1. TITLE

1.1 Data Set Identification

ISLSCP II Sea Surface Temperature

1.2 Database Table Name(s)

Not applicable to this data set.

1.3 File Name(s)

The following files are included in this data set:

1. sst_1d_monthly.zip: When extrapolated this file contains 120 files with the gridded monthly SST fields in degrees C. YYYY is the year from 1986 to 1995 and MM is the month from 01 to 12. The 00 means this is a monthly average. These files are named **sst_oiv2_1d_YYYYMM00.asc.**

This zip file also contains two additional files:

sst_oiv2_1d_changemap.asc: gridded ASCII file with values showing the differences between the ISLSCP II land/water mask and the original data set. All points with negative values ("-1") are those where the ISLSCP II mask showed water but where the original data set showed land and this point was removed. All points with a value of zero are those points where the two land/water masks agreed.

mask_diffs_1d.asc: gridded ASCII file with values showing the differences between the ISLSCP II land/water mask and the original land mask. The values are either 0, 1, or 2 where 0 = both ISLSCP II land/water mask and original mask agree that cell is either water or land, 1 = ISLSCP II mask is water and original mask is land, and 2 = ISLSCP II mask is land and original mask is water.

2. sst_1d_weekly.zip: When extrapolated this file contains 522 files with the gridded weekly SST fields in degrees C. YYYY is the year from 1986 to 1995 and MM is the month from 01 to 12. DD is the day for the middle of the weekly period. ***NOTE**: For the 1980s the weeks are centered on Sunday (i.e. Thursday to Wednesday) and from the 1990s onward the weeks are centered on Wednesday (i.e. Sunday to Saturday). This small change leads to a three-day overlap in the weekly SST files for the last week of 1989 and the first week of 1990. This zip file also contains gridded weekly normalized error variance fields (unitless). These files are named **sst_oiv2_1d_YYYYMMDD.asc** and **sst_oiv2_error_1d_YYYYMMDD.asc.**

3. sst_climate_1d_1971-2000.zip: When extrapolated, contains 12 files with the gridded monthly climatology of SST in degrees C averaged over any particular month during the period 1971-2000. 1d means that this data set is at a 1-degree spatial resolution in both latitude and longitude. MM is the month from 01 to 12. These files are named **sst_climate_1d_1971-2000-MM.asc.**

1.4 Revision Date of this Document

October 2, 2014

2. INVESTIGATOR(S)

2.1 Investigator(s) Name and Title

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2.2 Title of Investigation

NOAA Optimally Interpolated (version 2) (OI.v2) global sea surface temperature analyses for climate diagnostics, modeling and prediction.

2.3 Contacts (For Data Production Information)

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2.4 Data Set Citation

Reynolds, R., and D.C. Stokes. 2010. ISLSCP II Sea Surface Temperature. In Hall, Forrest G., G. Collatz, B. Meeson, S. Los, E. Brown de Colstoun, and D. Landis (eds.). ISLSCP Initiative II Collection. Data set. Available on-line [http://daac.ornl.gov/] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/980

2.5 Requested Form of Acknowledgment

Users of the International Satellite Land Surface Climatology (ISLSCP) Initiative II data collection are requested to cite the collection as a whole (Hall et al. 2006) as well as the individual data sets. Please cite the following publications when these data are used:

Hall, F.G., E. Brown de Colstoun, G. J. Collatz, D. Landis, P. Dirmeyer, A. Betts, G. Huffman, L. Bounoua, and B. Meeson, The ISLSCP Initiative II Global Data sets: Surface Boundary Conditions and Atmospheric Forcings for Land-Atmosphere Studies, *J. Geophys. Res.*, 111, doi:10.1029/2006JD007366, 2006.

Reynolds, R.W., N.A. Rayner, T.M. Smith, D.C. Stokes, and W. Wang, 2002: An Improved In Situ and Satellite SST Analysis for Climate, *J. Climate*, 15, 1609-1625.

3. INTRODUCTION

3.1 Objective/Purpose

Sea Surface Temperatures (SST) are an important indicator of the state of the earth climate system as well as a key variable in the coupling between the atmosphere and the ocean. Accurate knowledge of SST is essential for climate monitoring, prediction and research. It is also a key surface boundary condition for numerical weather prediction and for other atmospheric simulations using atmospheric general circulation models. SST also is important in gas exchange between the ocean and atmosphere, including the air-sea flux of carbon. Gridded SST products have been developed to satisfy these needs.

