Monthly Reports for Data Support, 1995 – 96

- Monthly Reports for 1995
- Reports for 1996
- DSS status, and plans for 1997, 98
- There are 25 items here and 56 pages

Roy Jenne
July 2002

Roy Jenne
23 July 2002

This has monthly reports and it has DSS plans for 1997 – 98.

There are about 25 items here and 54 pages, plus 2 pages in front.

1. Reports for 1995 (fairly short, 15 pages here)
   - During 1994 – 98 we were wildly busy to get the global observations to NCEP fast enough that they did not lose time on reanalysis production. We sent data in batches of about 10 years at a time.
   - There is information about climate assessment (Country Studies).
   - Comment on NCDC cards (page 3).
   - EOS research project with Bob Dickinson (page 5).
   - There are many separate reports about the data for reanalysis and the status of the projects.

2. Reports for 1996 (39 pages here)
   - Datasets updated during the month (page 2).
   - Most frequently accessed datasets on the Web in Jan 1996.
   - Visit China Sep 13 – 28 (page 18).
   - Trips in 1996, to Moscow (State Dept) May 96 (page 24).
     - This must have been written about Dec 1996.
   - Some review scores for Data Support (page 33).
   - DSS collaborations (page 39).
MONTHLY REPORTS

1995

BY ROY JENNE

DATA SUPPORT

- Some info for each month, Jan-Dec
- 15 pages here for 1995

SCD – NCAR
January 1995

MEETING OF THE SATELLITE PANEL (SAR data), Jan 9-10

I attended a meeting of the NRC CES panel in Irvine, Calif. The purpose of the meeting was to start a study to advise NASA on what sort of SAR radar missions to plan for. SAR can be used to measure sea ice drift (done now), derive motion of ice cap ice, obtain ocean currents, obtain biomass, etc. People at JPL will prepare some cost trade-off information for me. I prepared some information about data issues that need to be resolved.

JPL DATA PLANS, Jan 9

Frank Chrisey from JPL said that they had planned for a DAAC (data system) size of about 20 people, which would then decrease some in size after it was set up. The EOSDIS plan was that the size of JPL would grow to 90 people. Now the plan is for the JPL DAAC to grow to 30 or 35 people. A lot of effort will be required just to talk with the EOSDIS contractor. He said that "you (NCAR Data Support) are always used as the example of someone who can get a lot done with only 2 people." (True, but there's some exaggeration).

MEETING OF EPA AND ARGONNE COUNTRY STUDIES TEAM, Jan 12

About 15 of us met in Washington, DC, on Jan 12, to help coordinate the program and prepare for the workshop with 30 new countries in Hawaii in early Feb. The Country Studies program is popular in the government, but they are worried about future decisions by Congress. A few people do not like the idea of funding global change activities.

HOW GOOD ARE CLIMATE MODELS?

Congress asked for a GAO study to evaluate how good climate models are. In Oct 1994 a forum was held, chaired by Eric Barron. A text is now complete. It will soon be published, probably by OSTP.

TROUBLE IN THE NEW NWS OBSERVATIONS

A meeting was held at AMS-Dallas on Jan 15 to discuss the data problems. The measurement of Precipitation is the main problem, but there are others. In good weather conditions, the measured precip with the new equipment is about 5% low; in snow conditions it is about 30 to 40% low. All the top NWS brass were at the meeting in Dallas.

COUNTRY STUDIES

Jenne prepared a paper for the Feb 1995 workshop. It has updated information about climate model data, new plans for climate model runs and information about climate science to help users understand the data. About 30 new countries are attending this workshop to help start programs. In Feb 1994 the first 18 countries started.
February 1995

COUNTRY STUDIES

People from 30 countries attended this workshop in Hawaii to learn about how to use models for crop growth, forests, rivers, rangelands, etc. They also learned some about the climate models, and how to obtain model output for any part of the world. Dennis Joseph and I attended Jan 28 through Feb 6. I gave a talk about the climate models and led one of the workshops (with E. European countries) on how to extract desired data using software by D. Joseph. Dennis gave a talk and led the workshop of African countries.

INTER AMERICAN PROGRAM

On Feb 9 I gave a talk about data policy and data exchange possibilities for interamerican work. It was good to see some of the people who I met earlier in Uruguay. What we need are easy ways to exchange data. I fear that the people who like systems will define difficult methods that will hamper any data exchange.

GCIP-GEWEX

to find info

I went to meetings on Feb 22-23 in Boulder about data for GCIP. I gave a talk about the status of the Eta model data and used about 3.5 days on this topic. I'm trying to sort out the status of Eta and the plans. Not done yet.

DATASET OF WORLD RAOB DATA

On Feb 28 I was part of a conference call about raobs. We are preparing them for reanalysis. NCDC has a CARDS project. They have been getting about $1M a year for the project, from DOE. Money runs freely and people use expensive methods. Their software has problems. DOE will quit funding them. They want me to be part of a big project to help justify NOAA funds ($0.5M available). I will try to duck. They have not been good to work with.

OTHER

I attended the ARG meeting on Feb 21.

March 1995

TRIP TO GODDARD AND NMC, MARCH 5-9

NASA had a workshop to discuss their reanalysis (1985-90) on March 6-8. there were a lot of papers to compare reanalyses with each other and with other observations. I gave a talk about data inputs, and the status of the output files. A short 3-page version will be printed. I also
visited NMC for a day to talk about reanalysis and about the mesoscale Eta model.

PROBLEMS WITH SSMI WINDS IN NMC/NCAR REANALYSIS

We have known for some time that when SSMI ocean surface winds became available starting July 1987, they seemed to cause a "climate jump" in some reanalysis variables. On March 7, NMC found that the speed seemed to be biased about 2.0 m/sec high because of a confusion between an antenna temperature and a brightness temperature. It will take 2 months to sort out a cure; in the meantime, NMC will do 1982-84 and NCAR will quickly send the data for those years. Later, Jul 1987 to Dec 1991 4.5 years) will be done again. On March 24, I contacted the main expert on SSMI (Wentz) and made two pages of updated notes on what data are available.

GETTING READY FOR MESOSCALE Eta ARCHIVES

On Feb 17 I wrote a draft paper about Eta with updated model and data volume information. The volumes are getting alrge and some of the NMC plans are changing. NMC requested that I visit to sort out the issues and firm up plans. (I did visit NMC on Mar 9.) NCAR has Eta data for summer 1994, and the new flood of data will start May 1995. A text is available. In March I spent about 3 days on the new text.

CAN NASA SAVE MONEY ON INFRASTRUCTURE AND FACILITIES?

Joe King (Goddard) told me (on March 8) that NASA is trying to evaluate whether they can save enough money on the cost of infrastructure that they can keep the main projects going, even though budgets are reduced. What should be contracted out? How can money be saved? The facilities include functions like data centers, computing, libraries, communications, etc. Joe is head of the Space Science Data Center. He asked what I thought the core functions of a data center should be. I think it is possible to define core functions and roughly how to constrain costs. Cost comparisons are needed in the U.S. and Europe.

SEND NMC THE DATA FOR 1982-84 QUICKLY

On Friday 10 March, four of us at NCAR met to more precisely describe what data to send NMC. By 23 March, NMC had a total of 14 years of data (1981-94) from us, plus a few parts of the earlier data.

THE U.S.-RUSSIA BILATERAL

Gus Shumbera visited (from NCDC) on March 27 to talk about this program. Two of us will visit Russia about July 8-15 to plan next year's program. The USGS is preparing river flow data for us.
NEW ISCCP PRODUCTS (clouds and radiation)

I got new information from Rossow at Goddard Institute in New York and wrote text on the status of these (clouds and radiation) data (dated March 13).

USE DRONE AIRCRAFT (March 28)

Kuettner called about a possible project to measure things using drone aircraft at 60,000 feet, at 100 locations around the world. But they can't stand winds over 150 knots. He wanted probability statistics about high winds. We have atlases and datasets that would help, but some processing would be needed.

OUR EOS RESEARCH PROJECT (Dickinson project)

I have prepared several items for our project (has about 20 PIs). These were sent to Arizona.

• List of data that would help our pilot research project

• Update of my science plans to March 1995

• Update of timeline for the project

• Brief answers to their 25 questions about plans and progress

• Plans on data flows are poor. Wrote a text "The Big Problems of Using Huge Datasets." Now members of our project say we want 1000 Gbytes of data per day, and will give back 300 Gbytes of products. The planning has been handwaving so far. I showed the text to Sloan and Harano.

• I prepared a list of steps that are needed to help figure out how to handle the EOS data.

• Our needs for this project are to (1) constrain data volume where possible (formats, sampling, compression) and (2) to handle the necessary data flow at good costs.

TRENDS THAT MAKE DATA ACCESS HARDER

In the U.S. (and in UCAR) there are some trends that will make data access harder. Planners do not seem to know or care. I wrote two texts to help clarify these issues. These issues are a drain on my time that impacts reanalysis, GEWEX, and climate assessment studies.
April 1995

REANALYSIS--NOW GOING QUICKLY AGAIN

Reanalysis was stopped in mid Feb 1995 because of a problem with ship dew point (quickly fixed) and a worse problem with SSMI data (ocean surface winds biased high). The SSMI problem could have been fixed, but we decided not to use SSMI. This means that analyses for Jul 1987 - Dec 1981 had to be done again. Part of this has been done. We now have 5 years of good data (only 2.5 years at NCAR) and should have 13 years by Dec 1995.

I have a new status document for reanalysis. Also, we will soon send satellite VTPR sounder data to NMC (1972-79).

USE REANALYSIS WINDS FOR OCEAN MODEL

Bill Large told me (Apr 26) that they have used reanalysis winds to drive a new ocean model, and the output looks very good.

OLD SURFACE SYNOPSIS DATA

For reanalysis, we still need to prepare surface synoptic data for early years. Roy Barnes has much of the work done for TD13 (~1947-71). Ilana has the set for 1967-80. Perhaps these can be sent to NMC in Jul-Aug 1995.

NMC MESOSCALE ETA MODEL

This has been a lot of work on text, conference calls, etc. NMC did start the new archives on Apr 1. About 7 Gbytes per month.

DICKINSON IDS FOR EOS

Our interdisciplinary project is having a meeting in mid May. The main issues are what projects our section will accomplish for EOS and how much EOS data our team will work with. In fall 1994, our IDS said we wanted 1000 Gbytes/day and would give back 300/day. I do not think that these numbers are at all well thought out. To try to resolve the issues I have prepared several texts for the IDS about data storage technology, advances in computing, and the overall data problem. The Arizona crew especially liked the one about storage because they are getting equipment.

In early May they got a library with arms that hold 40 Exabyte tapes and has 2 drives (cost $30,000).

