atmosphere

Supplementary Materials

Table S1. Seasonal trends and their uncertainty range of Snedecor for the 95% confidence level, computed from measurements performed at Saint-Hubert.. The values between brackets indicate that they are computed for 1966-1979.

	$E_{g\downarrow}$ [W m^{-2}]				TCC [%]			
	1959-1979		1980-2010		1959-1979		1980-2010	
	Trend [decade^{-1}]	Range [decade^{-1}]	Trend [decade^{-1}]	Range [decade^{-1}]	Trend [decade^{-1}]	Range [decade^{-1}]	Trend [decade^{-1}]	Range [decade^{-1}]
Winter (DJF)	(-0.2)	(7.9)	+1.4	2.5	(+6.5)	(10.5)	+2.5	2.5
Spring (MAM)	(-1.3)	(13.2)	**+10.7**	6.1	(-1.3)	(9.8)	+1.9	3.7
Summer (JJA)	(+1.0)	(14.0)	**+12.0**	6.1	(-0.1)	(10.5)	+2.3	3.3
Autumn (SON)	(+3.4)	(10.0)	+4.3	4.4	(+0.6)	(10.0)	+3.3	2.9

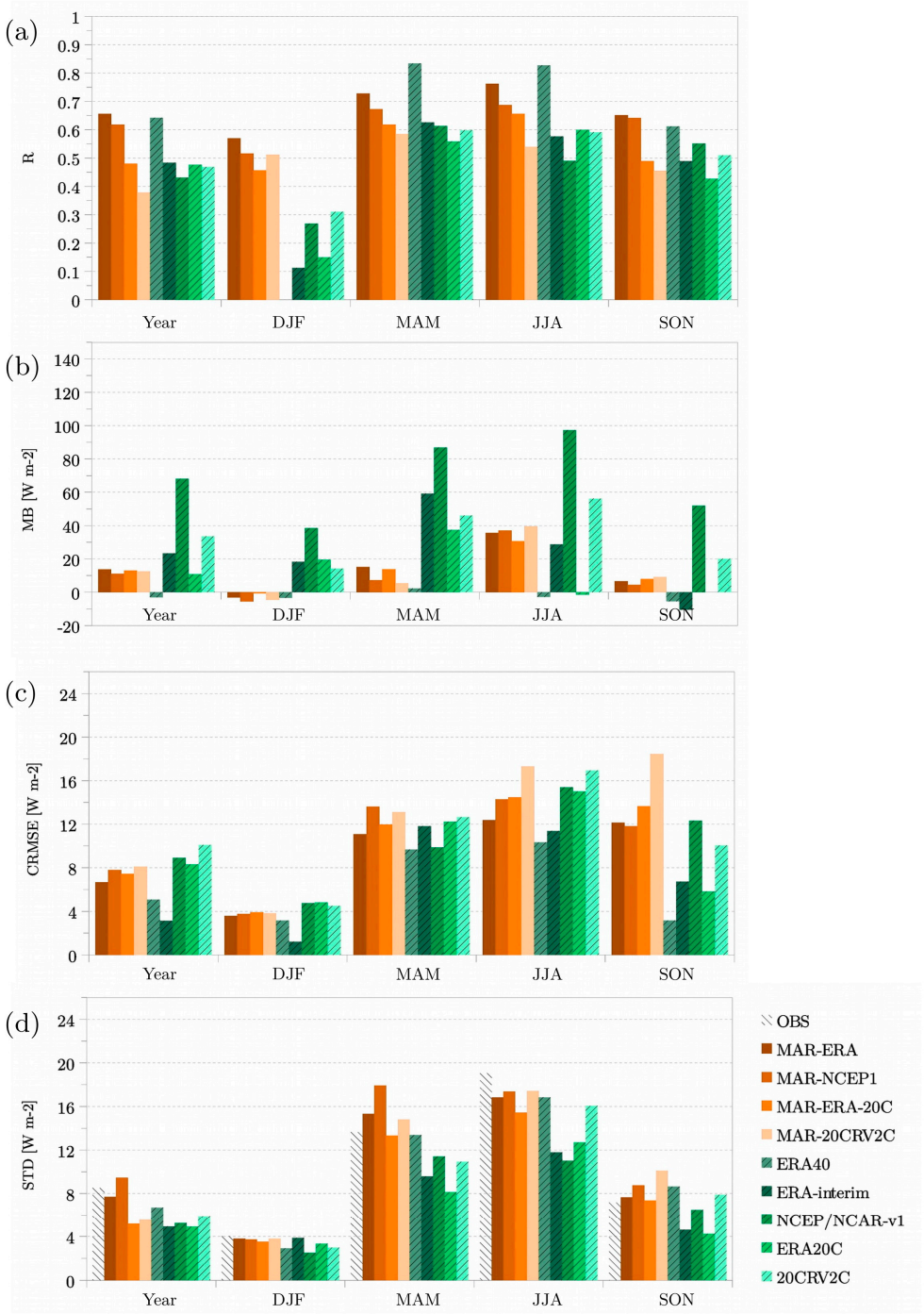

Figure S1. Modelled $E_g\downarrow$ vs observed $E_g\downarrow$ at Melle for 1967-2010 : **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1967-1978 while ERA-interim covers 1979-2010.

