

The following supplement accompanies the article

## A comparison of remote-sensing SST and *in situ* seawater temperature in near-shore habitats in the western Mediterranean Sea

Raffaele Bernardello\*, Eduard Serrano, Rafel Coma, Marta Ribes, Nixon Bahamon

\*Corresponding author: raffer@noc.ac.uk

*Marine Ecology Progress Series 559: 21–34 (2016)*

**Table S1.** Period of deployment of the loggers (10 to 40m depth) at 3 locations.

Location	Code	Depth (m)	From	To	Gap	N days
Medes Islands	MI	10	01/08/2010	07/07/2013	--	1072
		15	01/08/2010	30/09/2013	--	1157
		20	01/08/2010	30/09/2013	25/02/2012 20/09/2012	948
		25	01/10/2012	30/09/2013		365
Menorca	ME	10	01/07/2007	31/07/2013	--	2223
		15	01/07/2007	31/07/2013	06/08/2011 08/08/2012	1854
		20	01/07/2007	31/07/2013	--	2223
		25	01/07/2007	31/07/2013	--	2223
		30	01/07/2007	31/07/2013	--	2223
		35	01/07/2007	31/07/2013	--	2223
Cabo Palos	CP	10	01/05/2007	31/07/2013	--	2284
		15	16/03/2008	31/07/2013	--	1964
		20	01/05/2007	31/07/2013	--	2284
		25	16/03/2008	31/07/2013	--	1964
		30	01/05/2007	31/07/2013	--	2284
		35	16/03/2008	31/07/2013	--	1964
		40	16/03/2008	31/07/2013	--	1964

### Estimation of trend and seasonality

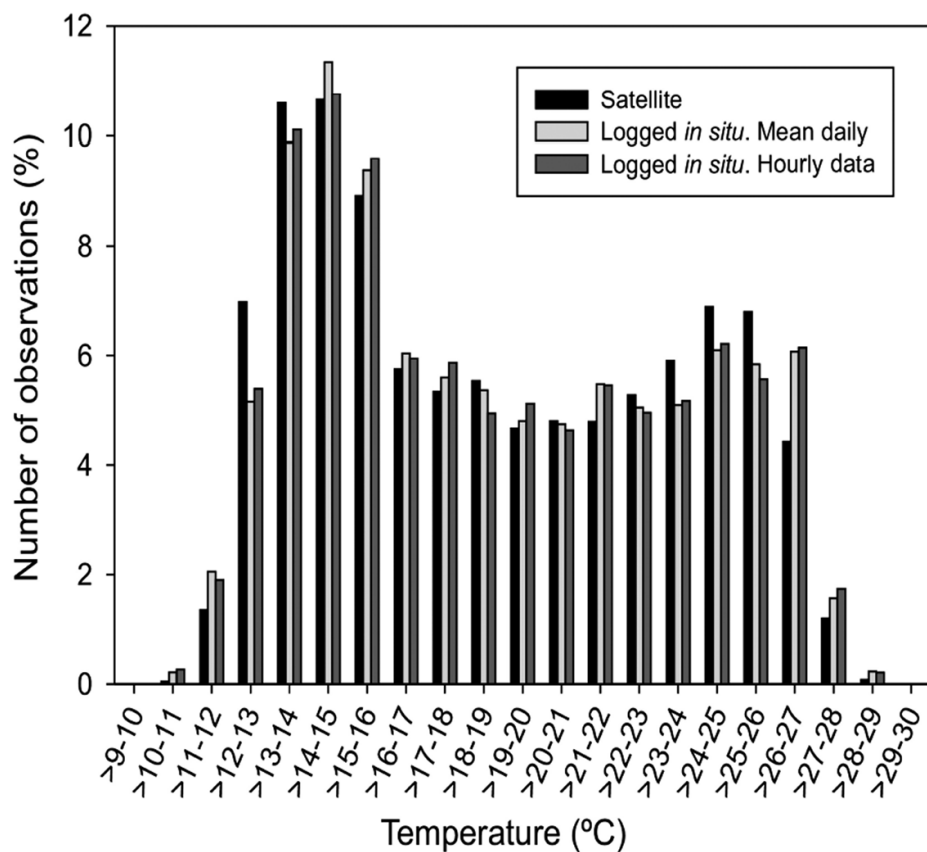
The GAMM consisted of a response variable explained by a number of covariates, of the form  $DT = s(JDY) + s(DSTS)$ , where  $s$  represents the smoothing spline function (that substitutes the slope in a linear regression model). To account for the inter-annual seasonal variability, the models were fitted with correlated errors nested within a year, using autocorrelation structure of the order 1 (AR1). DT is the response variable, that is, the daily temperature. The explanatory variable JDY is the Julian day, ranging from 1 to 365 (366 for leap years). This term allowed estimating the seasonal component of the time series. The second covariate in the equation is the daily sequence for the whole time series (DSTS), which length varied with the time series (see dates in Table 1). This term allowed estimating the trend component.

