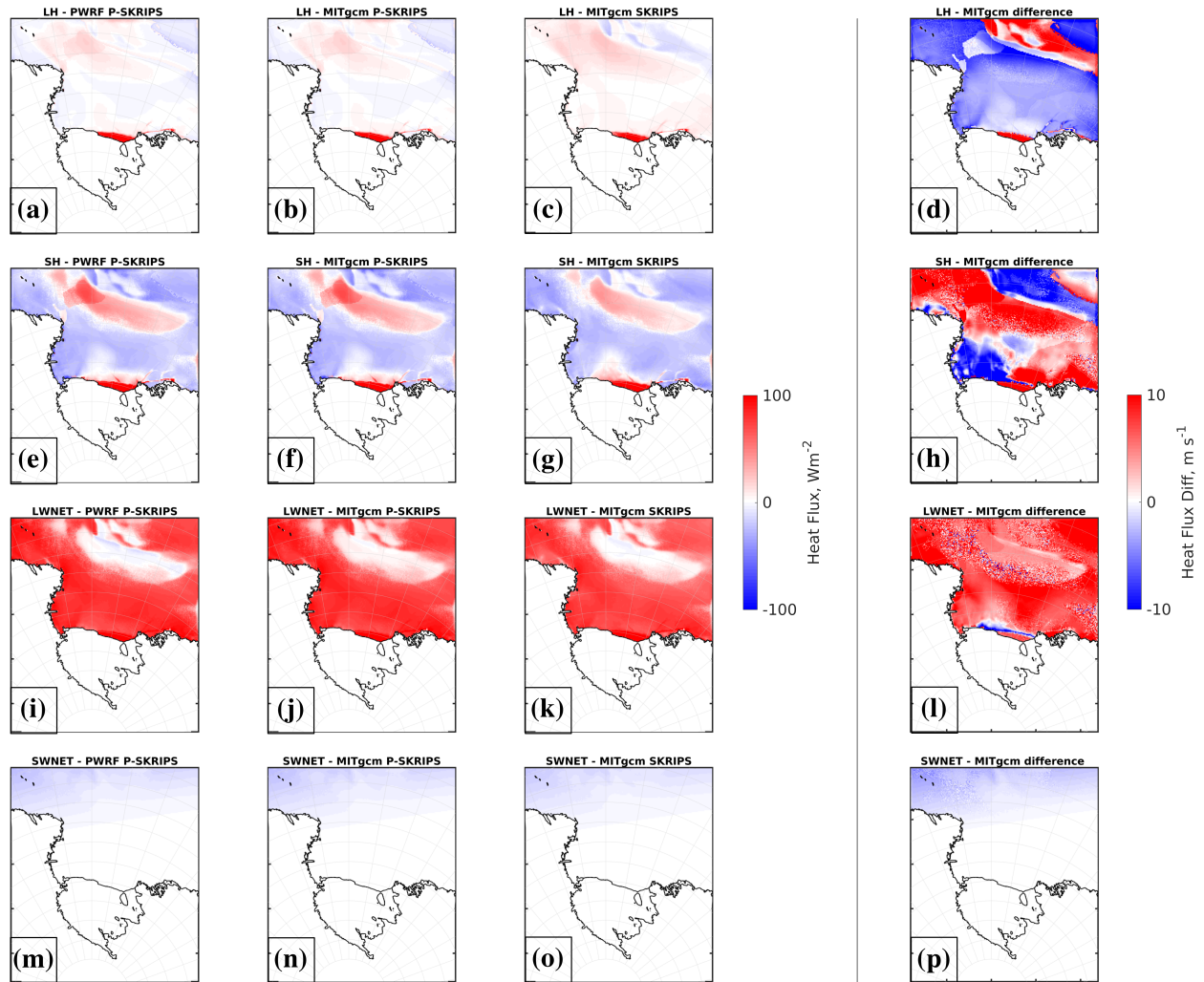[*]These authors contributed equally to this work.

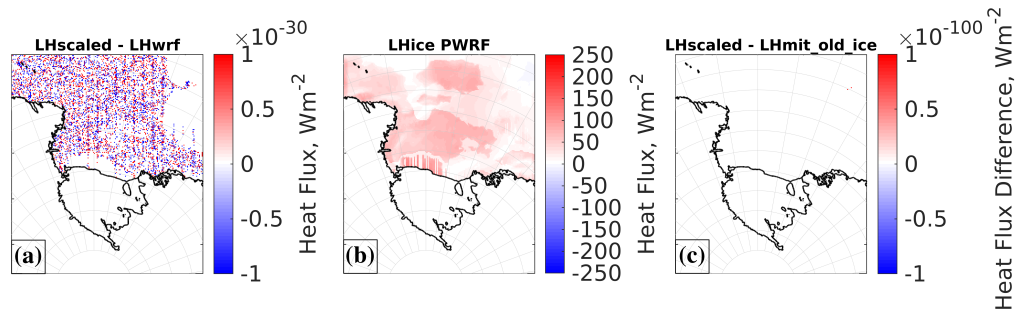**Fig. S1.** Same as Figure 4, but for August 2016 experiments.

