Supplementary material for Colonization of new nesting areas could provide climate refuge to loggerhead turtles under climate change

Table S1. Results of the Kruskall-Wallis test to assess the differences in mean, maximum and minimum sand temperatures by beach, island (Mallorca, Menorca, Ibiza, Formentera), year (2015, 2016, 2017) and month (June, July, August, September). Differences among groups were highly statistically significant in all cases.

	Tmean			Tmax			Tmin		
	$\chi2$	df	p-value	$\chi2$	df	p-value	$\chi2$	df	p-value
Beach	2645.2	18	p<0.001	2650.6	18	p<0.001	2572.7	18	p<0.001
Island	1243.7	3	p<0.001	1203.8	3	p<0.001	1230	3	p<0.001
Year	177.95	2	p<0.001	206.08	2	p<0.001	145.1	2	p<0.001
Month	1877.6	3	p<0.001	1696.1	3	p<0.001	1959.7	3	p<0.001

Table S2. Results of the linear and quadratic regressions using mean (Tmean), maximum (Tmax) and minimum (Tmin) temperatures and precipitation as predictors of sand temperature. We used the regression equation of the linear model to estimate sand temperatures (Ts) based on the air temperatures (Ta) obtained from the GFDL model. P-values below 0.05 are in bold and models of highest adjusted R-square are highlighted.

		Tmean			Tmax		Tmin		Precipitation		Tquadratic	
Beach	Island	Adj R-square	p-value	Regression equation	Adj R-square	p-value	Adj R-square	p-value	Adj R-square	p-value	Adj R-square	p-value
MES	MEN	0.582	**< 2.2e-16**	Ts=14.362+0.538*Ta	0.4287	**< 2.2e-16**	0.5469	**< 2.2e-16**	0.007959	0.08718	0.5807	0.0964, 0.6146
TIR	MEN	0.6084	**< 2.2e-16**	Ts=11.019+0.657*Ta	0.3936	**< 2.2e-16**	0.5747	**< 2.2e-16**	0.001252	0.2281	0.609	0.8067,0.207933
ALG	MEN	0.6328	**< 2.2e-16**	Ts=9.960+0.659*Ta	0.4627	**< 2.2e-16**	0.5496	**< 2.2e-16**	0.01083	**0.026**	0.6318	0.0734, 0.8291
ATA	MEN	0.5544	**< 2.2e-16**	Ts=14.621+0.472*Ta	0.3698	**< 2.2e-16**	0.5148	**< 2.2e-16**	0.01024	**0.02947**	0.5544	0.0185, 0.3073
BIN	MEN	0.4886	**< 2.2e-16**	Ts=12.533+0.466*Ta	0.3006	**< 2.2e-16**	0.5069	**< 2.2e-16**	-0.001513	0.5034	0.4913	0.603, 0.089
SON	MEN	0.163	**3.34E-11**	Ts=15.438+0.322*Ta	0.157	**9.61E-11**	0.1091	**8.57E-08**	0.01277	**0.04286**	0.1767	**0.00934, 0.02580**
PAL	MALL	0.6145	**< 2.2e-16**	Ts=13.748+0.537*Ta	0.4245	**< 2.2e-16**	0.6203	**< 2.2e-16**	0.01343	**0.01504**	0.6164	<0.001, 0.0942
PAG	MALL	0.5819	**< 2.2e-16**	Ts=14.862+0.464*Ta	0.4045	**< 2.2e-16**	0.5787	**< 2.2e-16**	0.001041	0.2408	0.5828	0.00380, 0.18438
MEZ	MALL	0.5511	**< 2.2e-16**	Ts=12.808+0.514*Ta	0.3684	**< 2.2e-16**	0.5641	**< 2.2e-16**	-0.001047	0.4321	0.5506	0.0209, 0.4147
SCA	MALL	0.6124	**< 2.2e-16**	Ts=10.954+0.563*Ta	0.3854	**< 2.2e-16**	0.5796	**< 2.2e-16**	0.0005176	0.2762	0.612	0.0123, 0.4174
COV	MALL	0.4995	**< 2.2e-16**	Ts=13.851+0.407*Ta	0.3262	**< 2.2e-16**	0.5306	**< 2.2e-16**	-0.00098	0.4233	0.5095	**<0.0001, 0.00396**
SCO	MALL	0.5215	**< 2.2e-16**	Ts=13.618+0.439*Ta	0.3913	**< 2.2e-16**	0.5251	**< 2.2e-16**	-0.002453	0.744	0.5214	0.0167, 0.324
SAM	MALL	0.5292	**< 2.2e-16**	Ts=12.196+0.472*Ta	0.3301	**< 2.2e-16**	0.5604	**< 2.2e-16**	-0.002725	0.9288	0.5284	0.3847, 0.5684
CAV	IBI	0.6864	**< 2.2e-16**	Ts=12.711+0.586*Ta	0.4891	**< 2.2e-16**	0.5791	**< 2.2e-16**	0.003393	0.1351	0.7075	**0.00034, >0.00001**
SAL	IBI	0.5919	**< 2.2e-16**	Ts=13.678+0.553*Ta	0.3946	**< 2.2e-16**	0.4941	**< 2.2e-16**	0.001723	0.2025	0.5987	0.16070, 0.00775
POR	IBI	0.4945	**< 2.2e-16**	Ts=15.867+0.472*Ta	0.4262	**< 2.2e-16**	0.421	**< 2.2e-16**	-0.003523	0.7019	0.5035	**0.00152, 0.02106**
TAR	IBI	0.6447	**< 2.2e-16**	Ts=12.146+0.623*Ta	0.4907	**< 2.2e-16**	0.5323	**< 2.2e-16**	-0.00223	0.6651	0.6547	0.05027, 0.00076
PUJ	FOR	0.5046	**< 2.2e-16**	Ts=15.657+0.451*Ta	0.4367	**< 2.2e-16**	0.4626	**< 2.2e-16**	-0.002489	0.7597	0.5091	**0.00178, 0.03714**
MIG	FOR	0.625	**< 2.2e-16**	Ts=13.329+0.544*Ta	0.4437	**< 2.2e-16**	0.535	**< 2.2e-16**	0.005143	0.09016	0.6281	0.5110, 0.0447

