Data Access to Marine Surface Observations and Products from COADS

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National Center for Atmospheric Research

Outline

- Definition of Products
- History of data access at NCAR
- Current interfaces at NCAR
- Improved Service from NCAR/CDC/NCDC

COADS data products

- ## Observations
  - Individual marine reports, 1784-1997
  - Called "LMRF", 155 million records

- ## Monthly summaries of observations
  - Statistical summaries in lat. x long. boxes
  - Called "MSG"
  - Two resolutions
    - 1° for 1960-1997
    - 2° for 1800-1997
  - Two flavors (types)
    - *Standard,* ships only with 3.5σ outlier trimming
    - *Enhanced,* ships and buoys with 4.5σ outlier trimming

History of data access at NCAR

- Customized data request
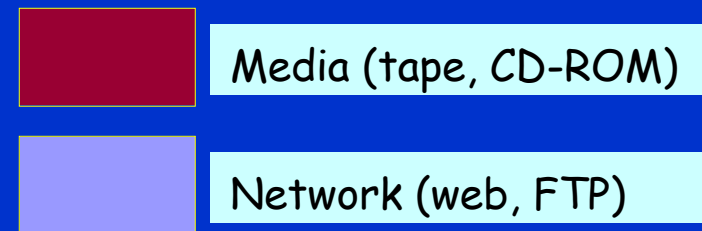 - Data packages prepared for individuals
  - 1983-2001

COADS data requests served from NCAR
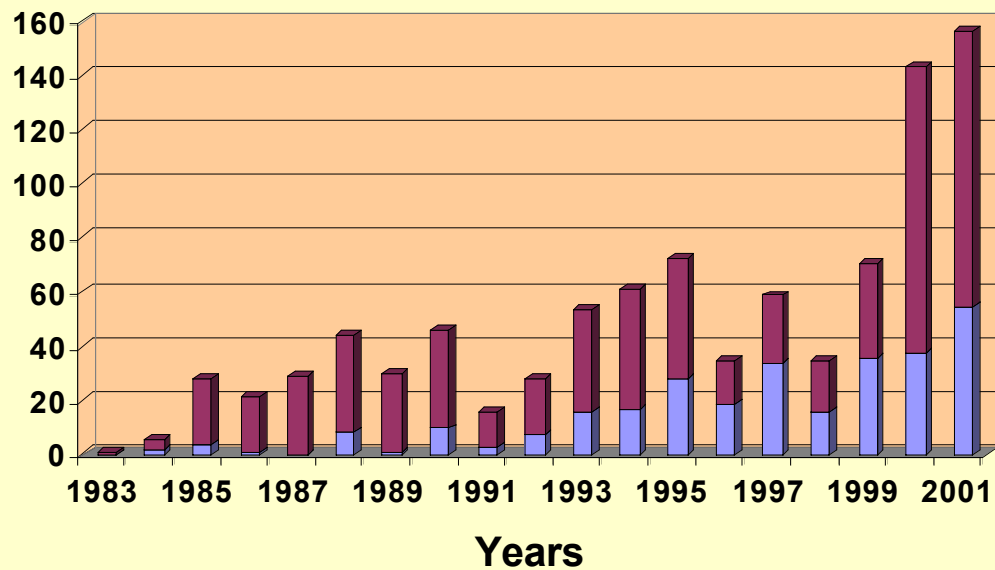
Media and Network Data Delivery
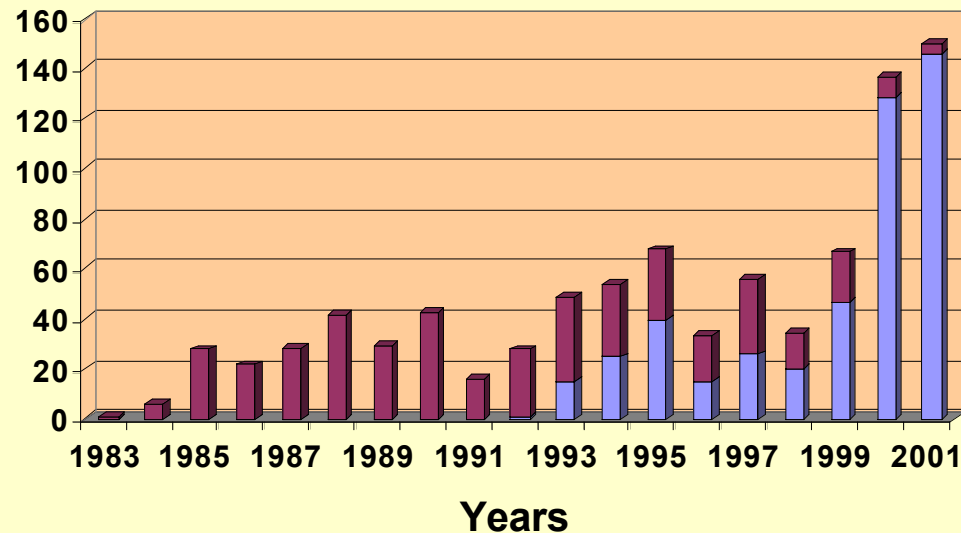
Brief COADS development history