In April, some texts were written for the EOS project and for other reasons:

- "Some Data Storage Options"
• "Some Comparisons of Fast Computer CPUs"

• "Information about the Speed of PCs"

• "CD-ROM Drives, Cost and New Types"

• "Data and Technology Issues for Large Datasets, Some Papers"

• "User Access to Large Datasets from NCAR"

• Plus other texts

MEETING WITH EOSDIS CORE

EOSDIS held a meeting in Boulder on Apr 25. About 30 people were there from NGDC, ice and snow DAAC, and others. Jenne attended and gave a 5-minute talk about big datasets. They got me some revised numbers about the data expected, but I need some more.

On Apr 26, two visitors from EOSDIS core (Lori Tyahla and Celeste Jarvis) talked with Jenne and Joseph about what data people want and what the patterns are for data use.

CLIMATE MODEL COMPARISONS

Peter Whetton is from Australia. He has a group called "Climate Impacts and Greenhouse Effect" group. He gave a seminar on Apr 20. He talked with me on Apr 21, and got some more model data from us. They have both 1x, 2x and transient model runs made in Australia. In several months we should obtain data from their model.

He showed helpful comparisons of several models.

OTHER

I am on an ARG subgroup that met Apr 24. Philip Armstrong visited from California on Apr 17 to talk about a computer he wants to build for doing fast sorts. He is trying to get $5000 from us to do it. He first talked to Bert Semptner in Monterey. Interesting, but it is just not worth it for us. We achieve speed and low cost with clever software.
May 1995

EARTH LOOKING SATELLITES (May 1-3)

Attended a NAS meeting of the Committee on Earth Studies (CES) panel in Washington, DC. We were briefed on NASA plans, NOAA plans, and the work to do more merging of satellite programs. People from several countries were there to discuss their SAR sensor plans. I have many briefing slides.

THE DICKINSON EOS GROUP

We met May 10-11 in Boulder. There are about 20 PIs in our group. I gave two talks, one about really big datasets and why we need to think twice before asking for 1000 Gbytes a day. Plus how certain technical approaches can handle some rather large datasets. I also gave another talk about our own science plans.

REANALYSIS

On May 30 NMC started reanalysis for Nov 1991. This means that they have done Jan 1985 to Oct 1991 (6.8 years) plus an earlier 6 months in 1982. On May 25 NCAR received the data for 1990 (we now have 6 years). Dennis and Chi-Fan checked the online version of the reanalysis CD-ROM at NMC.

US, RUSSIAN MONTHLY RIVER DATA

We are in the process of exchanging data for about 300 rivers in each country. River data in Russia has been sensitive. In some cases the U.S. has been slow. After about 8 years of work we may finally accomplish this. Three cheers.

GCIP

The process is continuing to define reduced sets of archives for the surface and atmosphere.

TOGA COARE MEETING (May 19)

The TOGA COARE project will close in Sep 1996. We met to talk about organizing the data and metadata so that it can be easily transferred to Data Support and so that it will survive for 50 years or more. This is possible.

A whole philosophy of how to package data (like a book) is needed. My work with NAS and the National Archives has helped this thinking.

RAWINSONDE DATA

We have to prepare a lot of older rawinsonde data for reanalysis. I finally got more done on two texts that outline many of the issues and problems.
CORE MEETING, WASHINGTON, DC (May 22-23)

The ocean community is trying to pull together a 10-year plan for key activities.

CLIMATE ASSESSMENT MEETING (May 24)

A meeting about climate assessment scenarios was held in Palo Alto, Calif. IPCC-2 in Washington, DC, had some trouble with scenario planning. Therefore, this meeting was held to help plan for 1998 assessments. I gave a talk about our involvement in assessment studies since 1987. I also attended a MECCA meeting at Stanford. Gates talked on AMIP, Henderson-Sellers on MECCA, Steve Schneider on climate. Ann said their rule was no common formats.

OTHER

A long ARG meeting was held on May 12. On May 24, at Stanford, I was told that the paleo modelers may talk to the UCAR trustees. In late May there were organizational changes in SCD, and some staff changes in SCD. At the national level, there are lots of budget arguments.

CANADIAN BUDGET PROBLEMS

Bill Burrows at AES, Canada sent a message to Dennis about data. He said "We're having one-third of Environment Canada laid off over the next 2 years. ... It hasn't been much fun around here! I'm okay myself, though." Bill was a grad student at CSU, and has now been back to Canada for several years.

June 1995

NMC Eta MODEL ARCHIVES

NMC started saving the new Eta on April 1. NCAR had not received any of the data by June 15. In May-June we defined a reduced output from each of three models. The total Eta archive will be about 7 Gbytes a month; the reduced Eta archive will have about 450 MB per month.

GET READY FOR THE JULY GLOBAL CHANGE MEETINGS

The NRC is having a major meeting July 19-28 to review global change and EOS issues. I am preparing more information about how to scale costs. A number of people in NASA and in Congress are gunning for EOS and EOSDIS now, according to Mahlman at GFDL.
OLD RAOBS

I now have two texts I put together about old raobs, and sent them off (June 12) to Dick Davis at Asheville, so we can keep trying to put the old data in good shape. On June 8 I also talked with the USAF people on this subject. This data for reanalysis is still not as far along as I would like.

SHUKLA NEEDS SSMI MICROWAVE INFORMATION

About June 9 we sent Shukla three texts and a letter about microwave data. I feel okay that we left the SSMI data for ocean winds (Jul 1987-on) out of reanalysis on this pass.

WHAT DO NASA EOSDIS USERS WANT?

NASA is studying this question. I have contributed text to two of the writing groups. One group is chaired by Prather in Calif., the others by Rosswat at GISS in New York. On June 12, Mahlman said he asked his staff how much storage they needed and got an answer that was 10 times more than they can afford, or that is reasonable and necessary. This was his example of how there are many requests that can't be treated in a literal way.

HYDROLOGY MEETING, Washington, DC (June 15-16)

What should NASA do about hydrology? Bretherton and others have been drafting a document for NASA, that outlines what needs to be done for the science of hydrology. We met to review the document and fill in missing parts.

EOSDIS NEWS (June 15)

I was at a meeting for NASA hydrology and had lunch with Ricky Rood, who is head of reanalysis at Goddard. He said that they think the MTPE (EOS plus other things) budget is down about 20% from where it was. He says the present idea is to take much of the cuts out of EOSDIS. Part of this is news and part is consistent with other things I have heard.

FORMAT FOR INCH SCATTER RADAR DATA

The format issue has been brewing strongly in this community of users during May-Jun 1995. Should the data be changed to NetCDF? We provided some information. When the chair found out (from elsewhere) that NetCDF can't handle variable length formats, the issue went away. A format that cannot handle variable length is not useful for this upper atmospheric radar data.

OTHER

On Vacation June 19-28. Several NOAA people were here on June 29 (Greg Withee, Bob Winocaur (sp?), etc.). Karen Labitzke is here from Berlin. She says we can get updates of her grids. We received the river data from Russia; three cheers; we have been trying to get it for about 8 years. The U.S. sent our river data.
July 1995

TRIP TO RUSSIA, DATA EXCHANGE (July 8-16)

I went to Obninsk, near Moscow, to plan for the US-Russia data exchange for 1996. A document is available that has the list of accomplishments and all of the plans. The recent "big deal" was that we exchanged monthly data for about 300 rivers in each country. We have been working on this for 7-10 years. On the plane I prepared a new summary of the data that the US has received from Russia over the last 5 years. I also have another set of notes about this trip, as well as the original notes.

REVIEW OF US GLOBAL CHANGE (July 19-28)

Congress (Chairman Walker in the House) asked the government for an NRC review of the US GCRP programs, with special emphasis on EOS and EOSDIS. This review was held at Scripps. There was discussion about whether the observations reflect what is most needed. I believe that the recommendations will look good enough to continue EOS. The EOSDIS program will be changed a lot. The group told NASA that it was costing too much money. John Dutton gave comparisons with other budgets and said that "No one understands the budget." It was a busy meeting. I was in the subpanel about climate for decades to centuries. Then I was in the panel about data.

Note on Aug 9: The follow-ups to the normal data mess have been devouring my time.

PROPOSAL FOR GCIP MODEL DATA

This proposal went in about Aug 8.

August 1995

GCIP PROGRAM MEETING, AUG 10-11

On Aug 10-11 there was a meeting of about 40 of us in Boulder about this GEWEX experiment. Another long-term phase of data gathering will start 1 Oct 1995. This was productive for me. I got a lot of information about the FSL model and wrote it up. The volume is rather high and that scares me. Plus, we do not have time to fit this in very well.
CES PANEL MEETING, AUG 21-23

On Aug 21-23 I attended a meeting (in Washington, DC) of the NRC panel on earth-looking satellites. People from NASA and NOAA gave their usual reports on the status of satellite plans, etc. Two people from GAO also sat in on part of the meetings. For 8 months, several groups have presented us with lots of information about possible SAR radar missions.

STATUS REPORT ON REANALYSIS

I did a lot of work to gather information about the status of reanalysis. It will be a tight schedule to keep ahead of NMC over the next 10 months or so. There is an awful lot of work to do. This report talks a lot about many datasets, but does not include all of them. At the end of Aug, I learned that we have a new type problem in reanalysis: local surface temperatures that are too hot and a bad wind calculation at the poles.

September 1995

FIRST SNOW AT NCAR (Sep 20)

From 2-4 pm there were big flakes. An accumulation of 1.6 inches was on the car at 6 pm. Then 6 inches more fell during the night. NCAR closed on Sep 21. On Sep 22, trees were very pretty, and there was blue sky. Lots of damage to trees.

TRIP TO OAK RIDGE, Sep 11-14

I attended the GCDIS data centers workshop, Sep 12-14. It included some talks about metadata standards. People are now talking about content standards, rather than format standards. They said that any formats can come later. However, some of their main standards had around 300 items for questions for a dataset. These groups make everything way too complicated. And such rules impact PIs and decrease the useful information that will be gathered.

A PROBLEM IN MIND, Sep 7, 8

A problem in surface modeling formulation in reanalysis was found in late Aug. It can give max temps of 50 degrees C over the Amazon, etc. the mood has been to keep the code as it is for consistency. I argued (7, 8 Sep) that we should fix it!

US-RUSSIA WG-VIII MEETING, Sep 6

On Sep 5-6 I went to a meeting of the US side of WG-VIII. There have been politics with the program; a key meeting with Russia in Oct that was to be in the US was cancelled. It turned out that at the Gore level, it was expected that the meeting would go on. This trip was an interagency meeting on Sep 6 to decide on the future of WG-VIII and how it interfaces with the
other Gore group. WG-VIII is definitely needed. Most of the projects (including our data) could not have been done without the government agreements.

October 1995

UCAR MEMBERS MEETING AT NCAR

It was good to have a chance to talk with a number of members from universities who were here Oct 9-11. Dick Halgren, head of AMS, referred to the NRC review of EOS and EOSDIS at Scripps in July, and said to me something like "What did you guys do at Scripps? You probably killed the program."