**Table S2.** Statistics relative to the overall variability between remote sensing SST and data loggers placed at depths from 5 to 40 m for the 3 locations. Pearson's correlations are significant at 99%.

Location	Code	Depth (m)	Pearson's correlation ( $r$ )	Mean bias ( $\delta$ )	Mean absolute bias ( $\Delta$ )	Ratio of standard deviations ( $\alpha$ )
Medes Islands	MI	5	0.98	0.16	0.52	1.02
		10	0.975	0.164	0.565	1.057
		15	0.953	0.455	0.885	1.125
		20	0.921	0.587	1.202	1.194
		25	0.851	1.323	1.521	1.405
Menorca	ME	5	0.98	-0.22	0.67	1.03
		10	0.974	-0.109	0.743	1.042
		15	0.960	0.100	0.885	1.074
		20	0.927	0.482	1.202	1.130
		25	0.889	0.852	1.521	1.193
		30	0.821	1.363	2.003	1.314
		35	0.755	1.764	2.378	1.436
Cabo Palos	CP	5	0.99	-0.15	0.53	0.97
		10	0.978	0.009	0.628	0.994
		15	0.943	0.587	1.041	1.088
		20	0.904	0.939	1.360	1.153
		25	0.810	1.933	2.181	1.372
		30	0.694	2.552	2.794	1.619
		35	0.597	3.328	3.501	2.117
		40	0.501	3.735	3.906	2.617

**Table S3.** MODIS SST outliers (days) detected by the appositely designed three-iteration filter, length (days) of the filtered MODIS series, length (days) of the interpolated MODIS series and distribution of interpolated data by season.

	<b>MI</b>	<b>LA</b>	<b>ME</b>	<b>CP</b>	<b>CT</b>
Outliers detected	9	31	64	49	11
Length MODIS before interpolation	749	860	1061	1280	374
Length MODIS after interpolation	1644	2019	2223	2284	915
% interpolated values winter	24	24	28	29	22
% interpolated values spring	30	26	23	25	28
% interpolated values summer	22	23	18	17	25
% interpolated values autumn	24	27	31	29	25



**Fig. S1.** Impact of averaging hourly data in loggers. The distribution of hourly logger ST data was compared to the distribution of their daily averages and that of daily MODIS SST. The distribution of logger daily averaged temperature closely reproduced that of hourly logger with both distributions exhibiting a large peak at about 13-16°C and a smaller one at 24-27°C. The distribution of MODIS data also closely reproduced that of daily averaged logger temperature except for the coldest (12-14°C) and warmest temperatures (22-26°C). Comparison between MODIS and loggers (mean daily and hourly data) seawater temperature (ST) data at 5-m depth. Number of observations (%) for each ST interval (from 9 to 30°C at 1°C intervals) over entire annual cycles (January-December). All years and locations are considered together.