- 1993, Release 1a + extensions, 1980 onward
- 1996, Release 1b, 1950-1979
- 2001, Release 1c, 1784-1949
- **1999, Online data request forms and subsetting**

Media (tape, CD-ROM)

Network (web, FTP)

Number of Requests by Product Type from NCAR

Monthly Statistics and Observations

Years

Monthly Summary Statistics

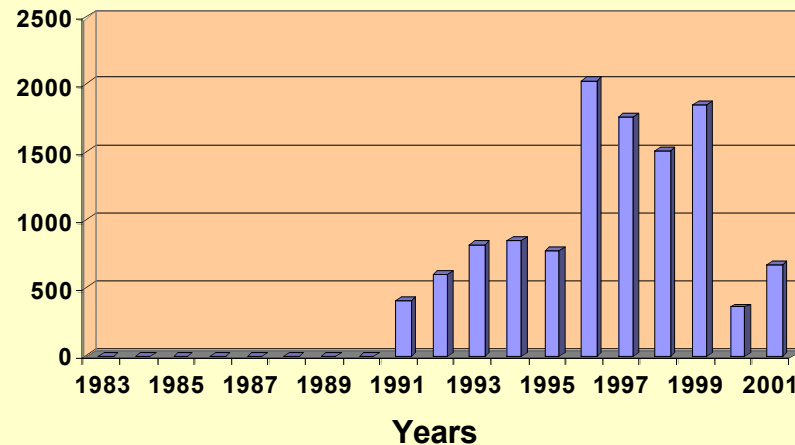Observations

Size of Data Requests from NCAR

Average Request Size (MB)