Fig. S2. Same as Figure 6, but for August 2016 experiments.
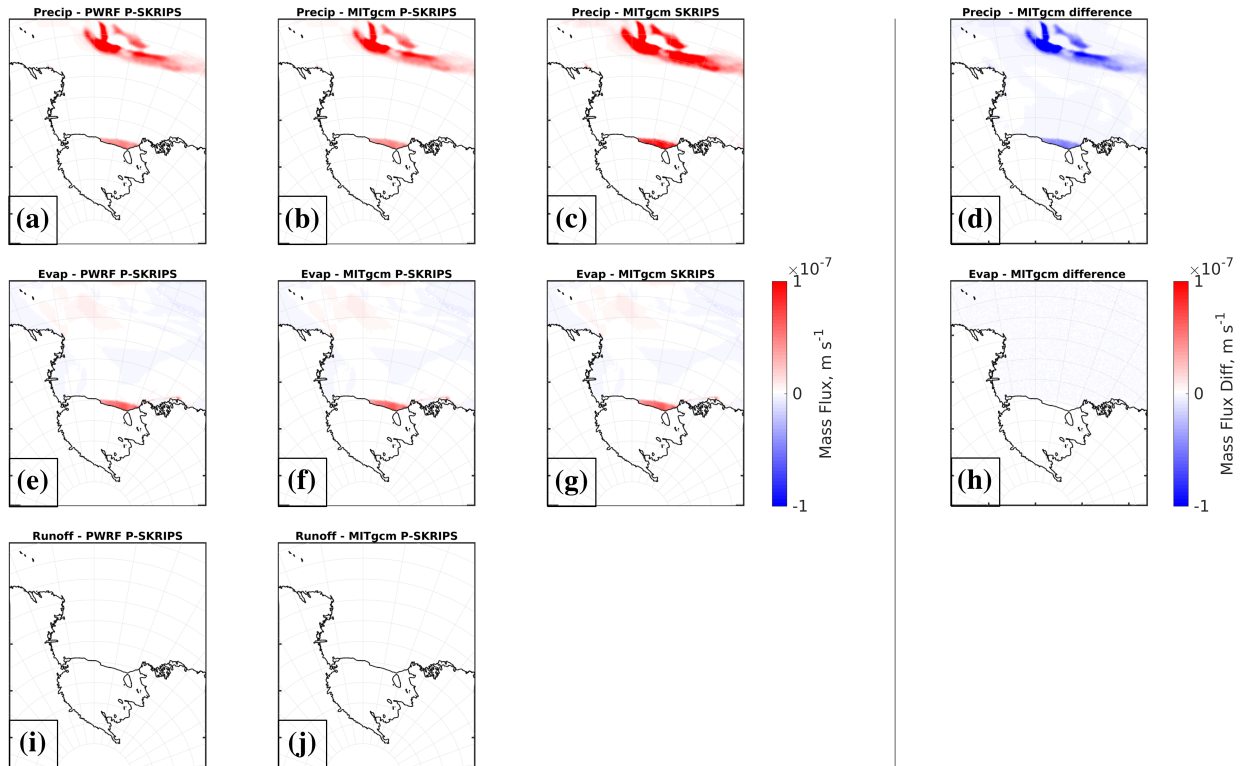

Fig. S3. Same as Figure 7, but for August 2016 experiments.

Table S1. Import of heat and mass fluxes versus calculations in the two experiments

		MITgcm exf	MITgcm seaice	PWRF
HEAT	latent heat	↓	↑	↑
	sensible heat	↓	↑	↑
	short wave net	↑	↓	↓
	long wave net	↑	↑	↓
	TOTAL	↑	↑	-
MASS	evaporation	↑	-	↑
	precipitation	↓	-	↓
	sea ice runoff	↓	-	↓
	land runoff	↓	-	↓
	TOTAL			

Table S2. Statistics presenting the mean value and biases through the coupling interface in the SKRIPS case. The variables are integrated over the whole simulation and through the entire domain (from Figures 8 and S4)

