

Supplementary material

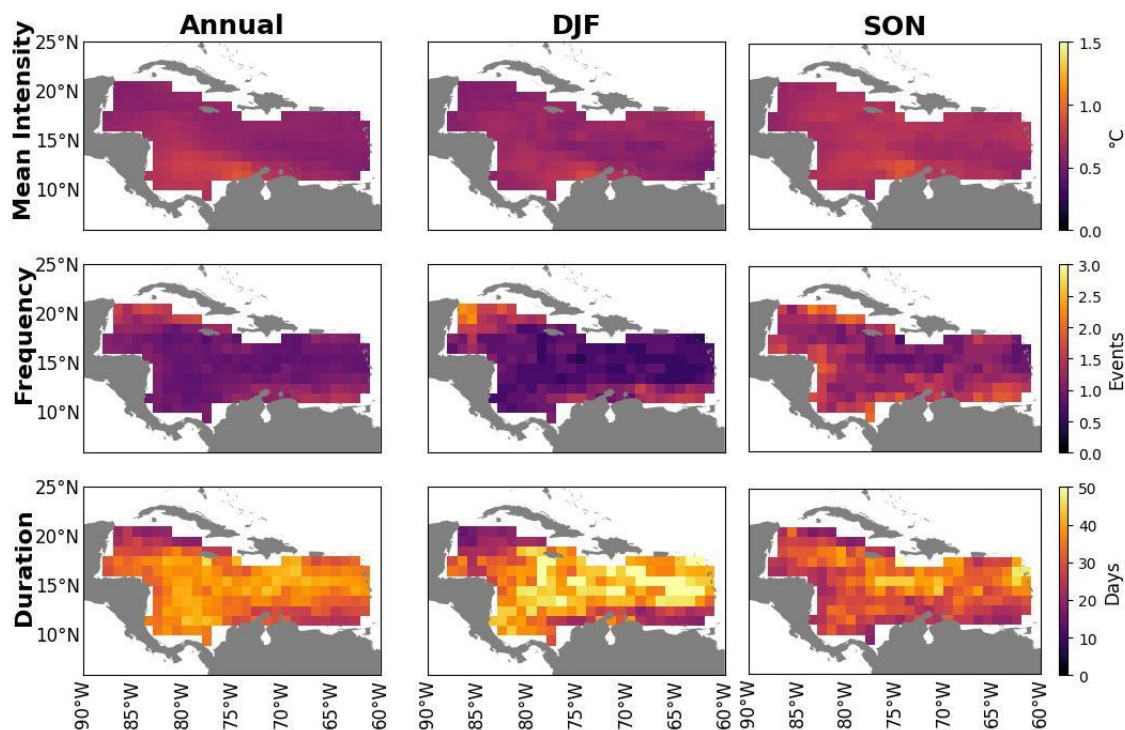


Figure S1. MHWs spatial behavior from the CESM2 model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows indicate mean intensity (°C), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