Note: First records begin in 1991

Maximum Average, 2039 MB, 1996

2001 Value, 685 MB

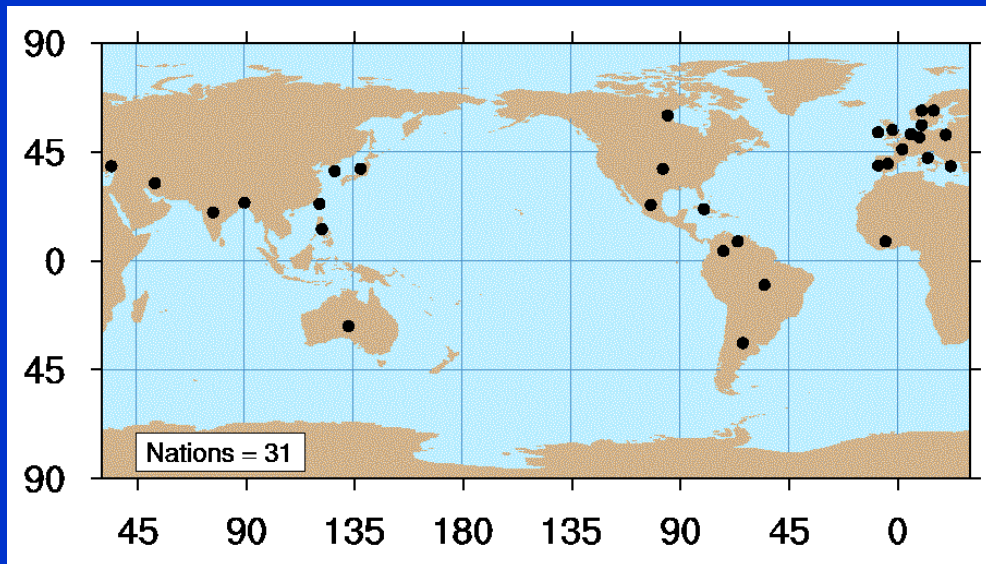
40% + are now less than 10 MB

% Requests <= 10 MB
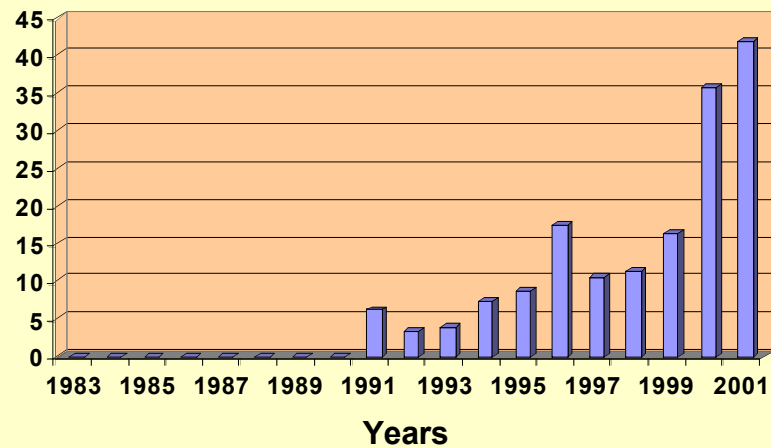
Nations Receiving COADS
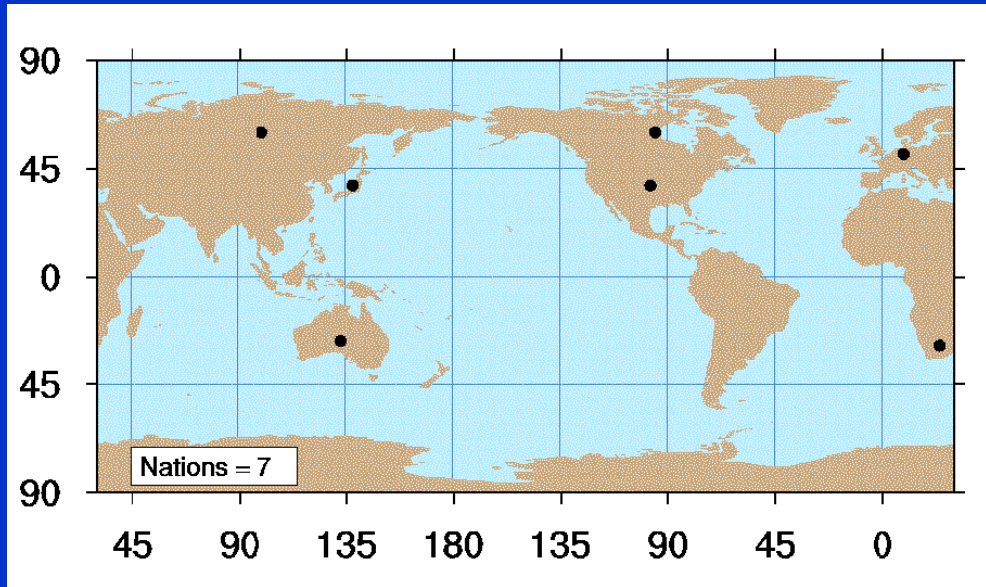
7 Nations in 1990, 43 requests