CLIMATE DIAGNOSTICS MEETING, SEATTLE, Oct 23-27

I attended the meeting and gave a poster about the output from reanalysis. There were also some papers about different reanalyses (three of them) and comparisons of selected outputs. I also found out about several datasets under development that we should have (especially new ones on world precipitation).

I have done a lot of work to develop the document "Status of Reanalysis," Oct 1995. It is mostly about the NMC/NCAR project but includes information about ECMWF, Goddard, and COLA projects. Copies were available in mid Oct 1995, and it is online.

DOCUMENT ABOUT EOSDIS AND GCDIS

I do not consider the advice from NRC Scripps (Jul 1995) as good as it should have been. NASA is very stirred up. I have put together a hefty document "National Data Systems and EOSDIS," Oct 1995. We started sending it to several people about Oct 30. Copies were sent to NSIDC, Goddard DAAC (about 20 copies), payload panel (Abbott), EOSDIS panel (Glover), Rood and Barkstrom (costs), and a few at NCAR.

There are several things in this NRC advice and national plans that could stir up all national data systems. I am trying to get enough thinking done and words written to head off problems. Who knows what will happen?

DATA FORMAT USE AT GODDARD

The official format to use is HDF. People realize that when a CD-ROM is prepared for international use, an easier format is needed. They just prepared some CD-ROMs--and used flat files.

Blanch Meesam at Goddard just surveyed users and asked what formats they want. The reply was simple flat files (binary or ASCII).
OTHER

- Got some slides developed for possible use at the SCD retreat. Dennis, Steve and Ilana will do most of this preparation.

- There was a GCIP meeting in Minnesota. I didn't go, but I will handle the necessary inputs by communicating with John Leese.

- Reviews: I got four things to review in early October. By Nov 10, three of them were done.

MOVED OLD DOCUMENTS ONTO THE MSS

All UNIX files for Jul 1987 to Nov 1993 (with one file from May 1980).

- These files are easy to access.

- There is good security for these files on MSS.

- There is a 2-year retention period. A notice via email will be sent to the admin support person of Data Support mid Oct 1997. Then a determination can be made about future retention possibilities for these files.

November 1995

Reanalysis Project

NMC is getting through the bad period of computer changes, hardware problems, and system software problems. NMC wants more of the older raobs than we have given them so that they can start figuring out what radiation corrections should be made on the data. We held meetings to decide what datasets can be sent quickly. There is a lot of work to be done. Overall, the project is going well.

- See "Notes on Reanalysis," 1 Dec 1995 (3 pages)

Working Group VIII and Goddard DAAC Meetings, Nov 1 and Nov 2-3

Changes are happening in the U.S.-Russia Working Group VIII bilateral. There was a meeting in Washington on Nov 1 to make plans. On Nov 21 we got information on new initiatives to Renee Tatusko for a meeting with the State Department. This research exchange will be kept separate from a related exchange program headed by Al Gore.
The annual panel meeting of the Goddard DAAC was useful. They now realize that they have trouble with ease-of-use of the HDF format. In late Nov, I found that another DAAC (SNIDC) is having similar big problems. I have short documents about these problems. SNIDC will stop sending HDF to users unless it can be made simpler.

CES Meeting, Washington, DC, Nov 15-17

I have been on the CES satellite committee of NRC starting Jun 1993. First we made a report covering lots of satellites. Then we considered the various uses of SAR radar sensors. During Nov 1995 - Aug 1996 we will be making a study of small satellites. During the meeting, Nov 15-17, we had 2 days of solid briefings about small satellites (including Clementine) and about how to make sensors smaller, lighter, and cheaper.

USRA Meetings in Huntsville, AL, Nov 20-21

USRA is a relationship between universities and NASA to accomplish research. There is an emphasis on post docs. I am on the panel. This also involves the NASA Marshall DAAC. USRA obtains salary information for the community as does UCAR. I have a summary of their information.

The Marshall DAAC is doing a good job. The NASA intention is now to stop their funding in about 15 months. Perhaps they can apply for a grant to provide data services??

U.S. Data Planning Trouble

My time is still being impacted by the confusion in NASA following the NRC Scripps review of Jul 1995. The Scripps EOSDIS was a missed opportunity to get the data planning right and less costly. As of Dec 1, it appears that the NASA response to NRC may be constructive. Kennel, NASA, met with the Payload Panel for a solid 2 days in late Nov.

December 1995

Meeting of IAI in Chile (Dec 3-9)

I attended a workshop near Santiago, Chile, Dec 5-7. The workshop mostly had scientific presentations on global change issues: El Nino related to temperature, precipitation, and river flow; paleo observations, the observing networks, etc. I gave a paper about what data we could provide and what data should be gathered together. The last afternoon there were workshops on observations and on the preparation of data plans. I was a co-chair of the one on data. We have a set of slides of recommendations. There will be a report from the meeting.
MONTHLY REPORTS

1996

BY ROY JENNE

DATA SUPPORT

SCD – NCAR

Does not include Dec 1996 Report.
Date: Tue, 4 Mar 1997 15:16:36 -0700 (MST)
From: dnovak (Debby Novak)
To: dnovak

DATA SUPPORT SECTION

Monthly Status Report
January 1996

Dataset Updates, Additions, and Requests

Data sets updated during the month and the most current dates available are:

NMC Global grid data through Dec 1995.
NMC 65x65 grid data through Dec 1995.
NMC ADP upper air data through 20 Jan 1996.
NMC ADP upper air split data through 31 Dec 1995.
NMC ADP surface data through 20 Jan 1996.
CPC summary of day/month updated through Jun95. (ds512.0)
NMC LFM (ds069.0) data through November 30, 1995.
NMC NGM (ds069.5) data through December 04, 1995.
TDL U.S. and Canadian Surface Hourlies (ds472.0)
data through August, 1995.
NMC Medium Range Forecast 10 day forecasts, 31 Oct 1995
NMC Medium Range Forecast sigma level analyses, 31 Oct 1995
ECMWF TOGA Global Surface and upper air analyses, 31 Dec 1995
ECMWF TOGA Global monthly analyses, DSS derived, Dec 1995

There were 25 formal orders completed during January. Of these, 15 were
delivered via ftp and 6 billed on credit cards. Consulting load for datamhelp
and direct staff contacts continues to be heavy, partially due to the addi-
tional exposure from the web.

General Archive Activity

Chi-Fan enhanced our GRIB decode library by adding GRIB decoders for
IBM/RS6000 and DEC/Alpha systems.

CD-ROM

The NMC GRID CD-ROM version III should be released in March. The
University of Washington is putting the finishing touches on the documenta-
tion.

Unidata

The SCD contract with Alden for receipt of data by satellite broadcast
has been extended to allow more time for IITAA to get up and running with
their realtime data receipt. Most systems operated normally during January.

Incoherent Scatter Radar Project (Barnes)

The month was spent updating the database using the new inventory
software. In addition to replacing all Arecibo data, all of Goose Bay
required editing. Problems with all Halley Bay Magnetic Local Time parameter
values were isolated and reported to British Antarctic Survey. Subsequent interaction isolated the bug; replacement data are forthcoming. All indices sets were updated and Sondrestrom was brought up to Aug 95. Two new HF radar sites data were added in support of HAO personnel campaign studies. This constitutes a major update, involving replacement or addition of 101 vsns.

Reanalysis Project

Several DSS staff spend most of their time in January working on data preparation for Reanalysis. Bob Dattore is working on several special upperair sets including TWERLE (balloon) winds, Russian Raobs, GATE data, and special aircraft sets. Joey Commeaux has been working on station libraries, USAF surface decode data, and pre-1973 upper air data. Will Spanger has been working on special raob sets including the TDS4 upper air data. Gregg Walters has spent considerable effort in trying to clean up the Russian Ice Island raob dataset (1954-1986). This set has numerous location errors.

Chi-Fan continues to handle all incoming NCEP Reanalysis products. All data of 1982, 1984, 1985-1993 are now on line. The data for 1983 (total of 144) cartridges arrived in January. and imports began on January 23, 1996. Chi-Fan continues to revise the reanalysis web pages to be posted in late January.

A CDOM of selected reanalysis products will be distributed with the March or April editions of the Bulletin of the American Meteorological Society. A first release of this CDROM was evaluated by Chi-Fan.

DSS Online Information Area

The Data Support Section home page was accessed 1855 times during the month of January. The dataset information page was accessed 1109 times.

Each dataset has a hypertext information file on the WWW machine, which points to the files in its ftp directory on ncardata. The most frequently used datasets, from WWW access statistics:

80 accesses ds754.0 U.S. Navy Global Elevation Data, 10-Min
73 accesses ds090.0 NMC Global Reanalysis Analys, 6-hrly
68 accesses ds111.2 ECMWF TOGA Global Sfc & Upper Air Analys
60 accesses ds570.0 World Monthly Sfc Station Climatology
57 accesses ds085.1 N.Hemis 72x19 Tropo Analys, monthly 1947Apr-con
55 accesses ds111.1 ECMWF TOGA Global Sfc Analys
55 accesses ds111.0 ECMWF TOGA Global Upper Air Analys
53 accesses ds082.0 NMC Global Tropo Analys
44 accesses ds277.0 Reynolds’ NMC CAC Sea Sfc Temp Analys, monthly
42 accesses ds765.0 Matthew’s GISS Global Vegetation, Land-use, & Albedo
42 accesses ds750.1 Rand’s Global Elevation & Depth Data

A total of 55569 retrievals of files on the ncardata.ucar.edu anonymous ftp machine were made during January, some via the WWW pages and some directly. The most frequently retrieved MASTER file was that for ds111.1 with 48 accesses from 23 different machines/users.
Comments by Roy Jenne

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NCEP Needs Observations for Reanalysis for 1968-77
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By about Feb 20, NCEP will be finished making analyses for 1979-95 (17 years). They badly need earlier data for the next batch of years, starting 1968. We prepared a text that summarizes many datasets, and gives an estimate of when we can get them to NCEP. ("Status of Observations for Reanalyses," dated 7 Jan 1996, 17 pages).

The text required a side study of the gaps in VTPR satellite data for 1972-79. We can fill these gaps.

We are very busy finishing preparation of many datasets, and putting the final report header information on even more datasets so that they can be sent.

Volume of Data sets in DSS, Especially Analyses and Satellite Data
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The datasets of analyses and observations from NCEP and ECMWF now add up to about 826 Gbytes. This will increase to about 2960 Gbytes when we have all the reanalysis data. About five sets of satellite data in DSS now add up to about 3300 Gbytes. The total volume for DSS is now 5.95 Tbytes (24 Jan 1996). We have a 3-page text about the data volume.

Save Data from Three Mesoscale Models
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We are the Model Data Center for the GCIP program. It is a complex set of model data. NCAR will start getting much data during Mar to Jun 1996. A main experiment period starts 1 Apr 1996. The volume will be about 240 Gbytes per year. John Leese arranged a conference call (2 hours) on Jan 11. Included were Leese, Jenne, and the experts for the three model groups (NCEP, FSL, and Canada).

