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Supplement of

BARRA v1.0: the Bureau of Meteorology Atmospheric high-resolution Regional Reanalysis for Australia

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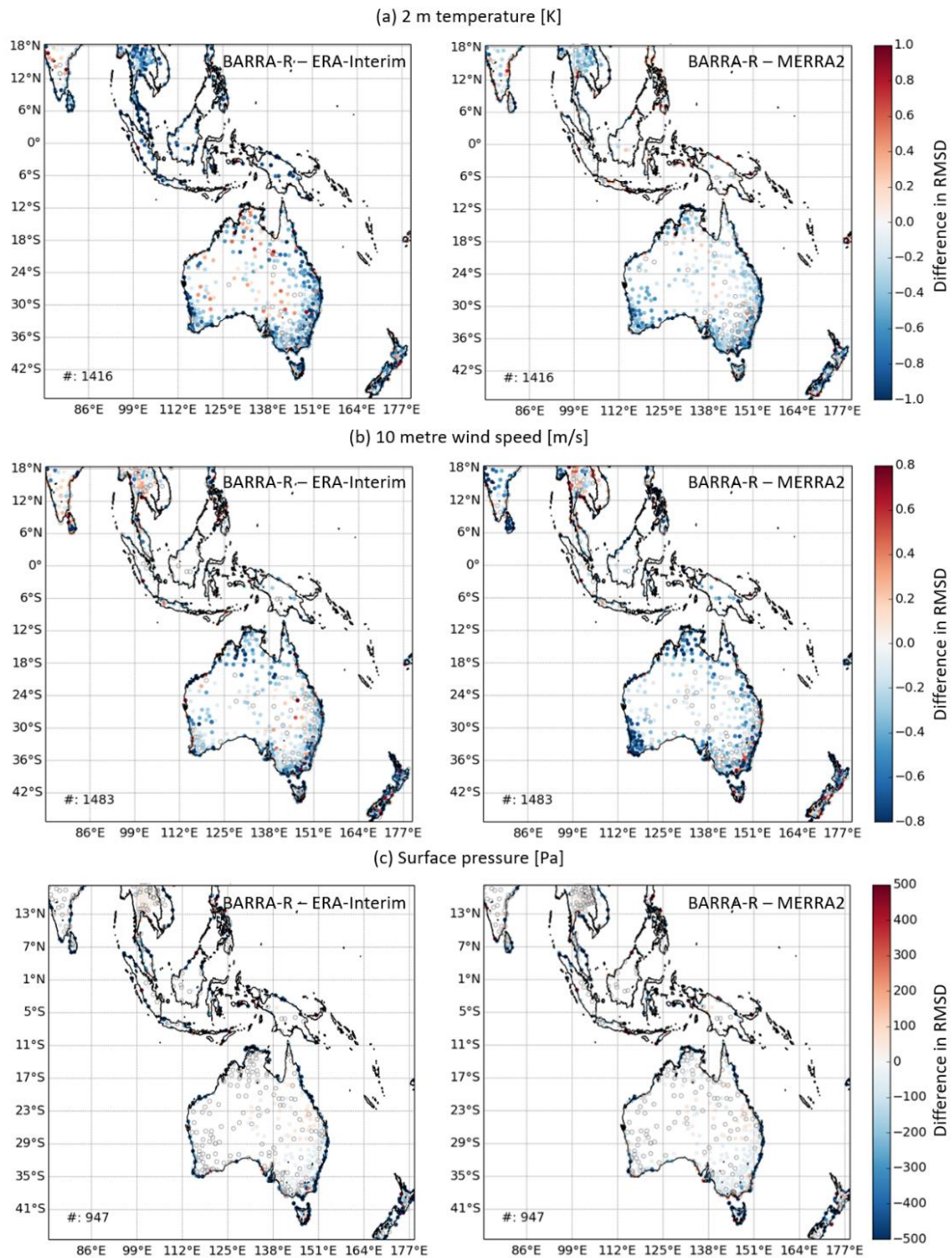


Figure S1 Spatial maps of the difference in RMSD between (left column) BARRA-R and ERA-Interim, and (right) BARRA-R and MERRA-2. RMSD is calculated on model forecasts against observed (a) 2 m temperature, (b) 10 m wind speed and (c) surface pressure. These figures supplementing Figure 3.

