

Arctic Ocean Regional Climatology: Online Atlas

http://www.nodc.noaa.gov/OC5/regional_climate/arctic

Summary

The Arctic Ocean is an area of intense activity both for environmental and commercial interests. Climate change has disproportionately affected this region with rising ocean temperatures and continued loss of summer sea ice extent. Oil and mineral exploration and exploitation are occurring and intensifying. To provide an improved oceanographic foundation and reference for multi-disciplinary studies of the Arctic Ocean, NODC developed a new set of high-resolution quality-controlled long-term annual, seasonal and monthly mean temperature and salinity fields on different depth levels. This new regional climatology is based on the World Ocean Database archive of temperature and salinity from observations spanning over more than a hundred years and incorporates a great deal of new data not previously available.

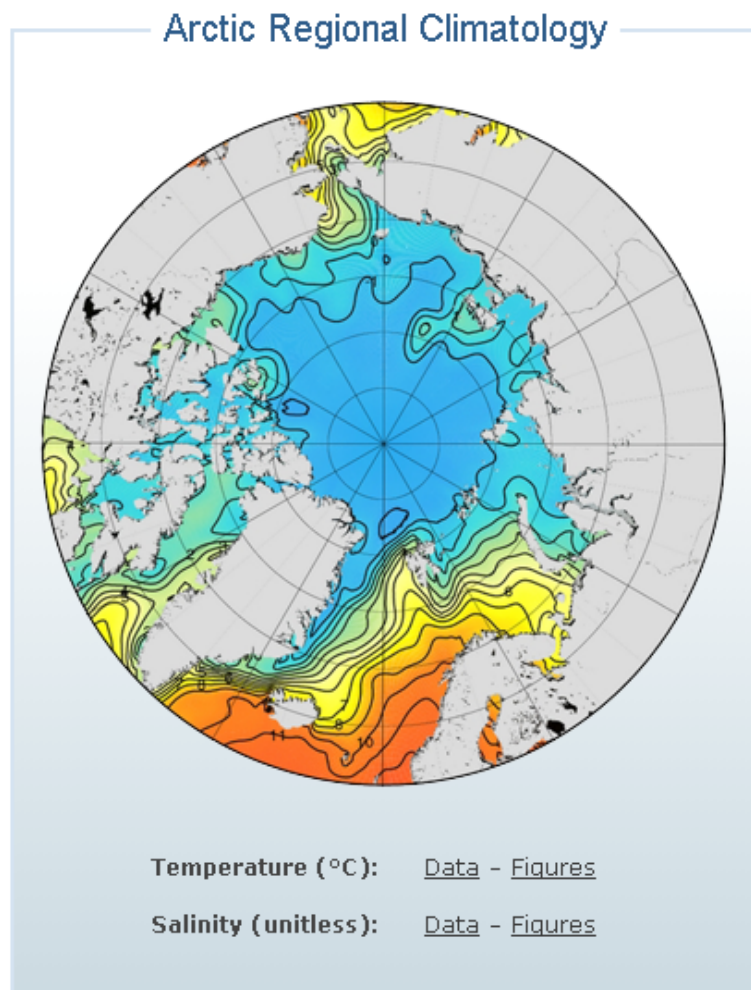


Figure 1. Front page of the Arctic Ocean Regional Climatology Online Atlas. Maps can be viewed by clicking on [Figures](#) for either temperature or salinity, then selecting the options from dropdown menus (Figure type, Time period, Depth and Grids). Data available for download in netCDF, ASCII or ArcGIS formats by clicking on [Data](#). The data and maps are available on the spatial grids with 1° and 0.25° resolutions.

Brief description of the Arctic Ocean Regional Climatology

A set of mean fields for temperature and salinity for the Arctic Seas are available for viewing and downloading.

Area: The area encompassed is all longitudes from 60°N to 90°N latitudes.

Horizontal resolution: Temperature and salinity are available on a 1°x1° and a 0.25° x 0.25° latitude/longitude grid.

Time resolution: All climatologies for all variables use all available data regardless of year of measurement. Climatologies were calculated for annual (all-data), seasonal, and monthly time periods. Seasons are as follows: Winter (Jan.-Mar.), Spring (Apr.-Jun.), Summer (Jul.-Aug.), Fall (Oct.-Dec.).

Vertical resolution: Temperature and salinity are available on 87 standard levels with higher vertical resolution than the World Ocean Atlas 2009 (WOA09), but levels extend from the surface to 4000 m.

Additional fields: In addition to climatological mean fields, fields of statistical means (before objective analysis), standard deviation, standard error, data distribution, observed minus analyzed, and difference of time period from annual climatological mean, are also available.

Units: Temperature units are °C. Salinity is unitless on the Practical Salinity Scale-1978 [PSS].

Data used: All data from the area found in the World Ocean Database (WOD) as of the end of 2011. For a description of this dataset, please see [World Ocean Database 2009 Introduction](#)

Bathymetry used: For the 1° and 0.25° climatologies, the mean value within a grid square from the [ETOPO2](#) was used.

Method: The method followed for calculation of the mean climatological fields is detailed in the following publications: Temperature: Locarnini et al., 2010, Salinity: Antonov et al., 2010.

Additional details on the 0.25° climatological calculation are found in Boyer et al., 2005.

The table from this publication giving radius of influence for the analysis procedure can be filled out with values for the 0.25° procedure as follows:

Pass	1° radius of influence	0.25° radius of influence
1	892 km	321 km
2	669 km	267 km
3	446 km	214 km

Data formats: Data are presented in a comma separated value (csv) format which gives lat/lon of the center of a grid box and the value at each depth in that grid box. Data are also presented in an ArcGIS compatible and netCDF formats.

References:

Antonov, J. I., D. Seidov, T. P. Boyer, R. A. Locarnini, A. V. Mishonov, H. E. Garcia, O. K. Baranova, M. M. Zweng, and D. R. Johnson, 2010: World Ocean Atlas 2009, Volume 2: Salinity. S. Levitus, Ed. NOAA Atlas NESDIS 69, U.S. Government Printing Office, Washington, D.C., 184 pp.

Boyer, T., S. Levitus, H. Garcia, R. A. Locarnini, C. Stephens, J. Antonov, 2005: Objective analyses of annual, seasonal, and monthly temperature and salinity for the world ocean on a 0.25 degree grid. *Int. J. Clim.*, 25, 931-945.

Boyer, T. P., J. I. Antonov, O. K. Baranova, H. E. Garcia, D. R. Johnson, R. A. Locarnini, A. V. Mishonov, T. D. O'Brien, D. Seidov, I. V. Smolyar, M. M. Zweng, 2009: World Ocean Database 2009. S. Levitus, Ed., NOAA Atlas NESDIS 66, U.S. Gov. Printing Office, Wash., D.C., 216 pp.

Locarnini, R. A., A. V. Mishonov, J. I. Antonov, T. P. Boyer, H. E. Garcia, O. K. Baranova, M. M. Zweng, and D. R. Johnson, 2010: World Ocean Atlas 2009, Volume 1: Temperature. S. Levitus, Ed. NOAA Atlas NESDIS 68, U.S. Government Printing Office, Washington, D.C., 184 pp.