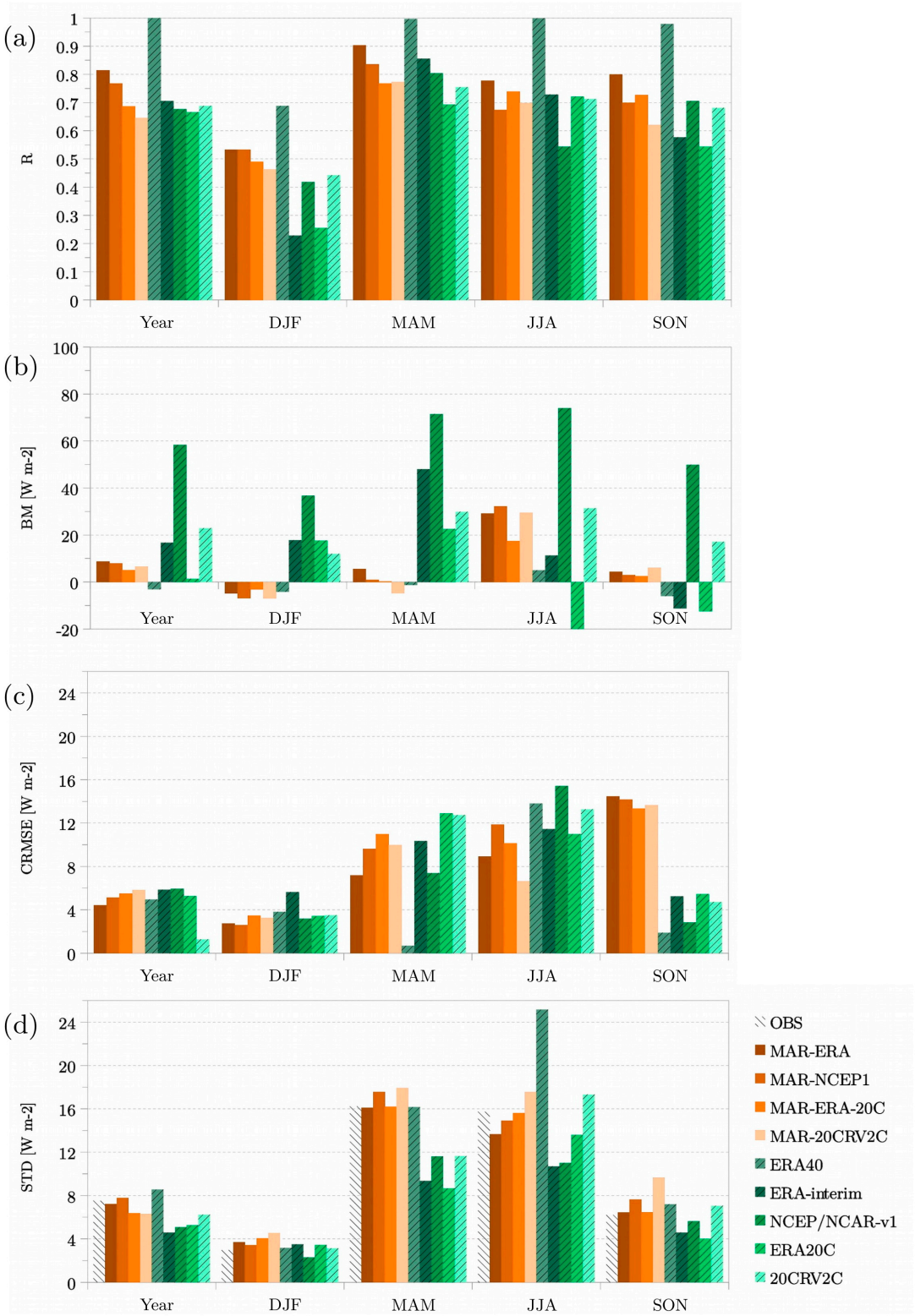

Figure S2. Modelled $E_{g}\downarrow$ vs observed $E_{g}\downarrow$ at Oostende/Middlekerk for 1975-2010: **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1975-1978 while ERA-interim covers 1979-2010.