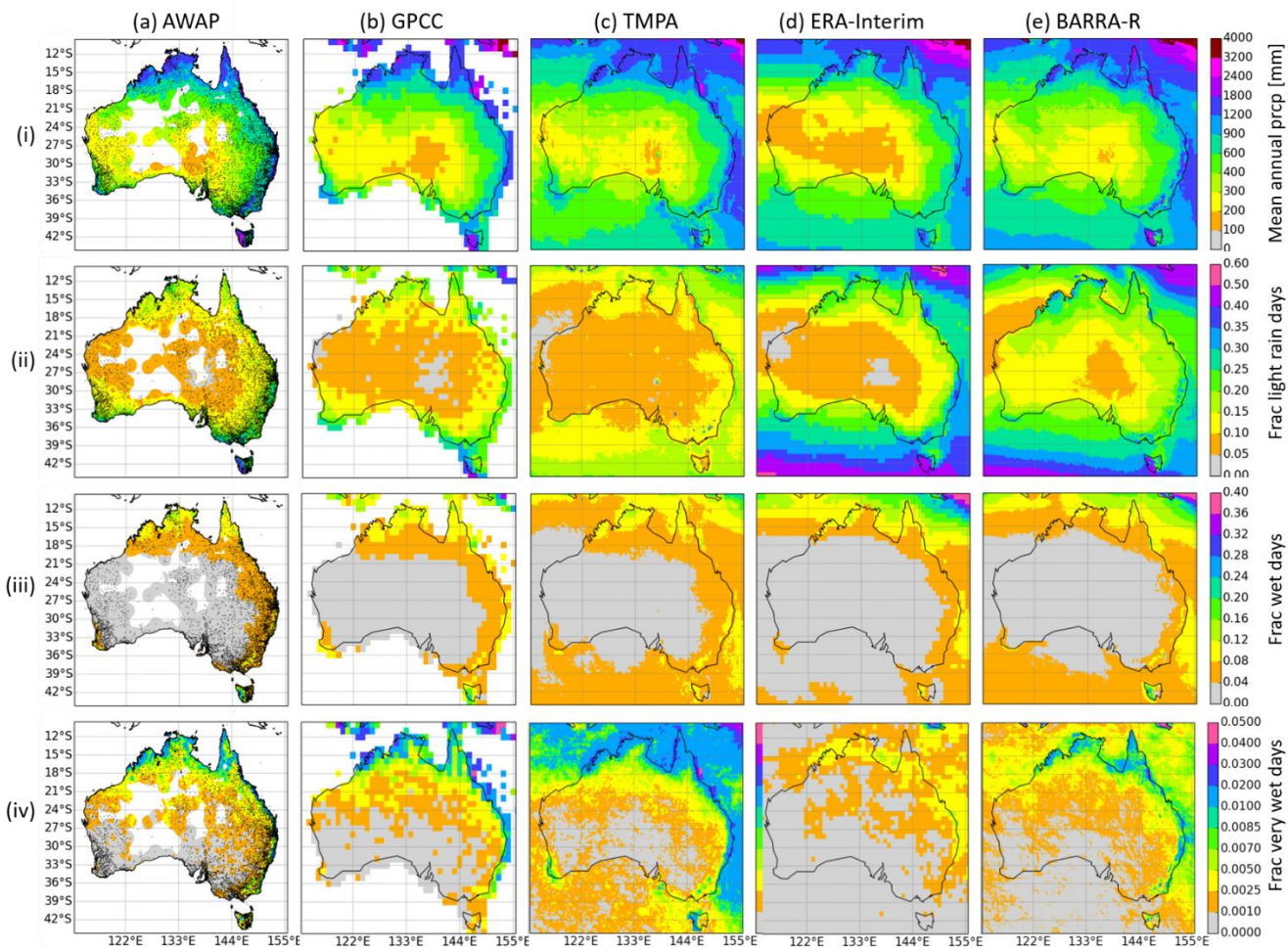


Figure S2 As Figure 8 but over Australia only. (i) Mean annual precipitation [mm], and (ii) fractions of rain days, (iii) heavy precipitation days and (iv) very heavy precipitation days, from 2007 to 2016 from (a) AWAP, (b) GPCP, (c) TMPA, (d) ERA-Interim, and (e) BARRA-R. Regions with more than 10% missing values in AWAP are masked.