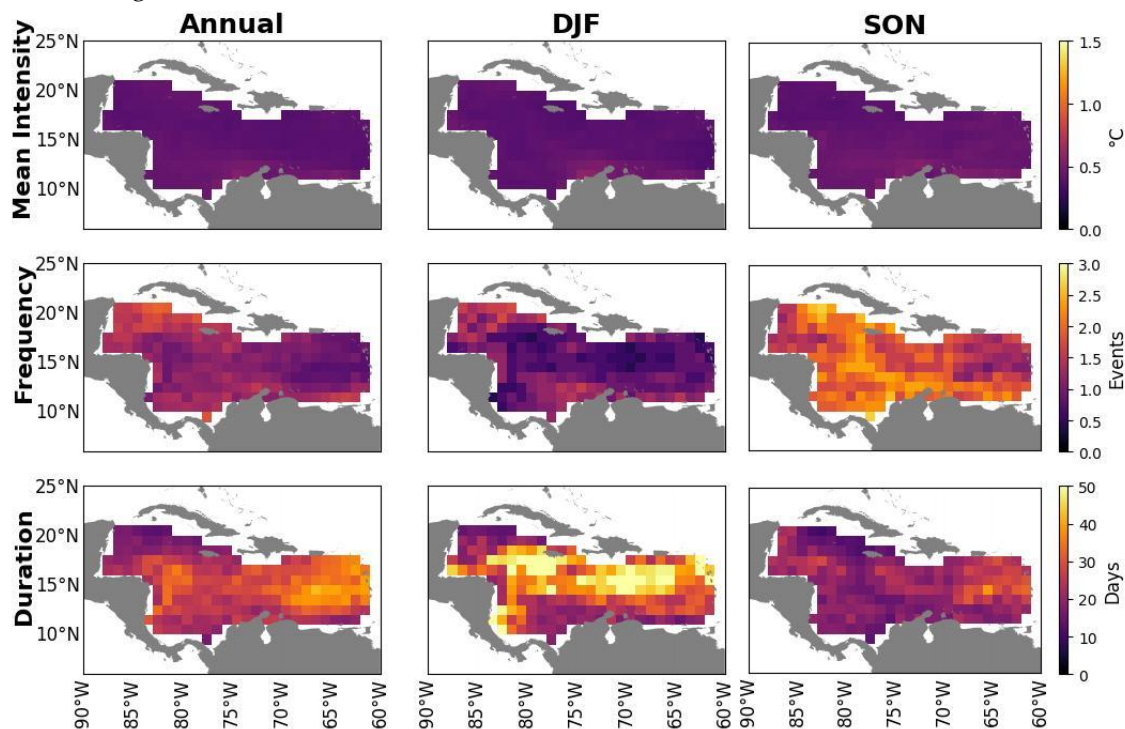


Figure S2. MHWs spatial behavior from the 5MMM model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows indicate mean intensity ($^{\circ}\text{C}$), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

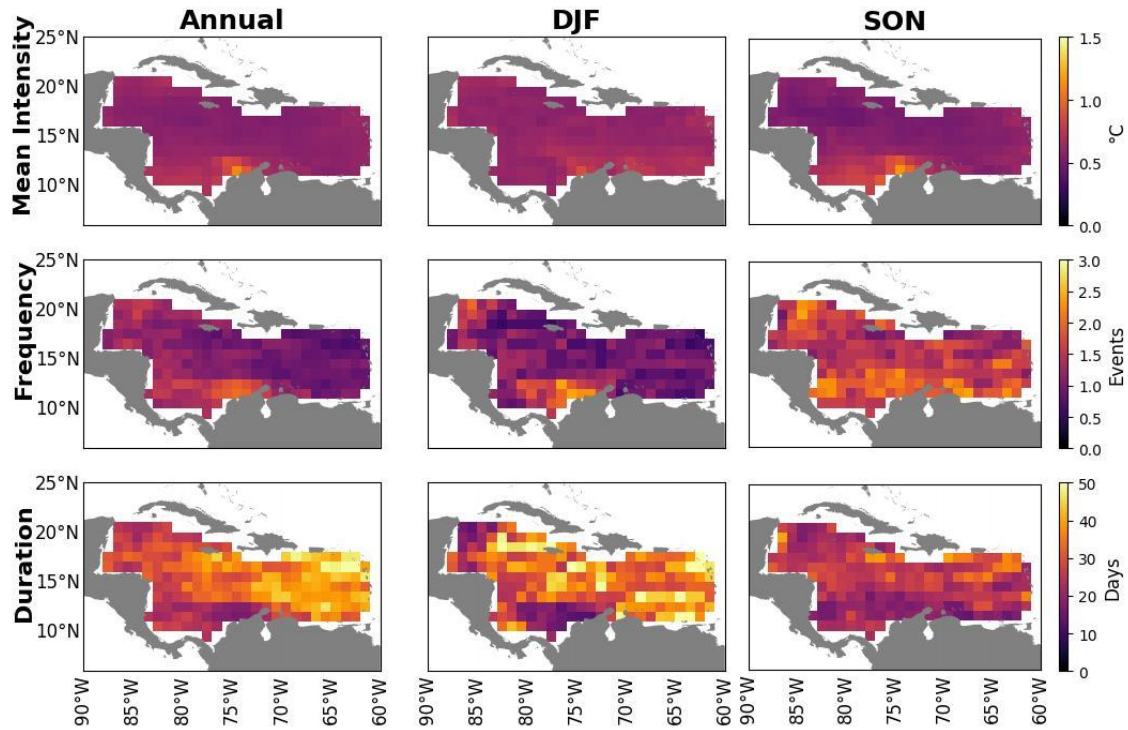


Figure S3. MHWs spatial behavior from the ACCESS-ESM1-5 model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows indicate mean intensity ($^{\circ}\text{C}$), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