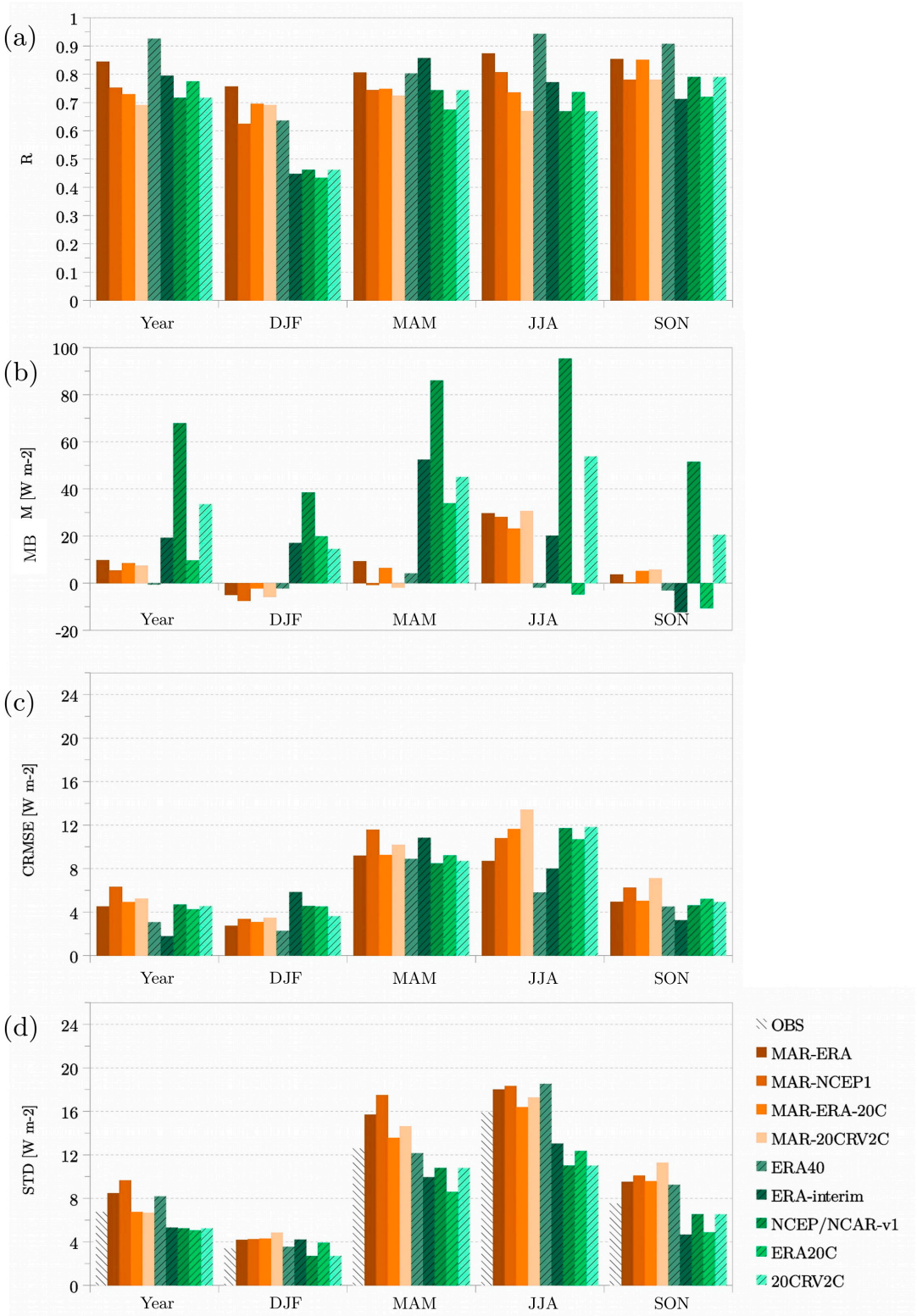

Figure S3. Modelled Eg ↓ vs observed Eg ↓ at Uccle for 1959-2010: **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1959-1978 while ERA-interim covers 1979-2010.