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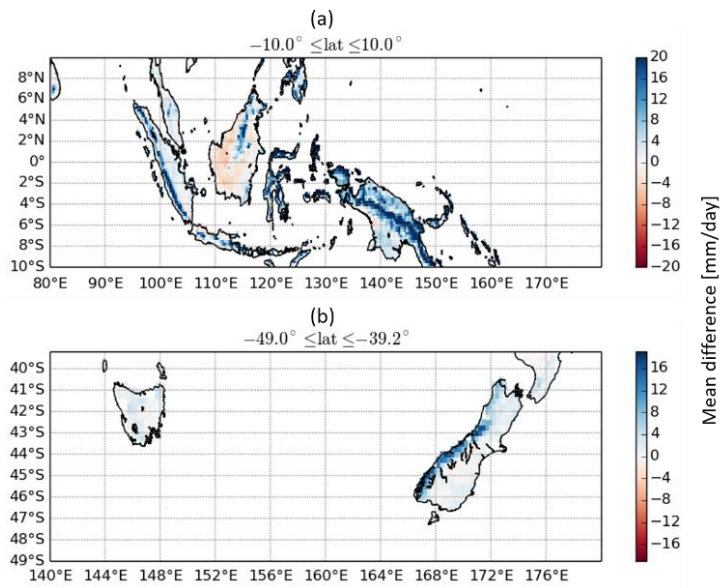


Figure S3 Mean difference in daily precipitation between BARRA-R and TMPA from 2007-2016 over two sub-domains in the tropics and New Zealand. The data is regridded to the TMPA 0.25° grid.

Fields	O-B		O-A	
	Bias	RMSD	Bias	RMSD
Surface temperature [K]	-0.09	1.78	-0.10	1.61
Surface pressure [Pa]	-3.67	101.69	-2.08	68.85
Surface relative humidity [%]	0.0	10.0	0.00	8.0
Surface zonal wind [m/s]	0.05	1.97	-0.01	1.74
Surface meridional wind [m/s]	0.04	1.94	0.01	1.72
Aircraft potential temperature [K]	-0.24	1.34	-0.17	1.10
Aircraft zonal wind [m/s]	-0.04	3.05	-0.03	2.09
Aircraft meridional wind [m/s]	-0.18	3.06	-0.07	2.07
Sonde temperature at 980 hPa [K]	-0.15	1.11	-0.08	0.81
Sonde temperature at 500 hPa [K]	-0.33	0.92	-0.18	0.60
Sonde zonal wind at 980 hPa [m/s]	-0.15	2.45	-0.06	1.45
Sonde zonal wind at 500 hPa [m/s]	-0.17	2.52	-0.07	1.41
Sonde meridional wind at 980 hPa [m/s]	0.23	2.34	0.09	1.38
Sonde meridional wind at 500 hPa [m/s]	0.11	2.44	0.03	1.39
Satwind zonal wind [m/s]	0.36	3.16	0.27	2.72
Satwind meridional wind [m/s]	0.05	2.90	0.01	2.40
Scatwind zonal wind [m/s]	0.06	1.39	0.03	0.95
Scatwind meridional wind [m/s]	0.20	1.78	-0.02	1.32

Table S1 Comparisons of the 10-year (2007-2016) mean of the RMSD and bias between the analyses and observations (O-A) and those between the background and observations (O-B), calculated for various observational types across the BARRA-R domain. Bold values show reduction in the RMSD and the magnitude of the bias by the analyses, i.e., the analyses draw the model forecasts closer to these observation types.

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