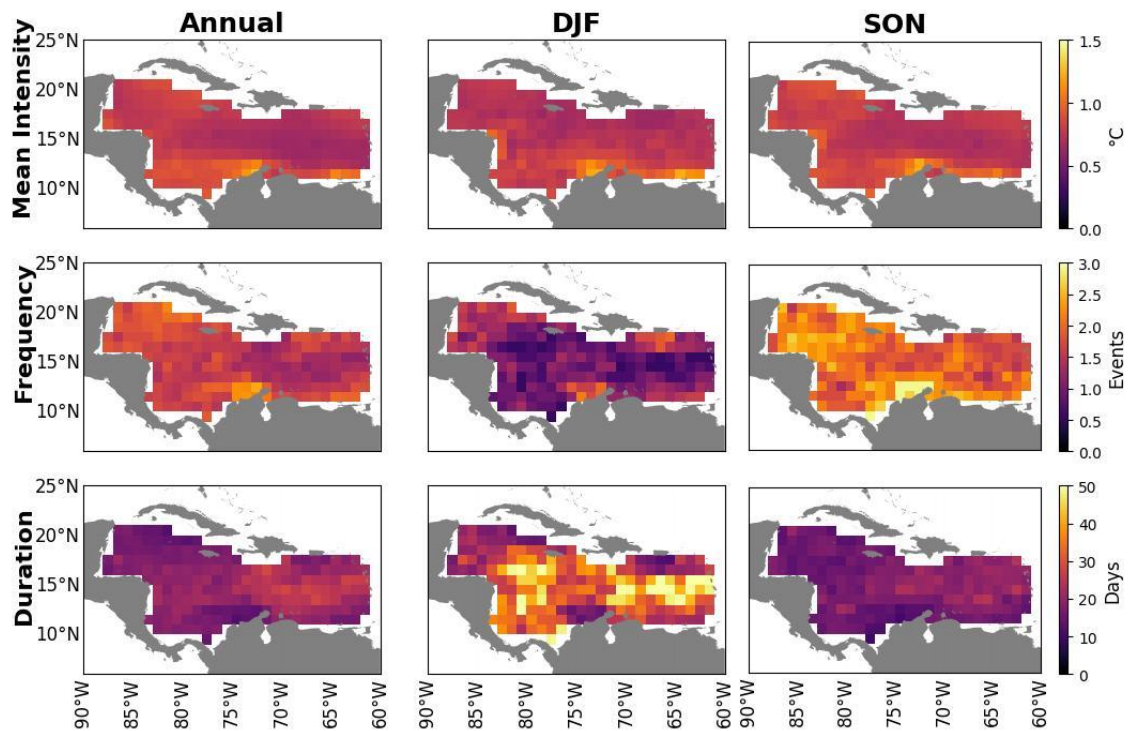


Figure S4. MHWs spatial behavior from the GFDL-ESM4 model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows indicate mean intensity ($^{\circ}\text{C}$), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