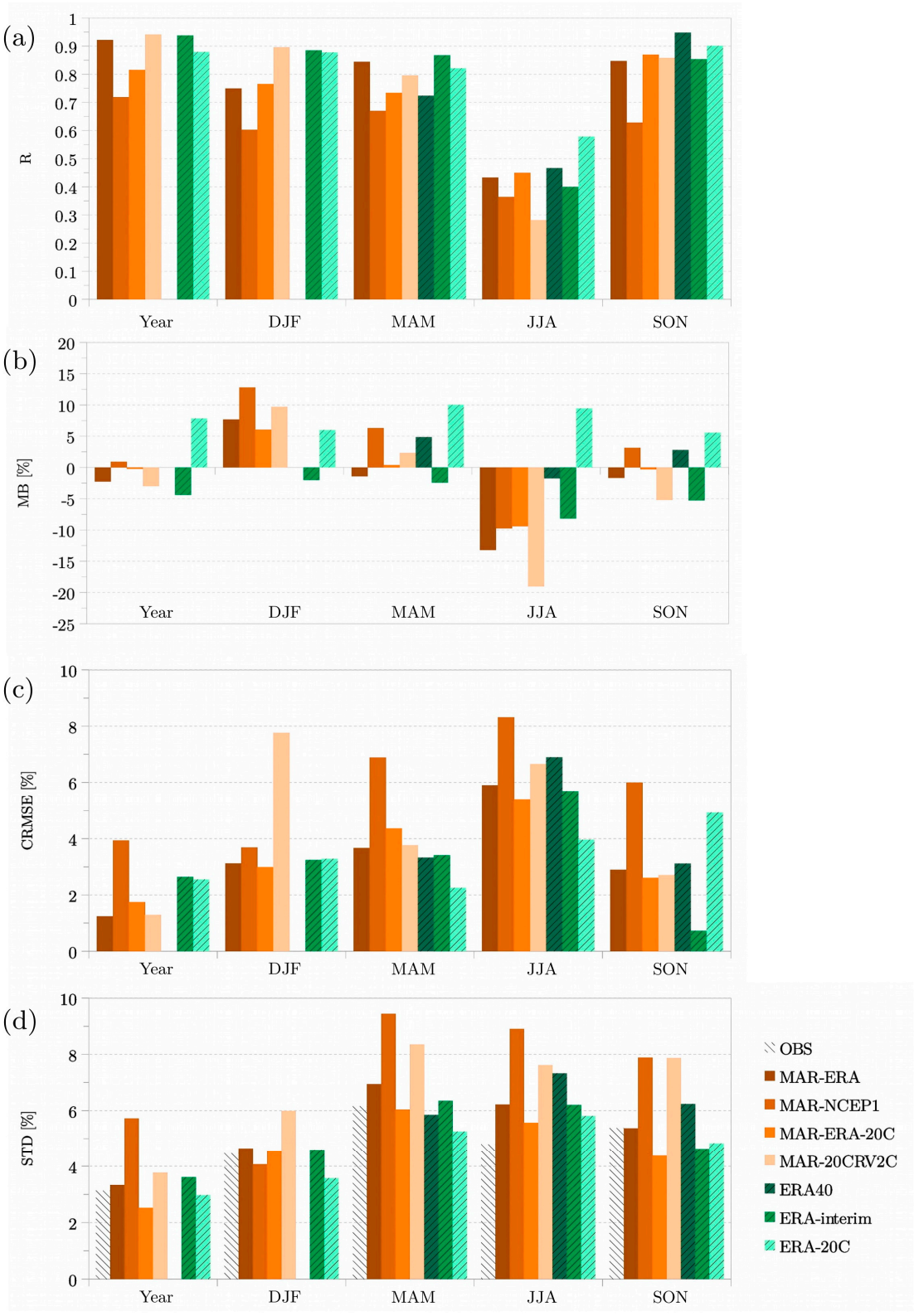

Figure S4. Modelled TCC vs observed TCC at Oostende/Middlekerk for 1966-2010: **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1966-1978 while ERA-interim covers 1979-2010. (TCC data from NCEP/NCAR-v1 and 20CRV2C were not available).