USA
Japan
Australia
South Africa
Russia
Canada
Germany

31 Nations in 2000, 137 requests

Germany	Argentina	Bangladesh
India	Italy	France
Canada	Ivory Coast	Iran
USA	Philippines	Turkey
Portugal	Taiwan	Sweden
South Korea	Netherlands	Ireland
Spain	Greece	Denmark
UK	Mexico	Columbia
Australia	Venezuela	Norway
	Cuba	Brazil
	Poland	Japan

Current Interfaces at NCAR

- Interfaces are based on WWW pages
- Three methods of access
  - Directly from the NCAR MSS
  - Download primary archive files (binary) and software
  - Request temporal and spatial subsets in ASCII or binary format using online forms

Characteristics of the subsetting process

- ## NOT real time
  - Typical turn around is less than 24 hours
  - Notification via email
- ## Delivery by WWW or FTP download
  - Data
  - Documentation
  - Software if applicable
  - Summary of request and log of process

ds540.0 - Comprehensive Ocean Atmosphere Data Set (COADS), Global Marine Surface Observations

Marine surface observations that define many aspects of the physical environment at the

USAGE:

Data Access Options

- For ASCII or binary temporal and spatial subsets use the **online data request forms**
- For the full global binary archive, **downloadable from this server** click on the "Data" file tab above.
- For file access from the NCAR MSS to NCAR computers click on the "MSS Files" file tab above.

wind force (speed)	visibility	wet bulb	dewpoint
cloud cover	ocean wave		

More variables are available. For more information see the "Data request ordering forms" or the "COADS project website".

TYPES:	oceanographic ◆ by ship stations
COVERAGE:	global coverage
COST:	Users with NCAR computing accounts have free access from the NCAR MSS. For other users data costs depend on the amount requested and delivery media used.
SOURCES:	National Climatic Data Center ◆ National Oceanographic Data Center ◆ US Navy
	NOAA's Pacific Marine Environmental Laboratory (PMEL) *Marine Environmental Data Service, of Canada (MEDS)* *Interamerican Tropical Tuna Commission (IATTC)* *All-Russian Research Institute for Hydrometeorological Information (RIHMI)*
RELATED SITES:	COADS project website. Here are more details concerning news, project description, available data

CONTACT: For assistance with this dataset, please contact *Steve Worley* (303-497-1248) . If the specialist is unavailable, please contact *Data Help* or call 303-497-1219.

RELATED DATASETS: ds540.1 - Comprehensive Ocean Atmosphere Data Set (COADS), Global Monthly Summaries

LMRF Archive Download

To use these data you need;

- Fortran language code **software** .
- LMR **documentation** .

NOTE : Some of the data files are relatively large (See table below). You may want to use FTP instead of your browser to manage the transfer.

Optional Contact Information.
If you wish to be notified about archive corrections, time series extensions, or general enhancements, fill in the information boxes below and then click on the [Submit Info.] button.
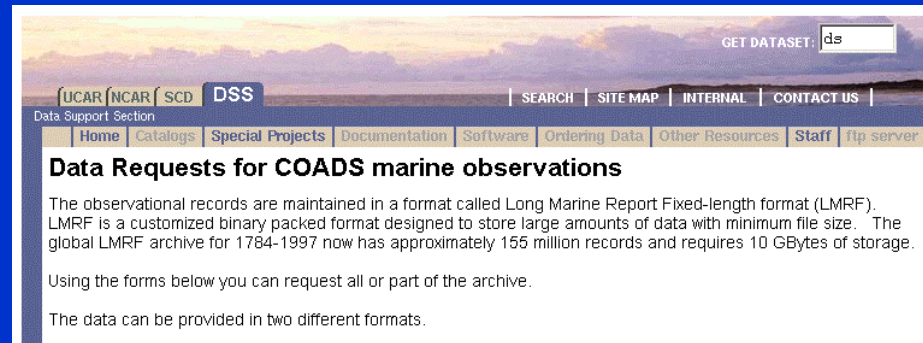
Name	Email Address		
		Submit Info.	Clear Info.