Delays in Obtaining ECMWF Analysis Data
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NCAR has not received any operational analyses from ECMWF for 1995. We had been getting data every 6 months. They have proposed to drop our half-price deal, but they ask about possible data exchanges to justify a low price. We also have a problem in obtaining the reanalysis data from ECMWF. At normal prices it would cost $840,000. On Dec 15, 1995, I sent a letter to ECMWF proposing that we send a lot of data that they would need for more years of reanalysis, and that they ship us their outputs at no charge (copies to Buzbee and Serafin). ECMWF indicates that they may respond around the end of January.

Dave Burridge, head of ECMWF, will visit NCAR on Apr 26 and will visit Jenne then.
Comments by Roy Jenne

1. GCIP data meeting (our model data)

I needed to gather more information about the status of data from the three mesoscale models. The situation is still in flux, but it is settling down. I got most of what I needed for the GCIP meeting in Asheville (trip Feb 6-10).

The NASA Marshall DAAC was taking care of some of the needed satellite data for GCIP. It appears that they will be closed out as a DAAC. But they hope to continue with data and be less systems oriented.

2. Need old datasets for reanalysis

I have been worried that there are two or three old datasets that would help reanalysis. I've been trying to get them from USAF-Asheville for 3 or 4 years without success. I spent 1.5 days with Dick Davis and we worked out some agreements on ways to help each other without a lot of money being necessary.

I felt very relieved. Dick will send about 230 tapes of foreign winds aloft data within a few days.

3. Funds for data projects given by NOAA

The NOAA Climate and Global Change Office funds data projects in three categories, including the preparation of data and data access. The overall funds have been cut. At Asheville Tom Karl talked with me about priorities. He manages the funds. He wants to put a very low emphasis on data access because a lot of efforts to build a system do not help a lot of people anyway. I said that data access is of fundamental importance, but a lot of efforts do not look for the designs that are low cost and effective. I support his priorities; develop the datasets and use methods of delivery that control costs and keep it easy for users.

Trip to CESS satelliteee meeting, Feb 12-15

The CES committee met in Washington, DC, in Feb. We heard a lot of talks about the developments of various types of satellites and efforts to reduce the costs of some instruments. Worldwide, a lot of Landsat-type satellites will be launched in the next few years. We had the customary briefings by senior NASA and NOAA people. This included information about changes in EOSDIS to comply with NRC recommendations (from Scripps-95).

Mass store imports are faster

In mid-1995, it took us 11 days to import a year of reanalysis data from NCEP (55 Gbytes, on 144 cartridges). By Dec 1995 the clog on the NCAR computers slowed this down to 21 days. At this rate we could
not keep up with the data inputs that we get. About Feb 6 the MSS group sped up the data import process. Now it takes about 30 minutes to import a cartridge, so that we can import a year of reanalysis data in about 2.5 days.

NCEP/NCAR Reanalysis Program, why not OAR too?

Jim Rasmussen was the head of some programs at WMO for a number of years. In 1995 he became the head of the Research Labs of NOAA (OAR). He also just became the U.S. head of the U.S. Russia WG-VIII bilateral. In Feb the U.S. side met in Washington; DC. On the side I gave him information on the NCEP/NCAR Reanalysis Program. His quick reaction was something like--You mean the NCEP/NCAR/OAR Reanalysis Program. The program is gathering more awareness in the community. This was on 29 Feb 1996.
1. Getting ready for the reanalysis panel

   We were very busy preparing material—the slides and some papers, which were:

   b. The NCEP/NCAR project to Reanalyze the Atmosphere
   c. Sending 1968-78 Data to NCEP (21 Mar 1996)
   d. Data for 1957-67 for reanalysis (2 Apr 96)
   e. What is the Status of Reanalysis (27 Mar 96)
   g. The TWERLE Balloon Dataset (8 Apr 96)
      This includes overall info and formats

2. Sending 1968-78 data to NCEP

   Our NCAR team has been very busy, especially during Jan-Apr 1996 to send data they need to work on the next 11 years. This means data preparation cross checks between data sets, diagnostic studies to detect errors, put on reanalysis headers, do location checks, etc. They got the last of this data on 10 Apr 96. The AF did not set units flags in land surface data for Dec 1968. We have now done enough diagnostics to figure out (the hard way) what the units should be. Dennis will send this month again so that they do not have to put long tables in software.

3. Panel meeting for reanalysis (Apr 11, 12)

   I attended the panel meeting at NCEP and gave a talk. Everyone is very pleased with the way reanalysis is going. About 25 people attended this meeting. Now the NOAA Climate and Global Changes office is very interested in getting the data out. I think that we will do most of the work, but most of the money will go to NOAA places.

   • 17 years are done (1979-1995)
   • They have observed data for 11 more years (1968-1978)
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

April 1996

Roy L. Jenne

1. Advisory panel meeting for reanalysis

The panel met April 11, 12 at NCEP near Washington D.C. I gave a 40 min talk about the data inputs. I talked about how the early years of analysis could be helped by some 500 mb analyses we have. Reanalysis may have trouble south of about 35° S.

But some didn't like the idea of using VTPR sounders very much. That data is not as perfect as TOVS. But using it gave analyses close to TOVS in the overlap period. The early (1972-74) VTPR radiance data is OK. But the soundings they made then were very poor. After a week of debate and tests—we will use VTPR for Mar 1975-Dec 1978. This will help.

To get ready for the meeting, I prepared a bunch of texts about the data we are sending.

2. Can I go to Russia May 16-26?

There are meetings in Moscow May 20-21 to plan for Gore’s visit with the Russian Vice President. On April 16, I got a message: could I go to represent the scientific exchanges between the two countries under Working Group VIII? It turns out that I will be going and it has been a lot of work to get ready for it. We will also meet with members of the science exchange in St. Petersburg.

3. The volume of observations for reanalysis

- Wrote the text, "Datasets and Data Volume for Reanalysis," 6 May 1996. The total volume of input data for NMC to use is 198 Gbytes for 1947-1995. The primary satellite sounder data (original radiances) has a higher volume---636 Gbytes (not used now).

4. About the reanalysis output
• The text, "Distribution of Reanalysis data, NCAR"

The distribution of the data has been a hot topic in NOAA Office of Global Programs. So I wrote this text, 4 pages. It has info about CD-ROM prices in several data centers, etc.

5. Effort spent on reanalysis (Jan-Apr 1996)

Reanalysis has been very intense during Jan-Apr 1996. We have run many diagnostics. We have had to fix many data problems. NCEP has needed data a little faster than we can prepare it. so in this period we have been using about 6.5 FTE's on reanalysis. In the previous few years, we tried our use of time to around 3 FTE. It has been very hard to get the other work done. but reanalysis is creating a new gold mine for users.

(We made a rough estimate of time spent on reanalysis: Gregg .3, Dennis .7, Will .8, Roy B. .4, Bob .9, Joey .9, Chi-Fan .8, Ilana .1, Steve .6, Roy J. .75, Debby .4).
May 96 Notes

Roy Jenne
1 May 1996

Reanalysis Notes

1. Sending data to us
   - The redone 1985 has been sent
   - The repaired 1982-84 is now being sent
   - Then repaired 86
   - Followed by repaired 87-88.

2. Clouds & snow
   In panel meeting, someone said not enough clouds and snow information being output.
   - Kana will set up to save 6 more cloud fields (2 for each of low-mid-hi)
   - Put a snow melt in water budget.
   Note: Now the analyzed satellite snow cover changes the snow once a week.

3. "Warm fuzzies" for Bob Kistler
   Bob notes how he would feel great if they could have all of the main types of data for 1957-on as soon as possible. This is a good goal, but a lot of work is left to do at the NCAR end.

4. Use of 500mb ht. analysis in Southern Hemisphere
   We have grids for 500mb ht. for Aug 1968-on. This might give good analyses for 1968-Mar 75 when good sounder data are not available. The problem is that program development to use it would take a few weeks.
June 96 Notes

Status of Reanalysis Data, 1946-67

1. TD54 World raob data (11 Jun 1996)

There are 5,354,916 rawinsondes in this dataset. About 94% of the data has been converted to time series format at NCAR. Half of these have been hydrostatically checked—fairly clean. There are 335,141 soundings (6.25%) that have not been converted from the original format. GFDL helped with the processing of 94% of this data.

2. TD52 UA winds only (pibals etc.)

The USAF assembled this dataset during the 1960's and 1970's. It has data for many years. The most recent data is for 1971. NCAR received 43 boxes and a bag during April 17-19, 1996. NCDC (Dick Davis) sent this data to us. The dataset came on 211 tapes (1/2-inch tapes). Wind reports usually give wind by height or wind by pressure. The actual height levels are not in the data; the levels have to be assigned on the basis on many tables in the documentation.

- There are indicators for wind speed units. Almost all are either knots or m/sec.
- Each deck has 40 or 50 stations.
- 5 or 6 decks have more than one table for units.
- The lat-lon location data is only on paper.
- NCAR will send a copy of the basic data (but on cartridge tapes) back to NCDC. Also we will provide NCEP and NCDC a copy of the processed version.
- An inventory is available.

3. Scherhag raobs

Bob has converted these to a TS format. He figured out the format by logic and checks against books in the library. He has figured out the overpunches. By checking against the library books, he has figured out some of the knots vs. m/sec. units. Most of the raobs have passed a hydrostatic check. I once thought that these would only have levels in the stratosphere. However, these are full soundings.

- It would really help to have a format.

4. Russian ship raobs

All of the data have been converted. The track checks are done for 1968-78 (and NCEP has that data). It will take a few days to do track checks on the rest of the data.

5. North Pole ice island raob data, Russian stations

Gregg did track checks, and fixed the location problems. The time has been adjusted from local to GMT time. Will has given the data to Bob to put on reanalysis headers.
This data is only for about sfc-700 mb. Jon Kahl (U. of Wisconsin) has most of the upper level data and is working on a merge and more parallel location work.

Status 1968-78: The sfc-700 mb data for 1968-78 was sent to NCEP for reanalysis.

Status 1979-on: NCAR has some of the full-sounding raob data (from Kahl, from Russia) for recent years, 1979-on. Spot checks showed that the NMC coverage was good during this time. NMC usually had data twice a day vs. only once in the other source. Also, NCAR ran out of time. So for 1979-on, only the NMC source of the North Pole data was used in reanalysis.

When will Jon Kahl finish the merge of higher levels of raob data?

6. Raob data from countries

Table 1 lists rawinsondes and winds-only data from several countries. The following amount of work is needed to prepare these data:

- US control: about 2 weeks
- Canada: 10 days
- China: one week to 2 months (lack of format info and the units digits were ruined in up-stream processing)
- All other countries in Table 1
  - Will needs one or two days to assemble data
  - Bob needs a week to do track checks on Russian ships and a day to add reanalysis headers.