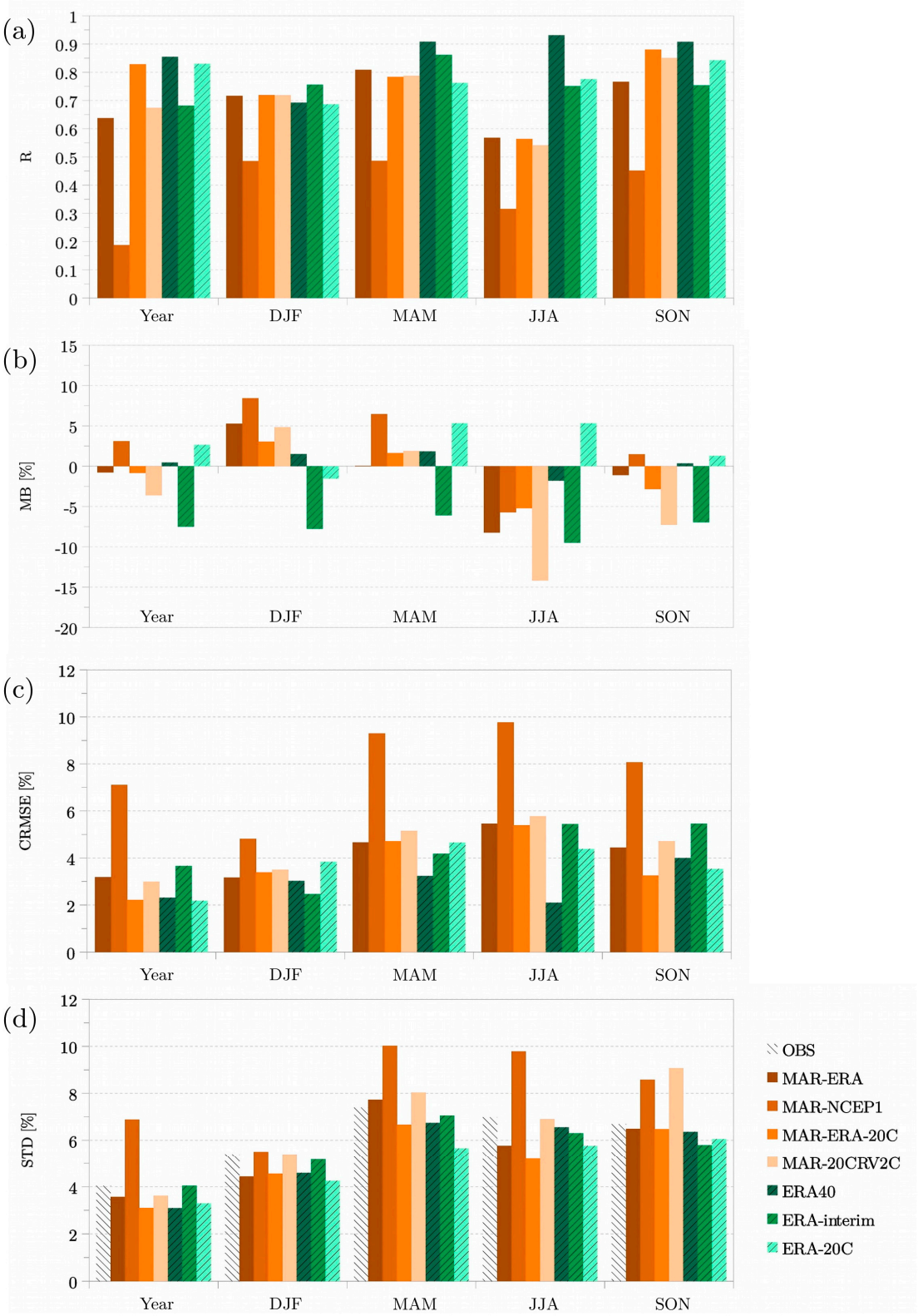

Figure S5. Modelled TCC vs observed TCC at Bierset for 1966-2010: **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1966-1978 while ERA-interim covers 1979-2010. (TCC data from NCEP1/NCAR-v1 and 20CRV2C were not available).

