

Daily Mean Sea Water Temperature Indicator of Puertos del Estado

The Daily Mean Sea Water Temperature Indicator is produced from the hourly data recorded by the Puertos del Estado buoy network. The information provided by this indicator corresponds to a processed product derived from measurements collected by the buoys, which record sea water temperature in the surface layer of the sea, between 0 and 3 meters depth. The hourly buoy measurements and complete information on the monitoring stations are available at: <https://portus.puertos.es/>.

The zoning and analysis of the data follow the boundaries of the Marine Demarcations (MDs) established [by Law 41/2010 of 29 December on the Protection of the Marine Environment](#). These demarcations are maritime areas with similar oceanographic and environmental characteristics. The Marine Demarcations and the locations of the monitoring stations (buoys) are shown in the following figure:



The indicator is calculated by first computing the daily mean temperature for each buoy from the hourly observations, using only directly measured data and without gap filling. The daily mean temperature for each marine demarcation is then calculated as the arithmetic mean of the daily mean temperatures recorded by the buoys within that demarcation. Therefore, if a buoy does not record any temperature data on a given day, it is excluded from the calculation of the daily mean temperature for its demarcation.

In addition to the information provided for each Marine Demarcation, the indicator also presents the national mean. The national daily mean temperature is calculated as the weighted average of the daily mean temperatures of the marine demarcations. The weighting factors are based on the coastline length of each demarcation, as the buoy network is representative of the Spanish coastal zone. According to the Spanish National Statistics Institute (INE) Statistical Yearbook¹, the distribution of Spain's coastline (approximately 8,000 km in total) is the following:

Marine Demarcation	Coastline Length	Weight in the National Indicator
Levantino-Balear	3.044 km (including the Balearic Islands)	37,4 %
Noratlántica	2.605 km	32,0 %
Canaria	1.583 km (total island perimeter)	19,5 %
Estrecho y Alborán	607 km (Eastern Andalusia, Ceuta and Melilla)	7.5 %
Sudatlántica	291 km	3,6 %
TOTAL	8.130 km	100 %

If, on a given day, an entire marine demarcation has no available data because none of its buoys have recorded observations, the national mean will not be calculated, and a gap will appear in the time series.

It should be noted that, in the Marine Demarcation “Sudatlántica”, only one buoy—the Outer Gulf of Cádiz Buoy—measured seawater temperature from 2001 onwards. In April 2026, a new coastal buoy, the Seville–Guadalquivir Buoy, was deployed in the waters of this demarcation. It has been verified that, due to its location and the relatively shallow depth at its mooring site, this coastal buoy records higher water temperatures than the offshore buoy. Consequently, temperatures in this demarcation have increased relative to the historical series, although this change is attributable to differences in measurement conditions rather than to a climatic phenomenon.

The graph showing daily mean temperatures by marine demarcation includes the annual mean temperature series for each year, with the three most recent years highlighted in colours ranging from yellow to red. It also displays the climatological mean (the daily average calculated from all available complete years), together with a band representing ± 2 times the standard deviation (which comprises approximately 95% of the data). In addition, the graph includes the decadal averages (2005–2014 and 2015–2024). The daily mean values for the current year are highlighted with a thick dark red line to facilitate ongoing monitoring.

The graph showing daily mean temperatures by year presents, for each year, the daily mean temperature series for each marine demarcation together with the national mean.

¹ Official source:

Instituto Nacional de Estadística (INE): *Anuario Estadístico de España*, [sección de Entorno Físico](#) (Longitud de las líneas de costa por provincias).