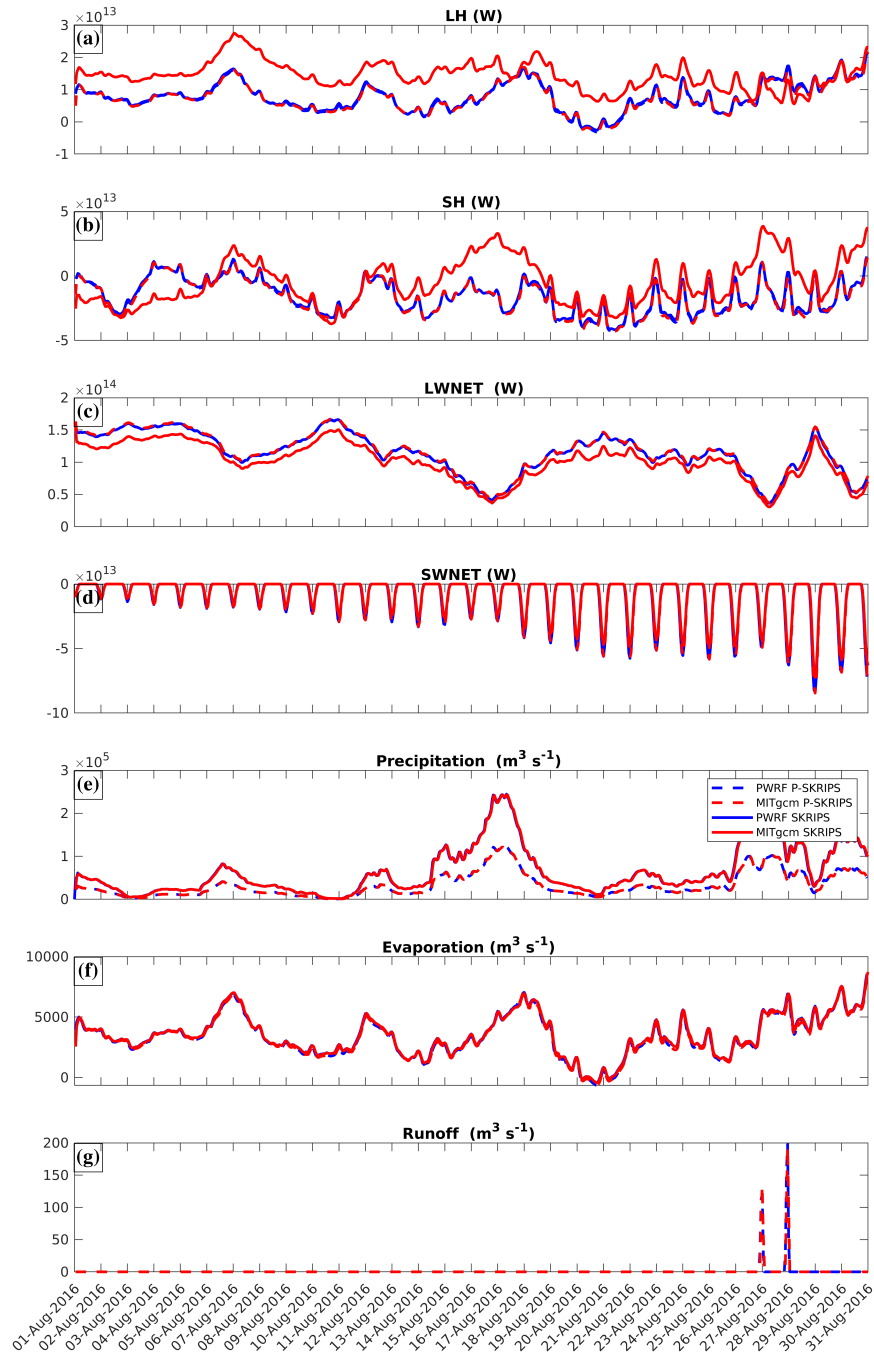|	January			August		
	Mean value	Mean bias	Max bias	Mean value	Mean bias	Max bias
Latent heat [W]	$2.69e^{13}$	$5.08e^{12}$	$2.31e^{13}$	$7.31e^{12}$	$7.61e^{12}$	$1.41e^{13}$
Sensible heat [W]	$1.68e^{13}$	$9.10e^{12}$	$5.62e^{13}$	$-1.61e^{13}$	$1.51e^{13}$	$5.13e^{13}$
Long wave net [W]	$8.88e^{13}$	$1.71e^{13}$	$7.03e^{13}$	$1.16e^{14}$	$1.34e^{13}$	$2.49e^{13}$
Short wave net [W]	$-3.94e^{14}$	$3.64e^{13}$	$9.48e^{13}$	$-7.54e^{12}$	$1.31e^{12}$	$1.48e^{13}$

Fig. S4. Same as Figure 8, but for August 2016 experiments.