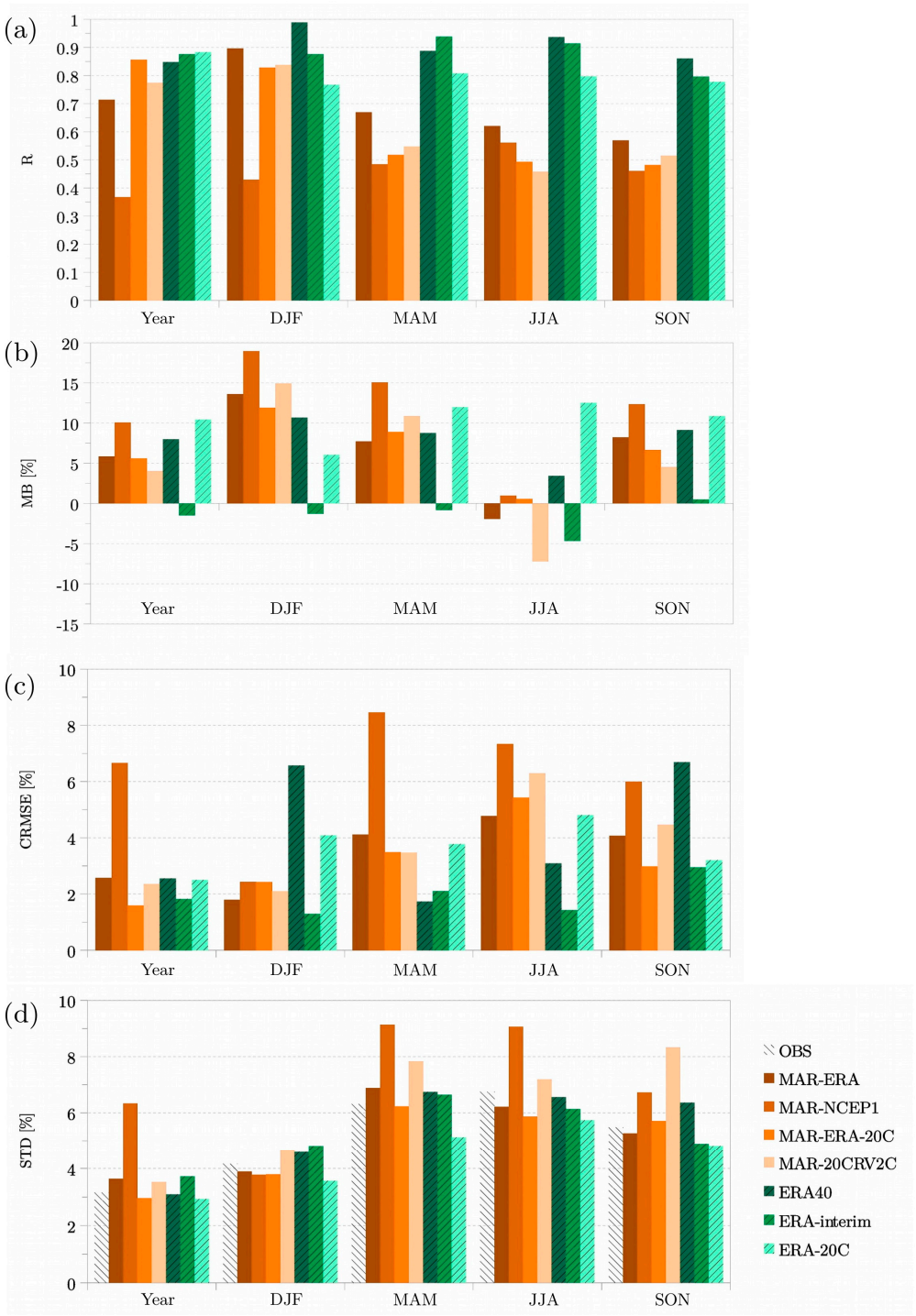

Figure S6. Modelled TCC vs observed TCC at Uccle for 1966-2010: **(a)** annual and seasonal correlation (R), **(b)** mean bias (MB), **(c)** centred root mean squared error (CMRSE) and **(d)** standard deviation (STD). It should be noted that ERA40 covers 1966-1978 while ERA-interim covers 1979-2010. (TCC data from NCEP/NCAR-v1 and 20CRV2C were not available).