7. US raobs for 50 states

NCAR did have a set of US raobs from NCDC that went through 1971 and then only had mandatory levels. NCDC merged the mandatory level data and significant level data. In the process data for Boise was made bad (data for different times were merged). Also a few stations lost whole years of data in the merge. NCAR obtained all of the merged data from NCDC and still updates it.

- Will has used our earlier mandatory level dataset to fill in gaps in the merge data (which has mandatory and sig levels).
- Boise has been fixed on the North American CD-ROM. We will use that data. There is a text about the US data and the CD-ROM.
- This raob data for 50-states is now available for 1948-on. We also have 1946,47. It will be used for reanalysis for 1946-1967. The more recent years were not used because the coverage of the US stations on the NMC tapes was good, and because there was a question about vertical smoothing on the archive winds during 1980-on.

8. Raob data from Canada

From various datasets, raob coverage is good for Northern Canada starting 1948. Much of the rest of Canada is not very good until 1955.

NCAR has rawinsonde data directly from Canada for the period 1961-April 1991. A few problems have to be fixed (when sig levels and mandatory are very close--within 0.5 mb, the heights are not consistent). We know how to fix it. Probably a week of work.

9. Coverage of Rawinsonde data for China

In TD51 there is data from about 37 Chinese rawinsonde stations that start about Sep 1956. Many more
stations start in Jan 1957. In 1958, there is rawinsonde data from about 78 Chinese stations. The TD54 data ends with Dec 1962. Data from the NMC/GTS decode is available starting 4 Mar 1962. From 1962-on there should be heavy coverage of Chinese rawinsonde data going into reanalysis. We need to check whether data coverage was also good in the stratosphere, say at 50 mb.


Note below that the data during 1954-1957 only has thermal data (no winds). For 1958-62 there is also wind by height data for the same 30 stations. Other datasets have good data coverage for China for Sep 1956-on.

<table>
<thead>
<tr>
<th>Year</th>
<th>Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>31, 9554, 195645, 195767, 1958-623030</td>
</tr>
</tbody>
</table>

11. Surface land data

a. Hourly US data, from NCDC.

Will Spangler prepared a 3-hourly dataset for use in reanalysis. The data was in local time. The rules for conversion from local time to GMT were not explicit, but we think that this problem has been solved. A few stations changed their local time zone during the history of the observations.

There are about 300 US stations in this dataset. They are for the 50 states, Caribbean, and Pacific Islands.

Most data starts in 1948, but about 15 stations start earlier. This dataset has data for recent years too. For reanalysis, we will use all data (about 300 stations) for 1946-1967.

b. TD13, World surface synop from USAF

The USAF sent 405 tapes with these data to NCAR in Aug 1990. We have prepared maps of data coverage for each year. In June 1996, the data are almost ready to use except that we are still making some last comparisons of data values and station locations between datasets.

The station locations were printed in the books, but were not available in digital form. NCAR made a digital version of the locations, and these numbers are included in every report.

c. Surface synoptic data for USSR

As part of the WG VIII bilateral, Russia sent synoptic reports to the US for 1936-1990 (data for 223 stations). This is 6-hourly data for 1936-1965, and then 3-hourly for 1966-on. In May 1996, NCDC sent copies of the data for the whole period, now on 25 cartridges.

In TD13, the data coverage for the USSR is very good from 1956-1971. In 1946 there is almost no data for the USSR and in 1948 the data for the North Coast is still thin. Data coverage from GTS datasets (origin USAF or NMC) will be good from 1967-on. We will use this dataset from Russia for reanalysis during at least 1946-1955, and probably during 1946-67.

A note: NCAR has contributed staff time and computer time to COADS, but has not received NOAA money for their effort provided to NCAR.
Trip to ECMWF, July 5-12, Attend ERA reanalysis workshop

I gave a talk about data for future reanalyses. There were a lot of comparisons between analysis output and observations. It was a very good workshop.

Agreement to obtain ECMWF reanalyses at NCAR.

This process has been going on for a year and has been getting frustrating. I have prepared a bunch of papers that show costs. To get most of the data we need would cost about $220,000 at half price. The outlook now seems better because:

They now want out older data and those sales will offset costs.

The conversion seemed more like a mutual desire to make an agreement.

They want one very large dataset of satellite data, which will costs a significant amount.

US-Russia data meeting, August 5-10, at NCAR.

We have been busy making plans for this meeting. This includes: subjects to cover, speakers, agenda, data exchange documents, etc.

Get USAF cloud archive from NCEP?

The USAF (Offutt) global cloud analyses have been going to NMC in real time for some time. I made notes of conversation about these data with NCEP.

On July 2, he called me. Are we still interested in obtaining these data? The answer is yes. He will be developing archive procedures over the next few months. The global volume is about ___ MB/mo. in native packed binary and ___ after a UNIX compress.

What technology for data storage?

NGDC is interested in preparing better near-line data storage for USAF DMSP data. They are looking at DLT, Exabyte, new IBM,
Redwood. I mentioned that NSSDC and EROS have DLT. I will extend my storage notes and then we will talk more.
Roy Jenne
August 1996

Data exchange between US and Russia (WG VIII bi-lateral),
August 3-10

Each year we have a meeting in order to prepare agreements on
what the activities for the next year will be. Two visitors from
Obninsk, Russia came to NCAR August 3-10 for this purpose. We
also had presentations about the status of various types of data
(rivers, snow, surface ocean, raobs, reanalysis, etc.). I took them to
see the Colorado Climate Center at CSU to see how one of the US
state operations worked. It was a hectic week, but we finished the
protocol and signed it. These tasks had me completely involved
for about four days of preparations, the week here, and three days
of follow-up.

Status of sending reanalysis data (now August 30).

Air Force sfc synop. (we have 1967-1980 in this set). Data
for 1968 was sent again August 5. Cleans up some more
problems.

TD13—World sfc synop, prepared by Roy Barnes. Sent
August 12 (1957-on); the earlier data could be sent quickly.

NMC data, 1962-1972 (Joey still working on library, probably
library OK about September 10.

Collection of raobs direct from countries. Will Spangler has
been working on this set. It will be done about September
6.

Russian ship raobs, 1947-1990. Bob Dattore finished the
track checks and hydro checks August 30. It will be sent
about September 3.

AMS Forecast meeting at Norfolk, VA, August 18-24.

I went to this meeting to present a paper about the preparation of
observations for the NCEP/NCAR reanalysis. I also chaired a
session. We also had side meetings about the GCIP project:
Wednesday 7:30-10:30 and Thursday 7:00-8:30 AM. The three
centers (NCEP, FSL, Canada) are gradually getting their mesoscale
model data in shape to send. I made many useful contacts about
the data and information (S. Africa, Japan, others). I talked with
Ron McPherson (head of NCEP) about obtaining a backup GTS
archive - before the decode programs.

Work to obtain the output of the ECMWF reanalysis.

ECMWF will complete 16 years of reanalysis in September 1996
(1979-1994). Since August 1995, we have been having discussions
and preparing documents about obtaining the data. But the price
was hard to afford—about $220,000. David Burridge, head of
ECMWF, and I met at the Norfolk meeting. They need a lot of
data from us so that it finally appears that we can work out a data
exchange that does not cost us a ton of money. We sent out a
memo about this to some of the users.

Accomplishments and plans.

We started to pull together information for this report for FY96,
and our two-year plans.
Roy Jenne  
September 1996

Report on Economic Growth, Energy, and Climate Change

We put a lot of changes and additions into this report, and obtained a new version on September 11, 1996. This gave me a few copies to use on the China trip (September 13-28). I also worked more on the text during the trip. I need this text to help clarify some of the Greenhouse policy issues.

Trip to China, September 13-28.

This visit was to the IAP Institute of the China Academy of Sciences in Beijing. There are about 650 staff in IAP. I mostly visited the modeling section (LASG) which has around 50 staff. It includes a data section (staff 10-12). We will help them to obtain some of the data that they need. Some of the highlights of the trip were:

I gave five or six talks to different groups. Four included reanalysis. Other subjects were data holdings at NCAR, methods for data archiving, storage technology, data for hydrology, etc.

We prepared and signed a data exchange agreement between NCAR and IAP.

I visited CMA (China Meteorological Agency–formerly SMA). I have most of the information needed to prepare a data exchange agreement with them.

I visited the Department of Hydrology.

It is about 50% likely that we can reach an agreement to exchange monthly river data with them.

It have a lot of notes from the trip and little time. I felt very happy with the trip; most items were accomplished, but I was starting to feel tired.

Reanalysis.

We are working hard on getting data to NCEP for the years 1946-1967. They have 1968-95. Now we are concentrating on 1957-1967 (11 years).
19 September 1996: NCEP finished analyses for 1973-1978 (now a total of 23 years)

On October 2, Kistler told me that they now know that VTPR did help a lot. Fortunately, we did use it. But it was a struggle for a while.
Roy Jenne  
October 1996  

Data for Reanalysis.

We are preparing all types of data for the years 1946-1967. There are many types of projects, and this is taking a lot of the groups time. I finished a short text that indicates the progress on the preparation of the data.

Information about storage technology.

I started to prepare another update about storage technology. The new Exabyte drive (3 MB/s) came out August 1996, and a new DLT (5 MB/s) will come out about January 1997. Those will provide new capabilities for data distribution.

Report on Energy, Carbon Dioxide and Climate.

We improved the transportation chapter in the report, "Economic Growth, Energy Supply, and Climate Change." In the paleo chapter, information was added about old Denver tropical forests and about trees in Northern Greenland at 2 mya. Also, some items in several other chapter were improved. It was printed on November 5 so that I could use it in the WG VIII meeting on November 8.

Intellectual Property arguments.

The US Government is proposing new, tough international copyright laws that can cause trouble for open data policies. Harriet Barker gave me information about this situation. I prepared information for Harriet, Rick Anthes, and Dick Greenfield who are trying to get the US Government to make some changes in the wording. There is a file on this issue.

History of Southern Hemisphere Climatology Project (1966-1972)

A symposium was held October 21 & 22 to honor the retirement of Harry van Loon. I prepared a talk and a paper about this very useful project. There will be a published report with the papers.
October 16, 1996, Question from Gayle Gray.

An astronomical event was seen from Paris, France on December 10, 1797. A user is doing research on the event and wants cloud cover and visibility. The Paris observatory says that they do not have weather records for that time.

I think that daily weather maps for Europe were analyzed (in delayed time) for a period around that time. Observations were published in a book. Phil Jones at East Anglia, UK should know.

Data Support Plans.

We did some more work on the document of DSS plans. We derived more information about the use of the on-line data system. We improved the long text about DSS, the summary of DSS plans, and we have a short summary of reanalysis.
Roy Jenne

November 1996

Trip to Washington DC, November 7-13, 1996.

a. The US-Russia WG-VIII Program.