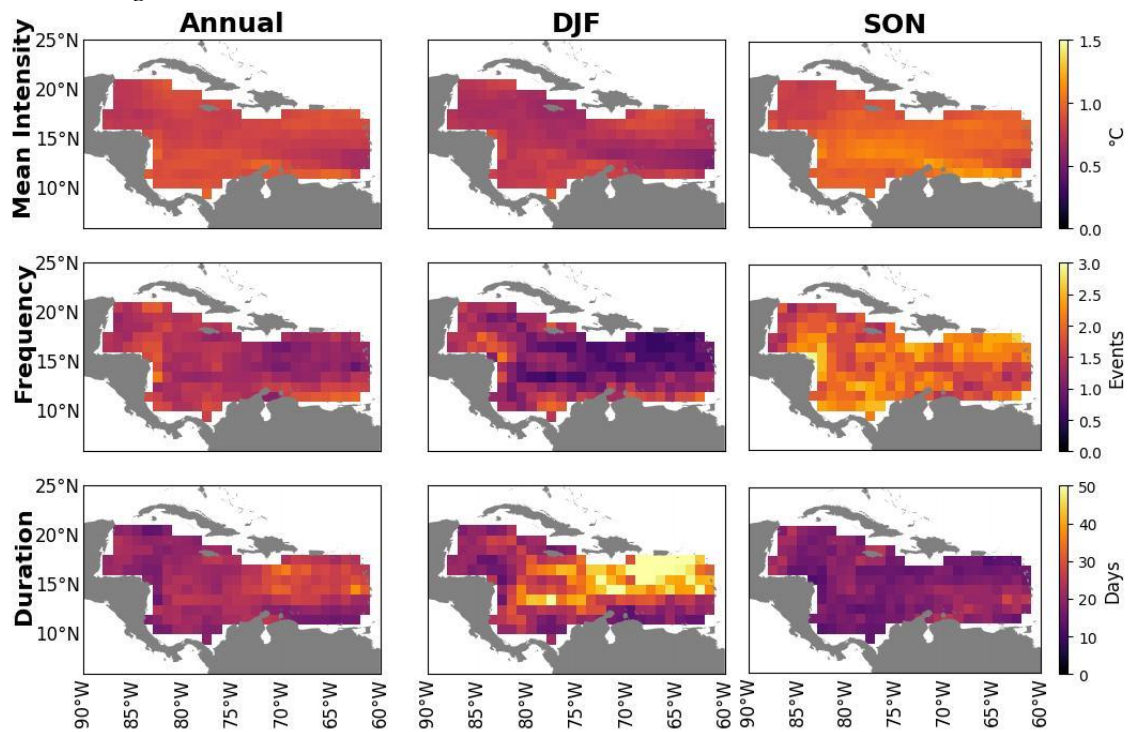


Figure S5. MHWs spatial behavior from the NorESM2-LM model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows

indicate mean intensity (°C), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

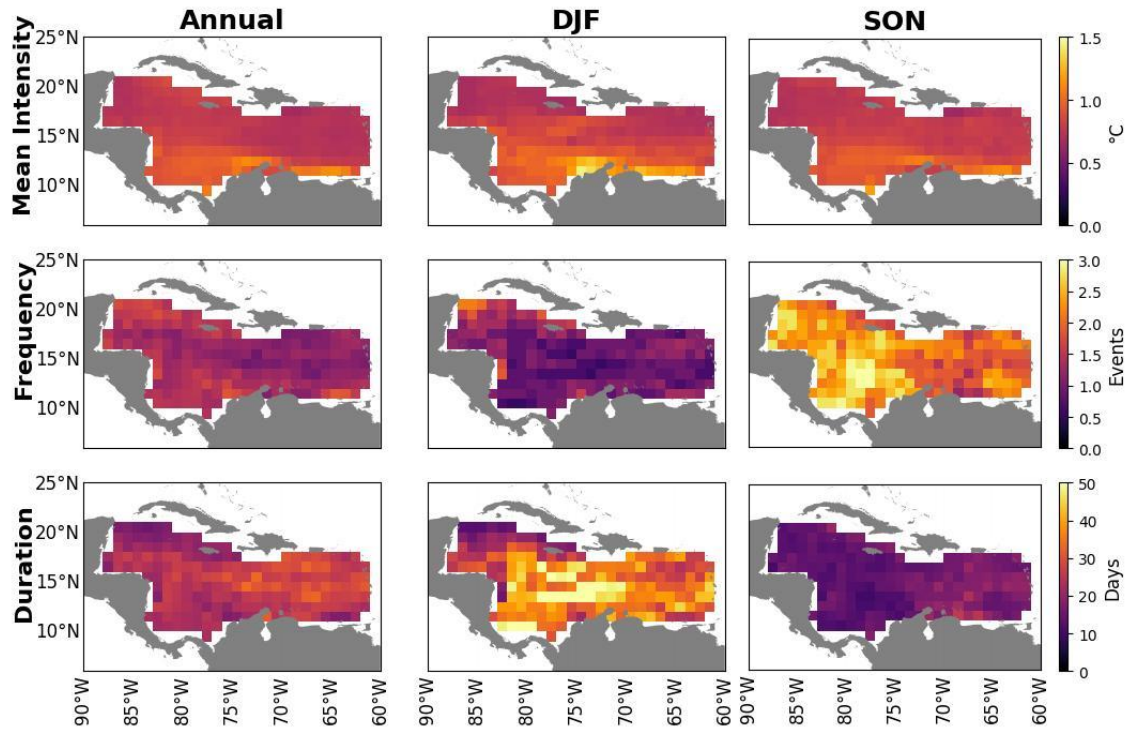


Figure S6. MHWs spatial behavior from the NorESM2-MM model in the CAR. Columns indicate the annual, dry (DJF) and rainy (SON) seasons, assessed from each node's mean in the 1983-2012 30-yr period. Rows indicate mean intensity (°C), frequency (events per month) and duration (days), which has a different color range than in Figure 5.

