

Sea Level

ESSENTIAL CLIMATE VARIABLE (ECV) FACTSHEET

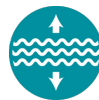


**GLOBAL CLIMATE
OBSERVING SYSTEM**
KEEPING WATCH OVER OUR CLIMATE



ECV IN BRIEF

Domain:	Ocean
Subdomain:	Physical
Scientific Area:	Physical Properties
Products:	Global Mean Sea Level Regional Mean Sea Level



Sea Level

Sea Level is one of the primary indicators of global climate change. Change in the global mean sea level provides a measure of the net change in ocean mass due to melting of glaciers and ice sheets, and net change in ocean volume due to thermal expansion. Sea level observations characterize inter-seasonal variability such as ENSO. On the regional scales, changes in sea level can be far larger than the globally averaged value due to changes in temperature, salinity and circulation. Along many continental margins vertical land displacement associated with crustal adjustments to past and current land ice melt also cause regional variations in apparent sea level independent of the ocean. Coastal sea level change is a major driver of societal impacts.

ECV Product¹

PRODUCT	DEFINITION	REQUIREMENTS				
		FREQ.	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
GLOBAL MEAN SEA LEVEL	The height of the ocean surface relative to a reference geoid.	Weekly to monthly	10-100 km	2-4 mm (global mean); 1 cm over a grid mesh	< 0.3 mm/yr (global mean)	See EOV Specifications at www.goosoccean.org/eov
REGIONAL MEAN SEA LEVEL	The height of the ocean surface relative to a reference geoid or an agreed regional datum	Hourly to weekly	10 km	1 cm (over grid mesh of 50-100 km)	< 1 mm/yr (for grid mesh of 50-100 km)	www.goosoccean.org/eov

¹ Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements until 2022. More information on: gcos.wmo.int and climatedata.wmo.int.



Data Sources²

In Situ Data:

- ▶ GLOSS - Global Sea-Level Observing System
<http://www.gloss-sealevel.org/data/>

Satellite:

- ▶ ECV Inventory by the CEOS/CGMS Working Group on Climate (WGclimate)
<http://climatemonitoring.info/ecvinventory>
- ▶ Aviso
<https://www.aviso.altimetry.fr/en/data/products/sea-surface-height-products.html>
- ▶ JPL PODAAC
<https://podaac.jpl.nasa.gov/OceanSurfaceTopography>

Sea Level Rise Map and Global

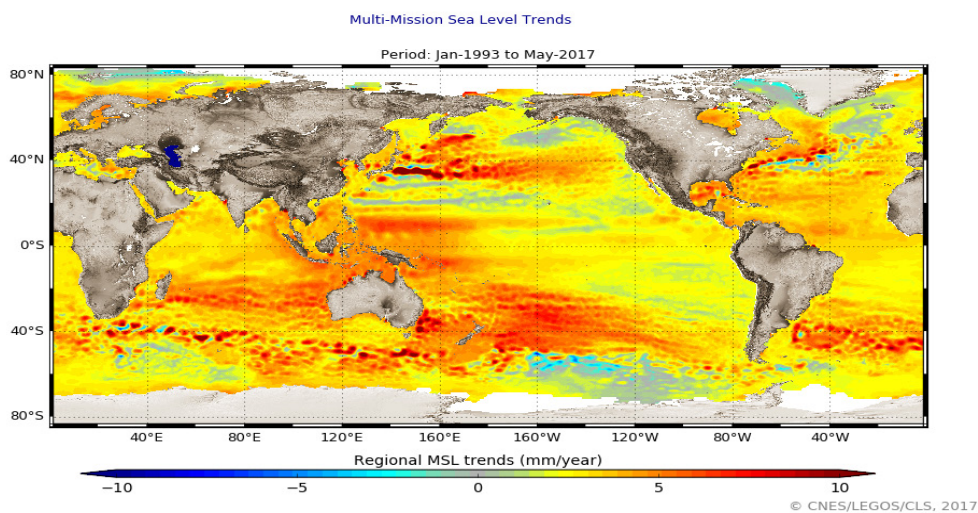


Figure 1: Combined map of regional patterns of observed sea level (in mm/year). This map can be obtained using gridded, multi-mission Ssalto/Duacs data since 1993, which enable the local slopes to be estimated with a very high resolution (1/4 of a degree on a Cartesian projection). Isolated variations in MSL are thus revealed, mainly in the major ocean currents and ENSO events (Credits EU Copernicus Marine Service, CLS, Cnes, Legos).

Source: <https://www.aviso.altimetry.fr/en/data/products/ocean-indicators-products/mean-sea-level.html>

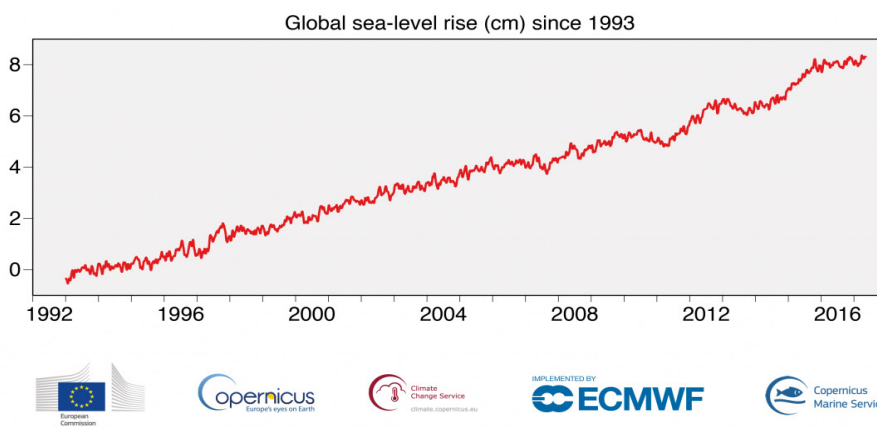


Figure 2: Daily global-mean mean sea level without annual and semi-annual signals from January 1993 to May 2017. The data have been adjusted for glacial isostatic adjustment.

Data source: CMEMS Ocean Monitoring Indicator based on the C3S sea level product.

Credit: Copernicus Climate Change Service/ECMWF/Copernicus Marine Environment Monitoring Service.

² This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s). The list does not claim to be complete. Anyone with a suitable dataset who would like it to be added to this list should contact GCOS.