We met in Silver Spring, Maryland on Friday, November 8, which was a very wet and windy day. The WG-VIII top level meeting in Boulder has been delayed until Spring 1997. The status of the joint monograph is still unclear. A US lead person has not been found and Russia has not sent a detailed reply about their position on the project. About four of the projects in the WG-VIII exchange are still doing well. Our data exchange is one of them. We were briefed about the organization of agencies, etc. in Russia with respect to environmental issues.

b. University Space Research Association (USRA) meeting.

On November 11 & 12, we met. I am on the board. This program facilitates University-NASA ties (Houston and Goddard), and it helps to set up post doc programs at Goddard. It includes some projects to prepare educational material for teaching. We may take some steps to make it easier for people to obtain data and facilitate access.

The Reanalysis Project.

NCAR (DSS) is working very hard to prepare datasets for 1946-1967. Our programs that check quality often find systematic problems that must be fixed. This makes the work slower than we hoped. There is good news about raobs for South Africa. We have a gap in available upper air soundings for 1963-1966. It appears that South Africa does have the digital data we need and it might be possible to obtain it in time for reanalysis.

Data exchange with China.

A data exchange agreement was signed with IAP, China during my meetings there in September.

Trip to Washington DC, November 16-21 (NASA, NCEP, DOE).

Nov 18, 19: Meeting of advisory panel to Goddard DAAC. Two new STK Redwood Silos are being installed. Each has ~5000 cartridges (each silo holds
about 275 Gbytes, not compressed). Also, one IBM silo (10 Gbyte cartridge) is being put in. The Langley hydrology DAAC is closing, so Goddard will also be obtaining that data (not a huge volume).

Nov 20: Visited NCEP about reanalysis. About November 15 they found a new problem. There is a tape of weekly snow cover for the Northern Hemisphere for the period 1973-present. The correct weekly snow cover was used for 1973. However, for 1974 thru 1994 the weekly snow that was used was still the snow valid for 1973. This will affect the land surface temperatures and heat fluxes in certain areas, depending on whether or not the snow was wrong. I also talked re QC and about an archive of bulletins.

Nov 21: Talked about US observation networks with Jim Laver (head of CPC), and about US-RUSSIA exchange. Then got many energy publications from DOE (for energy and carbon dioxide).
Some Meetings and Trips, 1996

1. Jan 1996  Stayed in Boulder all month
2. Feb 7,8  GCIP meeting at Asheville
3. Feb 12-15  Trip to CES satellite meeting, Washington DC
4. Feb 21,22 (Boulder) Went to Dickinson meeting of the EOS project in Boulder
5. Feb 26-Mar 8 (Boulder) I went to the InterAmerican meeting on one day, and gave a talk
6. Mar 19 (Boulder) Practice for NSF review. I don't have to give a talk
7. Mar 28, 29 (Boulder) SCD Advisory Panel here
8. Apr 10-12 Trip to Washington DC. Meeting of Reanalysis Advisory Panel at NCEP. I gave a talk. Discussions about whether to use VTPR data. I am for using it.
9. Apr 16 (Boulder) Go to ARG meeting.
10. April 17 I find out that I need to go to Russia in May. We write the first version of the Economy, Energy, Climate text during approximately Apr 19-May 14. Gave copies to Izrael, Budyko and to embassy in Russia. The 2nd version was ready June 20.
11. April 23-25 NSF site review in Boulder
12. May 16-26 Trip to Russia for meeting of CPG Working Group led by State Department.

May 17 — Meet in Washington D.C. (at NOAA), to discuss the trip
May 20-22 — Meetings in Moscow, led by the State Department
May 23-24 — Meetings in St. Petersburg, mostly about proposed climate monograph.

Note: Purpose was to represent the interests of the WG VIII (Science Exchange) in the 2nd meeting of the Climate Change Policy Working Group (CPG) under the environment Committee of the Gore-Chernomydgin Commission (GCC).

13. June 24-July 1 Vacation, Western Washington
14. July 6-12, Attend ECMWF workshop on their reanalysis project at ECMWF near Reading, England. I gave a talk about data inputs for future reanalysis projects.
15. July 25-26, SCD retreat at Copper Mountain, Colorado (Computing plans)
16. Aug 3-10, Russians were in Boulder, CO from Obninsk (near Moscow) to negotiate data exchange for 1997. A VERY BUSY week! We have made a document as usual.
17. Aug 18-24, AMS weather forecasting conference, at Norfolk , VA. Give talk on Reanalysis. Chair the session on "Reanalysis and Associated Studies."
18. **Sep 13-28**  Visit labs in China, around Beijing. About Climate and data, etc. Give 5 or 6 lectures. Prepare data exchange agreements. See documents about this trip.

19. **Oct 8-9**  (At NCAR) University members meeting. (Went to the evening thing) Wirth gave a talk, but I did not know about it.

20. **Oct 18-19 (Friday & Saturday)**  At GFDL, Princeton. Symposium for Bram Oort. (Did not go).


22. **Oct 22,23**  SCD Staff Retreat at Allens Park (can't go)


**NOTE:** Did not go on any distant trips in October 1996.

24. **Nov 7-13**  Trip to Washington DC (via Dallas, TX)
   
   Nov 8— Meeting at NOAA with Renee Tatusko and others (WG-VIII meeting on Friday, November 8).
   
   Nov 11,12— University USRA meeting at Goddard

25. **Nov 16-21**  Trip to Washington DC
   
   a. **Nov 18, 19:21**  Trip to Goddard DAAC (Washington). Goddard DAAC advisory panel November 18 and 19. At NCEP on reanalysis on November 20. To CPC November 21 and got DOE books.

26. **Nov 20-22:** GEWEX meeting at Huntsville (did not go)

27. **Nov 20 - Dec 4**  Two visitors from China (IAP) were at NCAR. We made another document

28. **Dec 4-7**  Conference in Arlington, VA. "Global Climate Change: Meeting Post-2000 Emissions Targets and Timetables." The meeting was Dec 5,6.

29. **Dec 22-Jan 3**  Vacation. Seattle area

**Summary of long trips in 1996:**

a. **May 16-26,**  Trip to Russia. State Department and WG VIII.

b. **July 6-12,**  Trip to England (ECMWF Reanalysis Workshop)

Summary of DSS plans for 1997, 1998

1. Plans for NCEP/NCAR Reanalysis.

The goal of this project is to do 40 or 50 years of global analyses, each 6 hours (surface to 30 Km). By October 1996, 23 years were done. NCAR has many tasks to do to keep sending NCEP observed data and to handle the output data. These overall tasks are:

   a. Make more checks on the observations. Obtain some added data inputs. Remove errors from library (station location) information. Send the data to NCEP.

   b. Handle the big files of output data from reanalysis. NCAR receives 54 Gbytes from NCEP for each year of analyses. We now obtain about 2 years per month. Provide data access on NCAR computers and send data to users.

   c. Handle the CD-ROMs output from reanalysis. NCEP is making 1-per-year CD-ROMs. There will be 40 or more of these. NCAR will do most of the distribution. This will take many transactions with users.

   d. Handle the needs for documentation. We have much documentation, but not nearly enough. Some of it changes as we learn new things about the datasets. More documentation will be prepared. This is a big task.

2. Obtain output from the ECMWF reanalysis.

ECMWF will complete 16 years of reanalysis in September 1996. NCAR will provide ECMWF with many observations. ECMWF will provide NCAR with the results of their reanalysis (1979-1994), which many users need. The users will have results from the NCEP/NCAR project and from ECMWF. This will permit comparisons of the results. Data from ECMWF started arriving in January 1997. This will be a large task to ingest this large volume of data, and help users.

3. Improve reanalysis observations; send data to ECMWF

The NCEP/NCAR reanalysis project has moved quickly. Some data came in too late to include. Some new knowledge could not be incorporated into data already used for reanalysis. Some additional checks should be run. Therefore, we need to spend some time to take care of a reasonable number of these factors. The results will be sent to NCEP.

We have a new exchange agreement with ECMWF. The US needs access to their reanalysis data. ECMWF needs access to many observations at NCAR in order to make a long reanalysis possible. This will be a big task for us to transfer the data, but nowhere near as huge as the task to prepare it for NCEP. Most of the work has been done.
4. Handle model data for the GCIP program.

The water and energy balances of North America will be studied under GCIP. DSS has been asked to serve as the model data center for GCIP. Selected data from three mesoscale models for North America will be archived. The volume is relatively high. The GCIP program concentrates on energy balances and water budgets, but many other meteorological variables will be archived.

5. Maintain the archive and help users (needs about 4 FTE).

It requires a large effort to update many datasets, prepare information about data, and help users. Now there are more users who have less experience compared with a year ago.

6. Add more datasets.

Now we have about 480 datasets and we add new ones at a rate of about 25 per year. We will increase the holdings for hydrology and for clouds.

7. Update holdings of climate model data for assessment studies.

We have been the main source of climate model data for world wide assessment studies. We have worked with international IPCC and the Country Studies Program. Now we need to add newer model runs.

8. Develop better methods for bulk transfer of data.

A lot of newer datasets have high volume. The old prices and old methods mean that users can not afford to obtain the data. We plan to improve methods that are easy, fast, and which have a much lower cost for users.

9. Handle several data exchanges.

- US-Russian (doing this each year since 1979; it is going well).
- US-China. We worked on this in 1988, and again in 1996. Some new data exchanges have been accomplished. More are needed.
- Latin America (big IAI program). Considerable work is needed to establish this data exchange.


We have huge archives that could help K-12 education. We want to spend 1 person-month in FY97 to help K-12 education, and 3 person-months in FY98.

11. Open up major datasets for scientific research.

Our goal (for many years) has been to prepare major datasets so that they are practical to use to study global and regional problems. This means that we need to obtain the data
from many sources, organize it so that the data flow is fast, remove some of the problems that may remain, improve information about the location of stations, and prepare tools to simplify data access for users. A major archive has resulted from these efforts; a lot of research is enabled by the availability of these data.

Access to each small piece of data is possible and practical, but we usually do not optimize for that type of access because it would slow down the big data flows, it would make it harder for users to study the big problems, the long term security of the archives would be compromised, and the costs would be much higher. A smaller portion of the data is organized for small scale access (either on-line or on CD-ROM).


We have a lot of information about our datasets, but we need much more. While processing the reanalysis observations, we determined much information about the data that users need to know.

More Information on the huge NCEP/NCAR Reanalysis project

The NCEP/NCAR project will accomplish 40 or 50 years of global reanalyses, with output each six hours. The project started in 1991, based on many earlier years of data gathering, model development, and related experience. The task of NCAR (DSS section) is to provide the observations. There are thousands of surface and upper air observations (from balloons, aircraft, satellite temperature and cloud wind data) that are being used. The operational production of analyses started in June 1994.