Table S1. Amplitude (°C) and phase lag (°) of the annual (12 months) and semi-annual (6 months) cycles, obtained from a regression fitted to observations (OISST) in three boxes (Figure 1), representative of the Venezuela, Cayman and Colombia basins. The % of the seasonal cycle explained variance (% Exp Variance), when compared to the original time series variance is included. In addition, the difference (*) between the observed and modelled variables (OISST – model) is shown.

Basin	Model	Annual		Semiannual		%Exp
		Amplitude	Phase	Amplitude	Phase	Variance
Venezuela	OISST	1,2	269	0,3	281	81,2
	ACCESS*	0,4	9	0,1	-14	-1,6
	CESM2*	-0,3	7	0,1	-12	-6,2
	GFDL*	-0,6	1	0,0	51	-10,6
	Nor-LM*	-0,4	-1	-0,1	18	-3,3
	Nor-MMM*	-0,4	3	-0,1	25	-4,6
	Mean difference	0,4	4	0,1	18	4,6
Cayman	OISST	1,7	247	0,1	235	91,5

	ACCESS*	0,2	-16	0,0	-76	1,4
	CESM2*	-0,1	-9	-0,1	-125	-2,0
	GFDL*	-0,3	-1	0,0	98	-2,8
	Nor-LM*	0,0	-4	0,0	-107	1,9
	Nor-MMM*	0,2	-7	0,0	-31	4,9
	Mean difference	0,2	1	0,0	57	2,6
Colombia	OISST	0,9	252	0,3	292	78,1
	ACCESS*	0,2	-3	-0,1	-13	4,6
	CESM2*	-0,3	-25	0,0	6	2,7
	GFDL*	-0,7	-14	0,2	23	-10,6
	Nor-LM*	-0,4	-36	0,0	14	-3,9
	Nor-MMM*	-0,3	-22	0,1	7	-0,2
	Mean difference	0,4	19	0,0	8	4,4

Table S2. MHWs properties for the 1983-2012 period, in the Caribbean Sea from OISSTV2, CESM2, ACCESS-ESM1-5, GFDL-ESM4, NorESM2-LM and NorESM2-MM annual time series. Intensity and duration from spatially averaged annual values. Frequency from the sum of events per year from all Caribbean nodes. Metrics include the 30-year mean, standard deviation (Std), maximum (MaV) and minimum (MiV) values, and their year of occurrence.

Intensity (C)							
	OISST	5MMM	CESM2	ACCESS ESM1-5	GFDL ESM4	NorESM2 LM	NorESM2 MM
Mean	0.94	0.41	0.59	0.60	0.76	0.82	0.80
Std	0.06	0.02	0.06	0.06	0.06	0.08	0.04
MaV	1.08	0.45	0.80	0.73	0.90	0.96	0.89
Year MaV	2005	1986	2007	1985	2012	1995	2004
MiV	0.83	0.37	0.51	0.44	0.61	0.65	0.71
Year MiV	2009	2006	2009	1997	1994	1992	2001
Frequency (total events)							
Mean	362.77	244.01	208.73	235.67	324.47	287.23	281.34
Std	409.29	291.19	259.84	282.65	343.51	366.57	361.45
MaV	1525	929	888	920	1133	1158	1154
Year MaV	2005	2004	1988	2006	2004	2001	2001
MiV	7.00	0.00	0.00	0.00	1.00	0.00	0.00
Year MiV	1991	1985	1986	1987	1988	1985	1985
Duration (days)							
Mean	7.96	15.97	14.71	18.36	11.76	13.80	15.35
Std	1.88	7.97	6.48	13.15	6.83	6.85	9.29
MaV	14.25	38.50	31.35	62.25	31.76	30.77	43.45
Year MaV	2010	2005	2008	2005	2002	2011	2005
MiV	5.55	5.00	5.95	6.01	5.03	5.00	6.17
Year MiV	1989	1999	1998	1994	1988	1990	1985

References

1. Torres, R.R.; Tsimplis, M.N. Seasonal Sea Level Cycle in the Caribbean Sea. *Journal of Geophysical Research: Oceans* **2012**, *117*, doi:<https://doi.org/10.1029/2012JC008159>.