Sea Water Column Tepmerature

Ocean historical data – two datasets are available:

1. GLORYS12V1 data

Ocean water temperature, water velocity and seawater potential temperature at seafloor (bottomT)[1)]

The GLORYS12V1 product is the CMEMS global ocean eddy-resolving (1/12° horizontal resolution, 50 vertical levels) reanalysis covering the altimetry (1993 onward). It is based largely on the current real-time global forecasting CMEMS system. The model component is the NEMO platform driven at surface by ECMWF ERA-Interim then ERA5 reanalyses for recent years. Observations are assimilated by means of a reduced-order Kalman filter. Moreover, a 3D-VAR scheme provides a correction for the slowly evolving large-scale biases in temperature and salinity.

This product includes daily and monthly mean files for temperature, salinity, currents, sea level, mixed layer depth and ice parameters from the top to the bottom. The global ocean output files are displayed on a standard regular grid at 1/12° (approximatively 8 km) and on 50 standard levels.

Climate Change and Ocean Temperature at Different Depths

The memory of past warming events is in the oceans, and even though there are weather events that alter the daily details, the atmosphere above the oceans is warmer and moister than it used to be. At any time, the direct effect of this blanket is small, but the accumulated effects are substantial and have consequences for our weather and climate. Over 90% of the extra heat ends up in the ocean and hence perhaps the most important measurements of global warming are made in the oceans.

Better baseline temperature observations and modelling simulation for future projections, provide critical information for scientific research and climate change risk assessments within the ocean environment and for offshore infrastructure development, safety parameters and operations.
The spatial resolution of the baseline and GCM change patterns is 0.25-degree latitude/longitude.
The World Ocean Atlas 2018 version 2 (WOA18) [2)]

[1)]https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=GLOBAL_REANALYSIS_PHY_001_030
[2)]https://www.nodc.noaa.gov/OC5/woa18/

Climate Insights

High quality, robust, defensible, actionable, climate physical assessment and risk ranking platform

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Future projections

CMIP5 GCM data: Monthly sea water temperature data will be converted from sea water potential temperature(thetao) data.
Processing methodology: pattern scaling approach

The ocean water temperature change patterns were processed using the monthly output of the GCMs.

(1) Global area weighted means of each year from 2006 to 2100 were calculated for all the available GCM's RCP runs.
(2) The GCM ensemble means of each RCP were calculated.
(3) The 95-year values were fitted to smooth curved polynomial lines i.e. that is the global annual mean change value (GV).

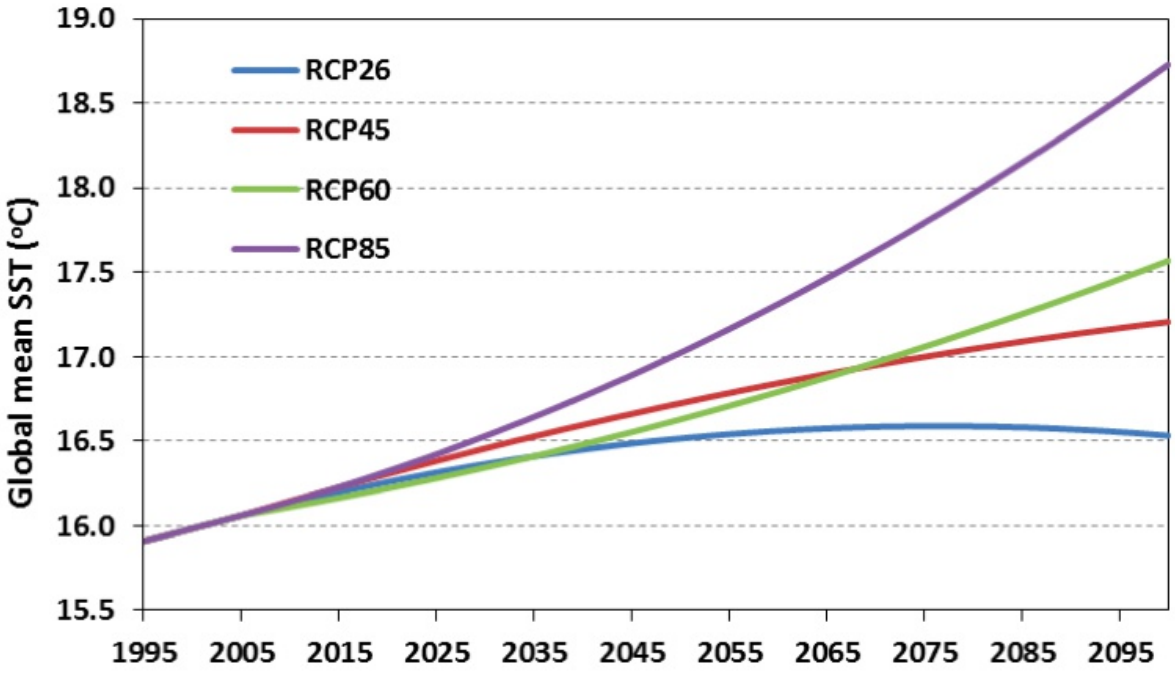

Fig 1. Global curves for sea surface temperature change