3.2 Summary of Parameters

For the International Satellite Land Surface Climatology Project (ISLSCP) Initiative II, gridded monthly and weekly global sea surface temperature for the period 1986-1995 and long term SST monthly climatology for the period 1971-2000 are provided. Gridded normalized error variance fields are also provided with the weekly data. All of these data have been made consistent with the ISLSCP II land/water mask by the ISLSCP II staff and are provided on an equal-angle 1-degree Earth grid.

3.3 Discussion

The National Oceanic and Atmospheric Administration (NOAA) Optimum Interpolation (OI) global sea surface temperature analyses use seven days of *in situ* (ship and buoy) and satellite SST observations and SST values derived from sea ice concentration. These analyses are produced weekly using optimum interpolation (OI) (Lorenc 1981) on a 1-degree grid. The OI technique requires the specification of data and analysis error statistics. These statistics show that the SST Root Mean Square (RMS) data errors from ships are almost twice as large as the data errors from buoys or satellites. In addition, the average e-folding spatial error scales have been found to be 850 km in the zonal direction and 615 km in the meridional direction (Reynolds and Smith 1994). The monthly analyses presented here were computed by linearly interpolating the weekly fields to produce daily fields and then by averaging the appropriate days within a month to produce monthly averages.

The analysis also includes a preliminary step that corrects any satellite biases relative to the *in situ* data using Poisson's equation. The importance of this correction has been demonstrated using data following the 1991 eruptions of Mt. Pinatubo (Reynolds, 1993). The OI analysis has been computed using the *in situ* and bias corrected satellite data for the period November 1981 to present.

In this release the OI version 2 (OI.v2) is presented. The original version (OI.v1) is discussed in Reynolds and Smith (1994). As discussed in Reynolds et al (2002), the OI.v2 is a replacement of the OI.v1. The OI.v2 analysis has a modest improvement in the bias correction because of the addition of more *in situ* data. However, a small uncorrected residual bias of roughly -0.03 degrees C remains relative to the in situ data. In addition, the OI.v2 uses an improved climatological sea ice to SST conversion algorithm. In this method, SST observations are derived from sea ice concentrations, following the method of Rayner et al. (1996) and Parker et al (1999). The SST value is determined by the quadratic equation:

$$SST = aI2 + bI + c$$

Here I is ice concentration (% of area covered by sea ice) and a, b and c are constant coefficients determined by historical collocated SST and ice concentration data. The constants vary with location and season. In the OI.v2 SSTs where simply set to –1.8 degrees C for ice concentrations above 50%. Comparisons near the sea ice margin show that the OI.v2 SSTs agree better with satellite and *in situ* data than the OI.v1. Note that the original sea ice concentration data used to produce this data set are not provided here. The SST data sets can be found online at http://dss.ucar.edu/datasets/ds277.7/.

Smith and Reynolds (1998) derived a monthly SST climatology on a 1-degree grid from two sources: the average 1 degree OI.v1 monthly fields for the period 1982-1996 and the monthly average of the 2 degree gridded fields of Smith et al. (1996) for the period 1961-1990. The Smith et al. (1996) fields were computed using a fit of empirical orthogonal functions to COADS (Comprehensive Ocean-Atmosphere Data Set) data between 45 degrees S and 69 degrees N. In Smith and Reynolds (1998), a smoothed difference between the two climatologies was produced. The difference became a correction that was used to adjust the 1 degree OI-based climatology. This adjusted climatology maintained the 1-degree resolution while using a 1961-1990 base period wherever the Smith et al. (1996) fields were defined.

Because of the large OI differences at high latitudes, Yan Xue, Climate Prediction Center, NCEP/NOAA, recomputed the climatology following the Smith and Reynolds (1998) method using the OI.v2 analysis (1982-2000) instead of the OI.v1. The adjusted climatology is based on the period 1971-2000. There is little change between the two climatologies except at high latitudes where the new climatology is warmer especially in summer months. There, the differences can exceed 1 degree C. A paper on the climatology is in preparation. For more details see http://www.cpc.noaa.gov/products/predictions/30day/SSTs/sst_clim.html.