Table S3. Mean difference between the sand temperatures (°C) recorded at the beaches and those obtained from the projections of the NOAA GFDL' global climate model for years 2015, 2016 and 2017. The mean difference in temperature for each beach and each month was then added to the projections to bias-correct them.

Beach	June	July	August	September
ALG	0.2	-0.6	-0.3	0.8
ATA	0.6	-0.3	-0.5	0.3
BIN	0.6	-0.2	-0.5	0.1
TIR	0.6	-0.4	-0.5	0.3
MES	0.8	-0.4	-0.5	0.2
SON	0.7	-0.4	-0.6	0.3
MEZ	1.1	0.0	-0.8	-0.3
PAL	0.9	-0.2	-0.6	-0.1
SAM	1.1	0.0	-0.7	-0.4
SCA	0.6	-0.3	-0.4	0.1
SCO	1.0	0.1	-0.7	-0.3
COV	1.2	-0.1	-0.8	-0.2
PAG	0.9	0.0	-0.7	-0.2
TAR	0.7	-0.3	-0.3	-0.1
CAV	0.6	-0.1	-0.4	-0.1
PUJ	0.7	-0.2	-0.5	0.0
POR	0.8	0.0	-0.5	-0.3
SAL	0.6	-0.1	-0.4	-0.2
MIG	0.8	0.1	-0.5	-0.4
Mean ± SD	0.76 ± 0.24	-0.18 ± 0.19	-0.54 ± 0.15	-0.01 ± 0.31