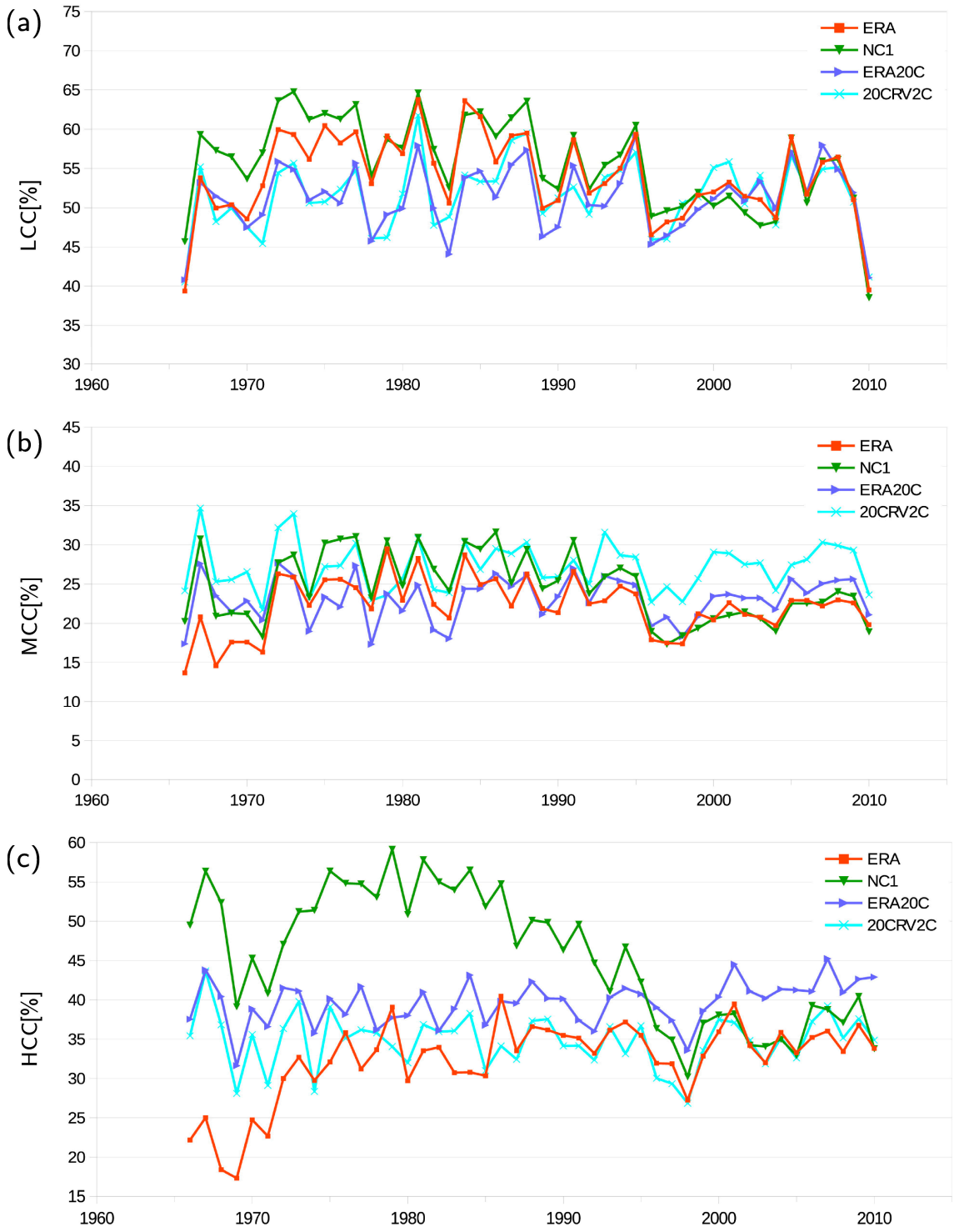

Figure S7. Time series of **(a)** LCC, **(b)** MCC, and **(c)** HCC modelled by MAR at Saint-Hubert.