4. THEORY OF ALGORITHM/MEASUREMENTS

There are two main sources of SST measurements: *in situ* and satellite. The *in situ* observations are direct temperature measurements made from ships and buoys. The ship observations are primarily made by measuring the temperature of water used for engine cooling. Almost all the remaining ship measurements are obtained from thermometers placed in insulated buckets that have been thrown overboard and filled with seawater. The buoy observations are made by thermistors that evaluate ocean temperature by either measuring the hull temperature of the buoy or measuring the temperature of the water directly. The depth of the measurement varies from roughly 20 meters (intake for engine cooling) to several meters (small buoys).

The satellite observations are obtained by measuring the thermal infrared radiation using the Advanced Very High Resolution Radiometer (AVHRR) on the U.S. National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites. These data were produced operationally by NOAA's National Environmental Satellite, Data and Information Service (NESDIS).

Because the AVHRR cannot retrieve SSTs in cloud-covered regions, the most important problem in retrieving SST is to eliminate clouds. The cloud clearing algorithms are different during the day and the night because the AVHRR visible channels can only be used during the day. After clouds have been eliminated, the SST algorithm is derived to minimize the effects of atmospheric water vapor. The satellite SST retrieval algorithms are "tuned" by regression against quality-controlled buoy data using the multichannel SST technique of McClain et al. (1985). This procedure converts the satellite measurement of the "skin" SST (roughly a micron in depth) to a buoy "bulk" SST (roughly 0.5-m). The tuning is done when a new satellite becomes operational or when verification with the buoy data shows increasing errors. The AVHRR instrument has three infrared (IR) channels (3.7µm, 11µm, and 12µm). However, because of noise from sun glint, only two channels (11µm, and 12µm) can be used during the day. Thus, the algorithm is usually tuned separately during the day and the night and typically uses two channels during the day and three at night (Walton, et al., 1998). The algorithms are computed globally and are not a function of position or time. A typical nighttime equation would have the form

$$SST = a\ T11 + b\ (T3.7 - T12) + c\ (\sec(\Phi) - 1) + d$$

Here Φ is the satellite zenith angle, and T‟s are the satellite radiances. The subscripts of T refer to the central wavelengths of each of the three IR channels**.** The numerical coefficients, a, b, c, and d were determined by regression against SSTs from drifting buoys.

5. EQUIPMENT

As discussed above, the SST analysis is derived from *in situ* and satellite SST retrievals from AVHRR. The satellite SSTs are tuned against drifting and moored buoys. Thus, changes in calibrations due to changes in satellite instruments are minimized.

5.1 Instrument Description

5.1.1 Platform (Satellite, Aircraft, Ground, Person)

In situ SSTs are measured from buoys and/or ships. The satellite data come from the AVHRR instrument, flown on board the polar orbiter “NOAA” operational environmental satellite series. At a certain time a “morning” and an “afternoon” satellite is operational, thus providing morning, afternoon, evening and nighttime observations approximately 6 hours apart. The local time of observations changes during a satellite’s lifetime because of orbital drift.

5.1.2 Mission Objectives

AVHRR was designed for the instantaneous observation of clouds, ocean, land, ice and snow cover for weather analysis purposes. The multi-spectral measurements have been proven to be suitable for the quantitative measurement of a number of parameters that AVHRR was originally not designed for. The long data record also allows the use of AVHRR data for climate analysis purposes.

5.1.3 Key Variables

AVHRR provides reflected and emitted radiation measurements. Only thermal channels are used for SST retrievals.

5.1.4 Principles of Operation

AVHRR, a scanning radiometer, is operated and maintained by the National Environmental Satellite Data and Information Service (NOAA/NESDIS). At a certain time, there are two operational satellites, but data from earlier satellites are also received and processed at a lower priority level.

5.1.5 Instrument Measurement Geometry

AVHRR operates with a cross-track scanning system with a maximum of 55.4-degrees scan angle from nadir.

5.1.6 Manufacturer of Instrument

The AVHRR instrument is manufactured by ITT.

5.2 Calibration

The satellite SSTs are tuned against drifting and moored buoys. Thus, changes in calibrations due to changes in satellite instruments are minimized. See Reynolds et al. (2002) for more details on calibration issues.

5.2.1 Specifications

5.2.1.1 Tolerance

See above.

5.2.2 Frequency of Calibration

See above.

5.2.3 Other Calibration Information

None.

6. PROCEDURE

6.1 Data Acquisition Methods

For the data in the ISLSCP data collection, the *in situ* (ship and buoy) data in OI.v2 were obtained from release 2 of the COADS through 1997 (see Slutz et al., 1995, and Woodruff et al., 1998). After this period the data are obtained in real time from the Global Telecommunication System (GTS).