1. Benefits of reanalysis and staff time used

Reanalysis has been a very big project for us at NCAR (the same can be said for NCEP). There are many benefits from the project: A very good set of analyses, other output such as precipitation and radiation, and datasets of observations that are in much better quality (and easier to use). The observations can be used for future reanalyses and for all sorts of other research. The work has been helpful to preserve national data treasures.

This project has a heavy impact on out time at NCAR. In late 1995, we had to speed up the work on all of the older datasets. Our Data Support Section had 7 FTE in August 1991; in October 1991 we had 10 FTE (we have also had 0.7 to 1.0 FTE of admin help). Both reanalysis and other projects have increase our workload. The time used on reanalysis has been as follows:

<table>
<thead>
<tr>
<th>Period</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 1991 - Dec 1992</td>
<td>~2</td>
</tr>
<tr>
<td>Jan 1993 - Aug 1995</td>
<td>2.5</td>
</tr>
<tr>
<td>Sep - Dec 1995</td>
<td>4.5</td>
</tr>
<tr>
<td>Jan 1996 - May 1996</td>
<td>6.5</td>
</tr>
<tr>
<td>Jun 1996 - Feb 1996</td>
<td>5.3</td>
</tr>
<tr>
<td>Mar 1997</td>
<td>6.5</td>
</tr>
</tbody>
</table>
Note: This project has had a very large impact on our staff of ten. I hope that this use of time can move down to 2.5 FTE by Dec 1997 so that we can handle other projects and catch up on various tasks that have been short changed. The very positive side is that this work has opened up many datasets to much easier use.

A brief history of the NCEP/NCAR reanalysis

a. Some key dates in the project

- Feb 1991: The project started—prepare data, develop operational systems, and improve analysis methods (includes forecast models).
- June 1994: The production of analyses started.
- 7 Sep 1995: 11.0 years were completed (1982-93, but not 1984)
- 5 Jan 1996: 14.6 years (1982-95 and Jan-Jul 1979)
- 11 Feb 1996: 17.0 years were completed (1979-95)
- Feb-Jul 1996: Run many tests; prepare for older data. Rerun some data.
- 19 Sep 1996: 23.0 years are done (1973-1995) plus 8 months of 1996.
- 14 July 1997: NCEP started production of the years 1957-1967 (11 years)

b. Some main texts and history of reanalysis

We will give a short list of the texts which help to describe the history of reanalysis work, and which describe the present project.

- Oct 1988: Paper by Bengtsson and Shukla is in Bulletin of AMS.
- Bull AMS, Mar 1996: (Kalnay, et. al.) Major paper on NCEP/NCAR reanalysis

Note: NCAR (DSS) has a list of texts about the data inputs for reanalysis and data coverage.

c. Preparing Large Sets of Rawinsonde Data

For reanalysis, we are using data received in real time from world telecommunication (for 1962-1996). We also use several large sets of data prepared in past years and we use rawinsonde data received directly from a number of countries.
NCAR prepared a collection of data received from countries to send to NCEP. The recently prepared set has data for 1946-1967. Data series from Singapore, New Zealand, UK, French Islands, and permanent ships were collected. Individual years of data or short periods that were missing from the country series were collected from other data files and included. The rawinsondes were hydrostatically checked, as well as corrected for misplaced or unidentified surface, and incorrect data sources and types. The soundings for 1946-1967 were also extracted from other data series from other places: Australia, India, Hong Kong, Argentina, Brazil, South Africa, Japanese and UK Antarctic stations, Russian ships and Russian Arctic ice islands. Data for more recent years had been sent to NCEP earlier.

NCAR has a collection of all the upper air data (rawinsondes, aircraft winds, cloud winds, etc.) that were collected by NCEP from GTS communications. Data for 1968-95 has been sent to NCEP. Data for 1962-67 is in the final stages of preparation. Much work was needed to check and prepare correct locations, and do data cleanup (remove duplicates, remove extraneous data, and fix some incorrect time periods offset by 12 hours.

Included in the plan for 1997-1998 are preparation of the US controlled soundings, the TD-54 set, the Canadian set, and the US marine set of raobs.

d. Removing errors in world station locations

There are many errors in various sources of information about the location and elevation of observing stations. When observations are used for reanalysis, it is very important that the location information be correct. Some location data has been wrong by many hundreds of kilometers. Progress in FY1996:

The general approach toward better station catalog information has been to start with the catalog of existing information most closely associated with the data set to which it would be applied. The location and elevation information is checked for internal consistency of locations over time and then checked against other sources of this same information. Many inconsistencies must be resolved by manual inspection.

For RAOBs, elevations have been calculated from the upper-air observations in order to validate the elevations reported in the catalog. Time limitations have prevented exhaustive use of this information, but it has been used to resolve discrepancies between other sources.

Station catalogs have been developed for data 1973 and later: NCEP upper-air decode files, USAF surface data decode files for 1967 through 1980, and TD13 surface data files. Work is in progress (Sep 1996) on catalogs for the pre-1973 NCEP upper-air decode files and the TD52 upper-air wind reports. TD13 and TD52 catalog information was key entered and verified from old documents. The catalogs have been used to check and correct location information on reports from other sources such as data received directly from various countries.
More information about additional data projects

1. The task to update many datasets, and add new sets

NCAR has a very large archive (now about 480 datasets). Many people do not realize that the task of updating many datasets takes a lot of time. We have to bring in the data, run inventories to check for problems that can be fixed, and update the information about the various archives.

During the period September 1995 through August 1996, 21 new datasets were added to the DSS archive. New sets include ocean pigment concentration estimates, the Global Historical Climatology Net, GEWEX Water Vapor set, TDF52 Air Force Pibal data, USSR surface synoptic data, hourly gridded precipitation, other new additions, and several new subsets of existing data sets. The TOGA COARE archive is being integrated into the DSS archive and new subsets of Reanalysis products are being added. UPDATES: Over 200 different data sets were updated in the past year, with nearly 90 of these updated more than once. Three sets were updated several times each month and eight were updated monthly.

Plans for 1997-98: The work to prepare updates will have to continue for each of these years. In fact, there may be a few more datasets that will need updates.

2. The comprehensive Ocean-Atmosphere Data Set (COADS)

COADS is recognized worldwide as the most extensive set of surface marine data over the past 140 years. This dataset is a result of a cooperative effort, beginning during the early 1980's, between NOAA's National Climatic Data Center and Climate Diagnostic Center (of ERL), and NCAR. NCAR contributes to the COADS project in three ways. Computers at NCAR are used for nearly all the data processing. The Mass Storage System serves as the permanent archive for all the data. The Data Support Section is responsible for a majority of the data and documentation distribution, and data access consultation.

COADS Release 1 (April 1985) contained global marine data for the 1854-1979 period. Interim extensions to Release 1 added data for 1980 through 1991. Recent accomplishments have further extended the time series and made improvements to Release 1 and the interim extensions. Release 1a adds data to the time series for years 1980-1993*. Release 1b has upgraded and replaced data for the 1950-1979 period. Figure X shows two time series of numbers of reports in COADS. The two curves represent the most recent part of Release 1 and the interim extensions (1960-1991) and the Release 1a and 1b collections for (1960-1993). This illustrates how we have added previously unavailable data to the global COADS archive. Along with adding observations to COADS we have made data processing improvements that increase the overall quality of the data, e.g. upgraded the format to include more data fields, fixed some known data errors, and changed processing rules to achieve an improved mixture (from the many data sources) of observations.

* 1990-1993 will be updated and 1994-1995 will be added in March 1997.
Longer term efforts will focus on improving the overall data quality control procedures in preparation for reprocessing the full period of record. In parallel we will continue to develop our online documentation, accessible via FTP and the WWW, so that the COADS data users can conveniently keep informed about our achievements.

3. Data Support for Oceanographic Research

Requests for oceanographic research data at NCAR and throughout the UCAR membership are given a high priority. Requests are filled in several ways. Data are collected from outside NCAR, documented, verified with access programs, and placed on the MSS for use on all local systems. Data products developed at NCAR, but outside of SCD, are migrated to the MSS, documented and placed under control and maintenance of the DSS. These products are then similarly available to all local systems at NCAR. Numerous data requests are also received from persons not having NCAR computing accounts. In these cases data, documentation, and access software is furnished to the user by network or magnetic media transfers.

A few current achievements and forthcoming projects are now briefly described to illustrate the scope of these activities.

- Improvements to COADS rely on acquisition of previously unavailable data. NCAR receives regular updates to support COADS from the Marine Environmental Data Service of Canada, the World Data Center B in Obninsk, Russian, the Inter-American Tropical Tuna Commission, the National Oceanographic Data Center (NODC), NOAA's Pacific Marine Environmental Laboratory, and Polar Science Center at the University of Washington just to mention a few. Collecting and placing these data into the permanent DSS archives insures the baseline data for COADS in the future.
• Cooperative data efforts with other government agencies also provide a significant service to the research community. Two examples of this are the World Ocean Atlas (WOA) 1994 by Levitus and associates at NODC and National Centers for Environmental Prediction (NCEP) sea surface temperature analyses by Reynolds and associates. The WOA provides the most complete set of ocean profiles in existence, and a variety of analyzed grids that are useful for ocean modeling. The NCEP temperature analyses has several different data products with one, an optimum blend of satellite and marine surface observations, that is kept current to nearly real-time.

• Satellite data have become more important in recent years. To support research at NCAR we receive the scatterometer surface ocean wind data derived from measurements by the European Research Satellite 2 (ERS2). We began receiving these data in 1991 and continue to do so today. We are also receiving similar products from the NASA Scatterometer (NSCAT). The calibration and validation period for this data began in September 1996 and is continuing now (Feb 1997). We receive weekly data tapes that are copied to the MSS in the original HDF format with one orbit per file. To enhance efficiency and performance on the SCD super computers weekly IEEE binary files are created and archived.

By responding to data service needs like these mentioned above, and many other smaller activities, the DSS supports a wide variety research throughout the national and international community.

4. Results from user survey of August 1995

Each four years the users of the Scientific Computing Division have been surveyed to determine their satisfaction with the services. The Data Support Section looked very good in this survey (see the table below). We had been a little concerned that our heavy pressure to carry out the reanalysis project may have hurt support for some of our users. We still have lots of work to do to gather more data, prepare it, and give users easy access.