lmrf.1955.1959.tar	200.47	
lmrf.1960.1964.tar	242.93	
lmrf.1965.1969.tar	379.16	
lmrf.1970.1974.tar	384.31	
lmrf.1975.1979.tar	388.08	
lmrf.1980.1984.tar	489.09	
lmrf.1985.1989.tar	600.95	
lmrf.1990.1994.tar	568.90	
lmrf.1995.1997.tar	400.12	
Total Size	4558.14	

Subsets of Observations

- Binary (LMRF)

- ASCII

Data Requests for COADS marine observations

The observational records are maintained in a format called Long Marine Report Fixed-length format (LMRF). LMRF is a customized binary packed format designed to store large amounts of data with minimum file size. The global LMRF archive for 1784-1997 now has approximately 155 million records and requires 10 GBytes of storage.

Using the forms below you can request all or part of the archive.

The data can be provided in two different formats.

The data can be provided in two different formats.

- **LMRF** format.   This is the most efficient way to handle the data.   All data fields and quality control options are included in each record.   Along with the data we supply FORTRAN code programs that read the data, it therefore, requires you have a FORTRAN compiler and a little experience working with programming languages.
- **ASCII** format.   This format has one observation per line in the output files with data fields in fixed width columns. Data fields, quality control, and filtering options are selected at the time the request is made and applied when the subset is created.

NOTE: **ASCII** formatted data files will be *significantly* larger than the equivalent **LMRF** formatted files.

Select LMRF or ASCII output format

- LMRF format
- ASCII format

LMRF Data Request

Adjust the pre-assigned fields as necessary. They are seeded with the minimum and maximum allowable limits. All other

Information We Need to Contact You

[   ] **Email Address**

[   ] **Telephone Number**

[   ] **Your Name**

Your Office/Business Postal Mail Address

[text area]

Comments and/or questions (optional)

[text area]

- ○ *Return to COADS Data Products Online Ordering*
- ○ *Return to the COADS Website*
- ○ *Return to the COADS Data and Metadata Page*
- ○ *Send Email and/or Questions about COADS Data Products*

Document maintained by Steve Worley (NCAR), worley@ucar.edu
Last updated: 13 March, 2001

☐	b10	10 degree box number	☑	yr	year	☑	mo	month
☑	dy	day	☑	hr	hour	☐	ti	time indicator
☑	lon	longitude	☑	lat	latitude	☐	li	lat/lon indicator
☑	dck	deck	☑	sid	source id	☑	pt	platform type
☐	qi	quality indicator (unused)	☐	ds	duplicate status	☐	dc	duplicate check
☐	tc	track check (unused)	☐	pb	pressure bias (unused)	☐	di	wind direction indicator
☐	d	wind direction	☐	wi	wind speed indicator	☐	w	wind speed
☐	vi	visibiliy indicator	☐	vv	visibility	☐	ww	present weather
☐	w1	past weather	☐	w2	2nd past weather	☐	slp	sea level pressure
☐	t1	temperature indicator	☐	at	air temperature	☐	wbt	wet bulb temperature
☐	dpt	dew point temperature	☐	sst	sea surface temperature	☐	si	sst method indicator
☐	n	total cloud amount	☐	nh	lower cloud amount	☐	cl	low cloud type
☐	hi	cloud height indicator	☐	h	cloud height	☐	cm	middle cloud type
☐	ch	high cloud type	☐	wd	wave direction	☐	wp	wave period
☐	wh	wave height	☐	sd	swell direction	☐	sp	swell period
☐	sh	swell height	☐	c1	country code	☐	c2	2nd country code
☐	sc	ship course	☐	ss	ship speed	☐	a	barometric tendency
☐	ppp	amt. of SLP change	☐	is	ice accretion	☐	es	ice thickness
☐	rs	ice accretion rate	☐	ii	ship ID indicator	☐	id	ship ID, call sign
☐	os	observation source	☐	op	observation platform	☐	t2	2nd temperature indicator
☐	ix	stn/weather indicator	☐	wx	wave period indicator	☐	sx	swell period indicator
☐	ird	IMM receipt date	☐	a6	allowance 6 flag			