For the period prior to 1990, the satellite SST retrieval data used in the OI.v2 were obtained from weekly data summaries of NESDIS data produced at the University of Miami's Rosentiel School of Marine and Atmospheric Sciences (RSMAS) (Evans, personal communication, 1993). These satellite summaries were produced for weeks centered on Sunday. Data from 1990 through present were processed from the OI data archives. For 1990-1995 the satellite SST retrieval data was obtained directly from NOAA/NESDIS.

The sea ice concentration (% of area covered by sea ice) for the period covered by this data set was obtained from passive microwave data processed at NASA Goddard Space Flight Center (GSFC) using daily data from the Scanning Multichannel Microwave Radiometer (SMMR) and the Special Sensor Microwave/Imager (SSM/I) (Cavalieri et al., 1999). These data were provided by the National Snow and Ice Data Center (NSIDC). Knight (1984) NIC chart-derived monthly fields were used to correct for melt ponds in the summer Arctic data. Hanna et al (1999) Bristol-algorithm SSM/I fields were used to calibrate the Antarctic data. Sea ice coverage for the Caspian Sea was obtained from a climatology (see Parker et al., 1995) because the GSFC data contained no information there. The user should note that the Cavalieri et al. (1999) sea ice concentration data are also included in the ISLSCP II collection but are NOT processed exactly as described above. Users can access the sea ice data used here at the following web sitehttp://dss.ucar.edu/.

An estimate of the OI normalized error variance is also included. This error is defined at the end of section 4 in Reynolds and Smith (1994) based on the OI theory. The range of the normalized error is 0 to 1. In regions with no data the normalized error is 1; in regions with dense data the error will approach 0. The total error variance for the analysis can be determined by multiplying the first guess variance and the normalized error. This first guess estimate is obtained from a daily analyzed satellite SST global 100 km field (Doug May, Personal Communication). The 100 km analyzed SST field is generated daily by objectively analyzing all retrievals collected during the previous 36 hours and using a 1 degree global grid. Each grid cell value is calculated by weighting the previous analysis SST and individual satellite retrievals by distance from the gridpoint center, the age of the retrieval, and the strength of the previous local SST field gradient. The standard deviation of the first guess error is shown in figure 11 in Reynolds and Smith (1994).

6.2 Spatial Characteristics

6.2.1 Spatial Coverage

The spatial coverage is global for all water bodies. Some small inland water bodies are not included in the 1971-2000 climatology.

6.2.2 Spatial Resolution

The data are given in an equal-angle lat/long grid that has a spatial resolution of 1-degree x 1-degree in both latitude and longitude.

6.3 Temporal Characteristics

6.3.1 Temporal Coverage

For the monthly and weekly SST analyses the temporal coverage is from January 1986 through December 1995. The monthly SST climatology is derived from data collected from 1971 to 2000.

6.3.2 Temporal Resolution

Weekly and monthly means. The climatology has a monthly temporal resolution.

7. OBSERVATIONS

7.1 Field Notes

Not applicable to this data set.

8. DATA DESCRIPTION

8.1 Table Definition with Comments

Not applicable to this data set.

8.2 Type of Data

8.2.1 Parameter/ Variable Name	8.2.2 Parameter/ Variable Description	8.2.3 Data Range	8.2.4 Units of Measurement	8.2.5 Data Source
OIv2 Monthly SST	Monthly averages of Sea Surface Temperature	N/A Land=-888.8	degrees C	OIv2
OIv2 Weekly SST	Weekly averages of Sea Surface Temperature	N/A Land=-888.8	degrees C	OIv2
OIv2 Weekly Normalized Error Variance	Weekly Normalized Error Variance	0-1 Land=-888.8	Unitless	OIv2
OIv2 Monthly SST climatology	Monthly SST climatology from 1971 to 2000	N/A Missing Data=-999.9 Land=-888.8	degrees C	OIv2
Points Changes	Differences between the ISLSCP II land/water mask and the original data: -1 = ISLSCP II mask is water and original data is land (data removed) 0 = Data sets agree over land or water (data unchanged) 1 = ISLSCP II mask is land or water and original data is missing (fill value used).	-1 to 1	See 8.2.2	Original data and ISLSCP II land/water mask

***** Data ranges are not available at this revision.

8.3 Sample Data Record

Not applicable to this data set.