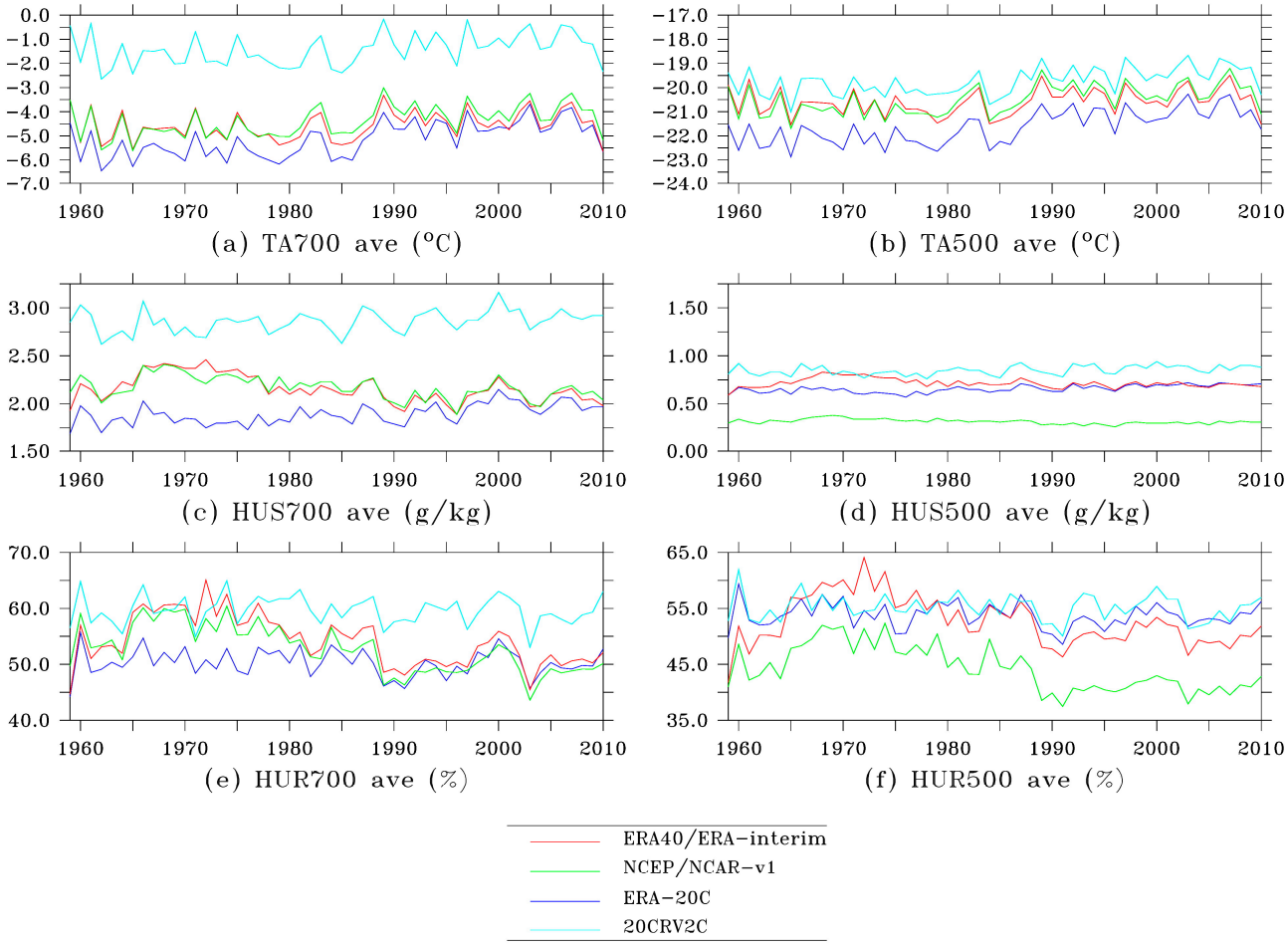

Figure S8. Reanalysis data used as MAR forcings at Saint-Hubert at two different pressure levels (700hPa and 500 hPa): **(a)-(b)** temperature (TA), **(c)-(d)** specific humidity (HUS), **(e)-(f)** relative