Sample LMRF ASCII output

date/time	location	dck/sid/pt	wind	slp	sst

```
1990  1  1  0.0 294.30  41.60 732 57   5 160  13.0 1018.6   10.0
1990  1  1  0.0 295.30  43.70 892 29   5 130  10.3 1013.0 -999.9
1990  1  1  3.0 290.50  40.50 883 50   6 180  14.9 1006.7    4.8
1990  1  1  3.0 293.40  41.10 883 50   6 191   9.2 1010.2    6.2
1990  1  1  4.0 290.07  42.55 780 89  12 -99 -99.9 -999.9    5.4
1990  1  1  6.0 290.50  40.50 883 50   6 208  12.2 1002.8    5.1
1990  1  1  6.0 293.20  44.10 888 79   5 220  17.0 1000.0 -999.9
1990  1  1  6.0 293.40  41.10 883 50   6 193  14.1 1005.5    9.7
1990  1  1  6.0 295.50  42.60 888 79   5 200  13.0 1008.5    9.0
1990  1  1  6.0 290.53  42.62 780 89  12 -99 -99.9 -999.9    5.8
1990  1  1  8.0 291.02  42.72 780 89  12 -99 -99.9 -999.9    5.9
1990  1  1  9.0 290.50  40.50 883 50   6 213  15.6  997.6    5.1
1990  1  1  9.0 293.40  41.10 883 50   6 194  12.4 1001.5    6.4
```

Subset to global size?

- For a short simple record like above

  - 155 million ASCII records

  - In compressed form the size is 1.7 GB

MSG Access

- Follows the same pattern as LMRF
    - Choose binary archive if desired
    - Select temporal or spatial subsets
    - Select 2° or 1° resolution
    - Select *enhanced* or *standard* statistics
    - Select variable

MSG Variables

☐ **S**, Sea surface temperature	☐ **W**, Scalar wind
☐ **A**, Air temperature	☐ **U**, Wind U component
☐ **Q**, Specific humidity	☐ **V**, Wind V component
☐ **R**, Relative humidity	☐ **P**, Sea level pressure
☐ **C**, Total cloudiness	☐ **D**, D=S-A, Sea air temperature difference
☐ **X**, X=WU, psuedo-stress	☐ **E**, E=(S-A)W, temp. diff. × scalar wind
☐ **Y**, Y=WV, psuedo-stress	☐ **F**, $F=QS^1-Q$, Specific humidity difference
☐ **I**, I=UA, Sensible heat parameter	☐ **G**, G=FW, Evaporation parameter
☐ **J**, J=VA, Sensible heat parameter	☐ **M**, M=FU
☐ **K**, K=UQ, Latent heat parameter	☐ **N**, N=FV
☐ **L**, L=VQ, Latent heat parameter	☐ **$B1^2$**, $B1=W^3$
	☐ **B2**, $B2=W^3$