8.4 Data Format

All of the files in the ISLSCP Initiative II data collection are in the Arc GIS ASCII Grid format. The file format consists of numerical fields of varying length, which are delimited by a single space and arranged in columns and rows. All files in this directory contain 360 columns (pixels) and 180 rows (lines). All values are written as real numbers. Land cells are assigned the value of -888.8 on all data layers. Missing data over inland water bodies in the monthly climatology files are assigned the value of -999.9.

All files are gridded to a common equal-angle lat/long grid, where the coordinates of the upper left corner of the files are located at 180 degrees W, 90 degrees N and the lower right corner coordinates are located at 180 degrees E, 90 degrees S. Data in the map files are ordered from North to South and from West to East beginning at 180 degrees West and 90 degrees North.

8.5 Related Data Sets

Additional ISLSCP II project information and data sets can also be obtained from the Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC): http://daac.ornl.gov/ISLSCP_II/islscpii.html.

9. DATA MANIPULATIONS

All SST data are screened using climatological means and standard deviations (see Appendix A and C in Reynolds, 1988). In addition, as described in Reynolds and Smith (1994), a ship and buoy tracking procedure is used to eliminate bad positions. AVHRR retrievals can be negatively biased by cloud and aerosol contamination. However, the preliminary bias correction step carried out before the OI corrects any large-scale bias relative to the *in situ* data. As noted in Reynolds et al. (2002) only a small residual bias remains even during periods of high volcanic aerosols.

9.1 Formulas

9.1.1 Derivation Techniques/Algorithms

See Reynolds et al. (2002).

9.2 Data Processing Sequence

9.2.1 Processing Steps and Data Sets

See section 4 and Reynolds et al. (2002).

9.2.2 Processing Changes

This is version 2 of the OI SST products.

9.2.3 Additional Processing by the ISLSCP Staff

The ISLSCP II staff have processed the data from their original binary format into ASCII. The original files were flipped from South to North and the origin was shifted from the Greenwich Meridian to the dateline. All files were then made consistent with the ISLSCP II land/water mask. Both the weekly and monthly SST data were provided without any land/water boundaries applied while the SST climatology already had land areas masked in.

For the weekly and monthly SST files, the land areas from the ISLSCP II land/water mask were simply masked in with a value of –888.8 on all data layers. Because of the way these data were provided, all inland water bodies contain a value of SST but many of these values are interpolated and not directly measured (See Section 11.2).

For the SST climatology, differences between the original land/water mask and the ISLSCP II mask were found. For cases where the original mask showed land and the ISLSCP II mask showed water (107 cells), SST values were calculated from an average of the SSTs of a 3 by 3 window of non-land surrounding cells. Cases where no SST data could be found within the surrounding window of cells were coded as –999.9, or missing data over water. This latter case was found mainly over inland water bodies. All cells where the original data showed water and the ISLSCP II mask showed land (1430 cells) were replaced with a value of –888.8 (i.e. Land). A file called **sst_oiv2_1d_changemap.asc** was produced showing the results of applying the land/water mask, as a viewable ASCII map: all points added ("1"), all points unchanged ("0"), and all points removed ("-1").

The above discussion implies that, while all weekly and monthly layers have SSTs over inland water bodies, the 1971-2000 monthly climatology does not. Users should consult the **sst_oiv2_1d_changemap.asc** file to view the spatial distribution of those points that were filled and/or masked with the ISLSCP II land/water mask.

9.3 Calculations

9.3.1 Special Corrections/Adjustments

See section 4 and Reynolds et al. (2002). **9.4 Graphs and Plots**

9.4 Graphs and Plots

See http://www.cpc.noaa.gov/products/predictions/30day/SSTs/sst_clim.html for figures of the 1971-2000 climatology.

10. ERRORS

10.1 Sources of Error

Errors in the final SST product are caused by errors in the data and errors in the analysis method. Reynolds and Smith (1994) determined that the RMS errors from different types of data were: ship, 1.3 degrees C; buoy 0.5 degrees C; day satellite, 0.5 degrees C; and night satellite, 0.3 degrees C.