Sample MSG ASCII output

```
Variable name : S , description : sea surface temperature          0.01 @C, format(i5,2i4,2f7.1,i5,10f8.2)
 YEAR MON BSZ    BLO    BLA PID2      S1      S3      S5       M       N       S       D      HT       X       Y
 1990   1   1  296.0   45.0    0   -1.80   -1.80   -1.80   -1.80    1.00    0.00   30.00    1.00    0.80    0.90
 1990   1   1  297.0   45.0    0    0.00    0.00    0.00    0.00    1.00    0.00    6.00    1.00    0.70    0.90
 1990   1   1  298.0   45.0    0    0.18    1.00    3.00    1.67   11.00    1.99   12.00    0.40    0.70    0.20
 1990   1   1  299.0   45.0    0    0.00    1.00    3.00    1.58   22.00    2.06   14.00    0.50    0.60    0.30
 1990   1   1  300.0   45.0    0   -0.64    0.20    3.00    0.72   13.00    1.59   16.00    0.80    0.50    0.60
 1990   1   1  292.0   44.0    0    4.48    5.00    5.84    5.19    7.00    0.95   16.00    0.60    0.80    0.20
 1990   1   1  293.0   44.0    0    5.33    6.10    6.20    5.87   43.00    0.57   18.00    0.10    0.80    0.80
 1990   1   1  295.0   44.0    0    2.00    2.00    2.00    2.00    1.00    0.00    8.00    1.00    1.00    0.00
 1990   1   1  296.0   44.0    0    0.43    1.50    2.00    1.40   10.00    0.94   16.00    0.50    0.60    0.20
 1990   1   1  297.0   44.0    0    0.31    1.00    2.30    1.27   18.00    1.01   14.00    0.20    0.70    0.40
 1990   1   1  298.0   44.0    0    0.00    0.25    0.90    0.22   10.00    0.94   14.00    0.30    0.50    0.70
 1990   1   1  299.0   44.0    0   -0.11    0.55    1.06    0.40   10.00    1.09   16.00    0.60    0.50    0.60
 1990   1   1  300.0   44.0    0   -0.66    0.00    0.33   -0.18    5.00    0.99   16.00    0.00    0.50    0.80
 1990   1   1  290.0   43.0    0    4.40    5.60    6.71    5.58   13.00    1.08   22.00    0.40    0.60    0.20
```

Each line has all computed statistics

- S1   1/6 sextile (est. of M – 1S)
- S3   3/6 sextile (the median)
- S5   5/6 sextile (est. of M + 1S)
- M   mean
- N   number of observations
- S   standard deviation
- D   mean day-of-month of observations
- HT fraction of observations in daylight
- X   mean longitude of observations

Other access points for COADS data

- ## At CDC
  - Real time service for all MSG products
    - netCDF format
    - graphics and data subsets in netCDF
  - New, very recent
    - Real time access via LAS/Ferret/DODS to all MSG products
    - Many formats, graphics, and subsets
    - Roland will give the full story next

Other access points for COADS data

- ## At NCDC

  - Forthcoming, next 12 months or so

    - LAS/Ferret/DODS access to analyses based on COADS

      - First SST

    - Access to ASCII formatted observations based on GTS data stream.

      (extend formal COADS to near real-time)

Improved Service from NCAR/CDC/NCDC

- Better, single point, information center
  - Intuitive layout for users
  - Need to accommodate new methods and sources
  - Need clearer references to analyzed products from COADS
    - COADS project activities
    - Outside groups, e.g. various Kaplan analyses, work at JISAO, work at UK MET, work at FSU, and many others

Comprehensive Ocean-atmosphere Data Set (COADS)

Jump to: COADS Home
Search for: [   ] Go!
Search options...   Contact us   Privacy statement

CDC

Climate Diagnostics Center

NCAR

National Center for Atmospheric Research

NCDC

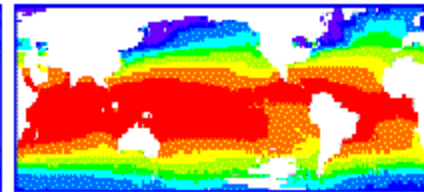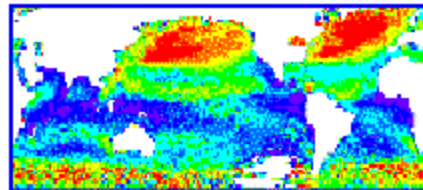National Climatic Data Center
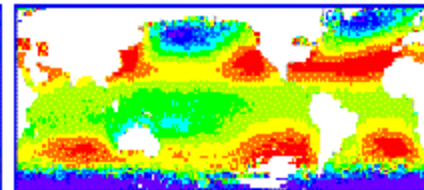
Search | Contact us | Site index
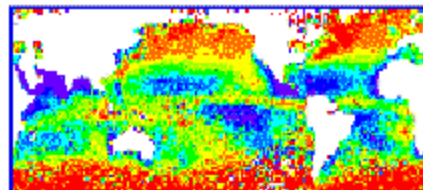Privacy | Disclaimer
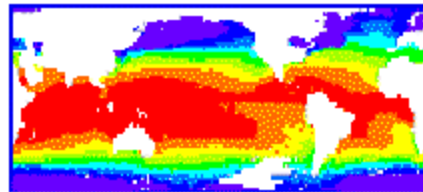
sea surface temperature

air temperature

wind

sea level pressure

cloudiness
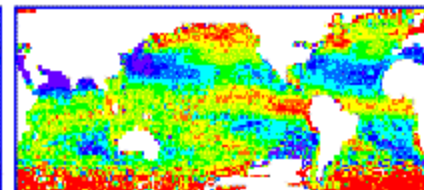
relative humidity

Chronology a

Project Des

COADS Data and Metadata

Contact Points

COADS Data

Documentation, Software, and Metadata

COADS data products fall into two basic categories:

- individual observations (surface marine reports from ships, buoys, etc.)
- monthly summary statistics for 2° latitude x 2° longitude boxes (and for 1°x1° boxes since 1960)

The current period of record is 1784-1997 (monthly summaries extend only back to 1800). The participating organizations offer a

National Center for Atmospheric Research (NCAR)

... ection (DSS).

Spatial and temporal subsetting is provided, if required, for both data products. ASCII data files can be made available for appropriately small monthly summary and observational data requests.

- Online Data Request Forms at the DSS

NOAA/Climate Diagnostics Center (CDC)

...ve Worley at NCAR/DSS.

... monthly summary statistics are stored on line in netCDF format.

- COADS netCDF monthly summaries
- NCEP Real-time Marine Data (1991-date) provide a continuation of some COADS products in near-real-time (updated monthly):
    - Individual observations (simple ascii format)
    - 2° monthly summaries:
        - netCDF (1991-)
        - simple ascii format (1998-)
- e-mail contact: cdcdata@cdc.noaa.gov

NOAA/National Climatic Data Center (NCDC):

Intuitive Layout for Users
Product and Service Organization

Observations

Monthly Summary Statistics

Analyses

F 2, Graphics, Near Real-time, etc

Help Sources

Metadata, Documentation, and Software

Why Bother?

- So the three centers can effectively serve the worldwide research community.

- Problem: Various version of COADS are available online, some are quite old and out of date. Scientist may not get our best collection. Impacts could be small or large?

IRI/LDEO Climate Data Library

http://ingrid.ldgo.columbia.edu/SOURCES/.COADS/

National Snow and Ice Data Center

http://www-nsidc.colorado.edu/data/docs/daac/nsidc0057_coads.gd.html

Texas A&M University

http://bass.tamu.edu/SOURCES/.TAMU/.COADS/.COADS_anomalies.cdf/

German – DKRZ

http://www.dkrz.de/forschung/project/iaods/coads.html

Commercial Ventures – EarthInfo

http://www.earthinfo.com/databases/gm.htm

Just a few examples:
• out of date collections
• advanced products based on old collections

Benefits of a centralized COADS information

- Users can find a variety of access methods and formats in one place
- A full set of support information and help is available
- The archives are current
  - Scientist worldwide have the best and same information

End

- Email: worley@ucar.edu

- COADS website:
  http://www.cdc.noaa.gov/coads/