To determine the analysis error, the SSTs from the OI were compared with SSTs from three equatorial moored buoys located at 110 degrees W, 140 degrees Wand 165 degrees E. The SST data from these buoys were not used in the analysis. The monthly difference between buoys and the analysis were computed for the period 1982-93. The RMS errors were: 0.38 degrees C at 110 degrees W, 0.39 degrees C at 140 degrees W and 0.24 degrees C at 165 degrees E. The bias errors (buoy - analysis) were -0.21 degrees C at 110 degrees W, -0.26 degrees C at 140 degrees W and -0.05 degrees C at 165 degrees E. The errors are larger in the eastern Pacific because the gradients and variability are larger than in the west. Analysis RMS errors less than 0.4 degrees C can be expected over much of the globe except in regions of the western boundary currents (e.g., the Gulf Stream) where the RMS errors can be 2 to 3 times larger.

10.2 Quality Assessment

10.2.1 Data Validation by Source

See Section 10.1 and Reynolds et al. (1998, 2002).

10.2.2 Confidence Level/Accuracy Judgment

See Section 10.1 and Reynolds et al. (1998, 2002).

10.2.3 Measurement Error for Parameters and Variables

See Section 10.1 and Reynolds et al. (1998, 2002).

10.2.4 Additional Quality Assessment Applied

None.

11. NOTES

11.1 Known Problems with the Data

The accuracy of the SST product is affected by the input data. For example in the middle and high latitude Southern Hemisphere there are few *in situ* data especially between the dateline and 80 degrees W. In these regions any satellite biases cannot be corrected. In addition there are areas with persistent cloud cover (for example the western tropical Pacific) where the persistent cloud cover forces the analysis to rely completely on *in situ* data. For more information please see Reynolds et al. (2002).

11.2 Usage Guidance

The OI analysis is done over all ocean areas and the Great Lakes. There is no analysis over land. The land values are filled by a Cressman interpolation to produce a complete grid for possible interpolation to other grids. As discussed in Section 9.2.3, while all weekly and monthly layers have SSTs over inland water bodies, the 1971-2000 monthly climatology does not. The users should exercise caution when using the SSTs over inland water bodies except the Great Lakes. Users should also consult the **sst_oiv2_1d_changemap.asc** file to view the spatial distribution of those points that were filled and/or masked with the ISLSCP II land/water mask.

The user should note that the Cavalieri et al. (1999) sea ice concentration data are also included in the ISLSCP II collection but are NOT processed exactly as described in this document. Users can access the sea ice data used here as well as all the original data at the following web site: http://dss.ucar.edu/.

11.3 Other Relevant Information

None.

12. REFERENCES

12.1 Satellite/Instrument/Data Processing Documentation

None.

12.2 Journal Articles and Study Reports

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13. DATA ACCESS

13.1 Contacts for Archive/Data Access Information

The ISLSCP Initiative II data are available are archived and distributed through the Oak Ridge National Laboratory (ORNL) DAAC for Biogeochemical Dynamics at http://daac.ornl.gov.

13.2 Contacts for Archive

E-mail: uso@daac.ornl.gov
Telephone: +1 (865) 241-3952

13.3 Archive/Status/Plans

The ISLSCP Initiative II data are archived at the ORNL DAAC. There are no plans to update these data.

14. GLOSSARY OF ACRONYMS

AVHRR Advanced Very High Resolution Radiometer	AVHRR Advanced Very High Resolution Radiometer
COADS Comprehensive Ocean Atmosphere Data Set	COADS Comprehensive Ocean Atmosphere Data Set
DAAC	Distributed Active Archive Center
GSFC	Goddard Space Flight Center (NASA)
ISLSCP	International Satellite Land

	Surface Climatology Project
NASA	National Aeronautics and Space Administration
NCDC	NCDC National Climatic Data Center (NOAA)
NCEP National Centers for Environmental Prediction (NOAA)	NCEP National Centers for Environmental Prediction (NOAA)
NESDIS National Environmental Satellite, Data & Information Service (NOAA)	NESDIS National Environmental Satellite, Data & Information Service (NOAA)
NOAA National Oceanic and Atmospheric Administration	NOAA National Oceanic and Atmospheric Administration
NSIDC National Snow and Ice Data Cente	NSIDC National Snow and Ice Data Cente
NWS National Weather Service	NWS National Weather Service
OI Optimum Interpolation	OI Optimum Interpolation
ORNL	Oak Ridge National Laboratory
RMS Root Mean Square	RMS Root Mean Square
RSMAS SMMR	RSMAS Rosentiel School of Marine and Atmospheric Sciences
SMMR	SMMR Scanning Multichannel Microwave Radiometer
SSM/I	Special Sensor Microwave Imager

SST	Sea Surface Temperature