<table>
<thead>
<tr>
<th>QUESTION:</th>
<th>FY87 SAT</th>
<th>FY91 SAT</th>
<th>FY95 SAT</th>
<th>FY87 DIS</th>
<th>FY91 DIS</th>
<th>FY95 DIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease accessing archived data on servers</td>
<td>64.9</td>
<td>62.1</td>
<td>80.7</td>
<td>8.1</td>
<td>8.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Content and Extent of Data Archives to needs</td>
<td>65.7</td>
<td>52.6</td>
<td>85.2</td>
<td>2.9</td>
<td>3.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Documentation on Data Archive &amp; accessing data</td>
<td>44.1</td>
<td>37.5</td>
<td>79.1</td>
<td>8.8</td>
<td>14.3</td>
<td>6.1</td>
</tr>
<tr>
<td>SCD Data Support Assistant</td>
<td>74.3</td>
<td>58.6</td>
<td>89.5</td>
<td>0.0</td>
<td>1.7</td>
<td>1.9</td>
</tr>
</tbody>
</table>

SAT = Very Satisfied + Satisfied
DIS = Very Dissatisfied + Dissatisfied
This table was prepared October 1995 (by Ginger Caldwell)
5. Data for the very high atmosphere, 70-1000 km

Since as early as 1966, NSF has funded five special radar sites to probe the upper atmosphere between about 80 and 1000 km. The main database from several radars is from 1981-on. Variables such as temperature electron density, and ion velocity are measured. In 1984, NSF began a special program involving the DSS and NCAR’s HAO to establish and maintain a database at NCAR so that data from several radars can be easily used together. Under the CEDAR program, this effort has expanded to include related ground-based measurements and model output; for example, Fabry-Perot interferometer observations, Light Detection and Ranging (LIDAR) observations by the University of Illinois, Thermospheric/ Ionospheric General Circulation Model (TIGCM) output from Ray Roble (HAO), and Assimilative Mapping of Ionospheric Electrodynamics (AMIE) model output from Art Richmond (HAO). Mesosphere-troposphere radar, medium-frequency radar, and high-frequency radar data have been added.

A minicomputer is maintained at NCAR for access to this database. Batch and interactive software and documentation have been written and installed. Internet access is maintained at two levels: Documentation and data inventories may be obtained via anonymous ftp or Web page, but a login is required to obtain data. Current plans are to add an interactive data selection capability to the Web interface.

We assist data contributors by designing new record layouts, providing conversion software and verifying results. During the summer (1996), we provided these services plus an office with computer access to a visitor from Kyoto University, while he commenced conversion of the Japanese MU (Mesosphere and Upper atmosphere) incoherent scatter radar data set (about 1 day per month from 1988 to present). DSS staff will periodically archive new data contributions, fill data and software requests, consult with users, and prepare and distribute an annual catalog.


The Use of Data from the Data Support archives at NCAR

The Data Support Section (DSS) helps many users obtain the data that they need. There are a large number of datasets in the archive (about 480), and the volume is about 7000 Gbytes. Users can obtain data and information in several ways as outlined in Table 1. Users can obtain information and smaller amounts of data by Internet. We send large amounts of data on media. The DSS can also offer a special service that most data archives are not able to provide. We can provide fast data flows directly from the NCAR mass store into user programs that are run at NCAR.
There are about 1200 users of the main computers at NCAR (the users are from NCAR, universities, and other places). During any one year about 400 of these users read Data Support (DSS) archives directly into their computer programs being run at NCAR. This direct use of DSS data is high (about 5000 GB/year), as seen in the table below. The Data Support Section sends data to users and provides direct data access for users as summarized in the table below. The main categories of use are as follows:

Table 3: An overview of data services provided

<table>
<thead>
<tr>
<th>Service Description</th>
<th>Monthly Use</th>
<th>Yearly Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Data from the on-line Internet server</td>
<td>35,000/mo</td>
<td>20 GB/year</td>
</tr>
<tr>
<td>• Information files and some data:</td>
<td></td>
<td>~4,000/year</td>
</tr>
<tr>
<td>— Volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Phone and E-mail sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Send data to users, mostly on tapes</td>
<td></td>
<td>500 GB/yr</td>
</tr>
<tr>
<td>• About 380 requests/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Send data on CD-ROMs</td>
<td></td>
<td>CDs: 30/yr</td>
</tr>
<tr>
<td>• Still small, getting bigger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Users access data from NCAR mass store</td>
<td></td>
<td>5000 GB/yr</td>
</tr>
<tr>
<td>• About 400 separate users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Send data for special projects</td>
<td></td>
<td>300 GB/yr</td>
</tr>
</tbody>
</table>

Use of the Data Support On-Line Internet Server.

This on-line system has catalogs of our datasets, documentation about the data, and many more detailed data inventories. It also has a selection of popular data for self-service access by users. We see above that users take about 35,000 files from this system every month (about 1000 per day). We will give more details about this system later on in this text.

This on-line system became available for users in January 1992, and DSS keeps expanding the content and data volume available. Monthly use statistics are available, and are summarized in Table 2.

Consulting about data and receive data orders.

DSS receives many email and phone messages about data. Based on spot checks, these are about 320/month (or 4000 per year). It takes about 2 or 2.5 message transactions to handle each of these. Example questions: What is the closest rawinsonde station to Kitt Peak? In addition, Ilana Stern sends a short email newsletter to ECMWF users about 5 times a year (67 users on list in 1996).

Data sent from NCAR DSS

Many users request data sets from the DSS archive. These requests often involve consulting on data needs, giving price estimates, consulting on the use of data, preparing subsets to meet user needs, and delivering data to the user on media, or via ftp (small datasets).
Each year we send about 500 Gbytes of data to about 380 users. This data goes into archives where it is usually used by 1 to 7 people (probably a mean of 4), and each user may use it several times. Therefore, the 500 GB that we send may be equivalent to about 2500 GB of data used directly from NCAR mass store. The data that we send is summarized in Table 4.

**Table 4: Data sent from NCAR DSS**
This shows the handling of user requests at DSS.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Requests handled</td>
<td>400</td>
<td>417</td>
<td>441</td>
<td>399</td>
<td>328</td>
</tr>
<tr>
<td>Read MSS files for users</td>
<td>6212</td>
<td>5099</td>
<td>7116</td>
<td>8268</td>
<td>9192</td>
</tr>
<tr>
<td>Data sent to users (Gbytes)</td>
<td>150</td>
<td>154</td>
<td>258</td>
<td>382</td>
<td>750</td>
</tr>
<tr>
<td>Number of media sent</td>
<td>1257</td>
<td>664</td>
<td>887</td>
<td>649</td>
<td>665</td>
</tr>
<tr>
<td>FTP transfers</td>
<td>16</td>
<td>80</td>
<td>89</td>
<td>190</td>
<td>120</td>
</tr>
<tr>
<td>Sold CD-ROM (NCEP analyses 1946-on)</td>
<td>15</td>
<td>29</td>
<td>35</td>
<td>11</td>
<td>35</td>
</tr>
</tbody>
</table>

**Help people use data on NCAR computers.**

There are about 450 NCAR staff plus about 750 university staff who use the main computers at NCAR. When these users need archive data, the DSS helps them to start using the data and provides simple data access programs that makes access easy. This service is about 5% initial help, and 95% self-serve. This accounts for more data volume of use than the data sent to distant areas.

In February 1997, we were surprised to learn that about 400 unique computer users read about 5000 Gbytes each year from our Data Support data archives. This is about three times larger than we would have guessed. This is the first time in ten years that we have found time to process the NCAR computer job files to obtain these statistics. Figure 1 shows that this direct use of our DSS data from the mass store has grown from 1100 GB in 1990 to 5600 Gbytes in 1996. More information is in the table below.

**Data users read DSS Archives**

<table>
<thead>
<tr>
<th>Year</th>
<th>Unique Users</th>
<th>Data Bitfiles</th>
<th>(Gbytes)</th>
<th>% by Univ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>256</td>
<td>21693</td>
<td>1099.6</td>
<td>52.4%</td>
</tr>
<tr>
<td>1991</td>
<td>285</td>
<td>49624</td>
<td>2479.6</td>
<td>47.5%</td>
</tr>
<tr>
<td>1992</td>
<td>349</td>
<td>51089</td>
<td>2637.7</td>
<td>58.5%</td>
</tr>
<tr>
<td>1993</td>
<td>394</td>
<td>56343</td>
<td>3625.8</td>
<td>68.9%</td>
</tr>
<tr>
<td>1994</td>
<td>418</td>
<td>84503</td>
<td>4397.0</td>
<td>69.8%</td>
</tr>
<tr>
<td>1995</td>
<td>391</td>
<td>81476</td>
<td>4666.4</td>
<td>78.2%</td>
</tr>
<tr>
<td>1996</td>
<td>399</td>
<td>88994</td>
<td>5621.1</td>
<td>74.1%</td>
</tr>
</tbody>
</table>
Data provided for major projects and exchanges.

About 98% of the data in this category has not been entered in our other accounting systems. Under the NASA TOVS Pathfinder Project, DSS provided 631 GB of TOVS (Oct 78-Mar 92) to three places (Goddard, NOAA, France). So 1893 GB were sent during 1992-1996. For reanalysis, the main work is a lot of data checking and making data fixes on many, many datasets. The volume is about 202 GB to send during 1993-1996. During 1993-95 (and earlier), we provided climate model data for the US Country Studies Program and for IPCC to make assessment studies (crops, forests, etc.). In 1994 we provided 50 copies of 7 floppies, and 200 copies of 6 floppies (IPCC). In 1995, we gave 50 copies of 10 disks, and 25 copies of 13 disks.

Summary of data for special projects

<table>
<thead>
<tr>
<th>Year done</th>
<th>Volume sent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-92</td>
<td>1893 GB</td>
</tr>
<tr>
<td>1992-97</td>
<td>210 GB</td>
</tr>
<tr>
<td>1994-95</td>
<td>1200 floppies</td>
</tr>
<tr>
<td>1996</td>
<td>1200 floppies</td>
</tr>
</tbody>
</table>

Use of the NCAR Data Support On-Line System.

The Data Support Section has been preparing information about data for many years. Since January 1992, we have been making more of this information available online. This information system is used heavily.

It is fortunate that the Internet server can provide a lot of data and information so the our staff does not have to be involved with every question. About 1000 data and information files are sent on Internet every day. Table 5 is a summary of the use of Internet server in 1993 and in 1996.

This online system has catalogs of our datasets, documentation about them, selected reports and software, and some smaller amounts of data, all for quick access on-line. It was useful as soon as it became available for users in Jan 1992. By Jul 1992 another main step in adding information had been attained, and more is being added all of the time. Ilana Stern was able to gather usage statistics starting mid-Dec 1992.

The Data Support Section Information area can be accessed by direct ftp or through the Web.

| anonymous ftp address: | ncardata.ucar.edu (128.117.8.111) |
| URL for Web access:    | http://www.ucar.edu/dss          |

Plans for Web access: The DSS plans to add significantly more information about datasets, and to add more search capability. We will add more disk capacity so that there will be quick access to more data.
Table 5: Data and info files obtained from DSS data server.
These data are all monthly counts of data obtained from the server.

<table>
<thead>
<tr>
<th>Jan-Jul 1993</th>
<th>Jan 1995-Sep 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Total connects per month (3200)</td>
<td>a. Total files/month taken (~35,000/month)</td>
</tr>
<tr>
<td>— from ~800 unique sites</td>
<td>— This was 11,000 per month in 1993</td>
</tr>
<tr>
<td>b. total file retrieval of data and info</td>
<td>b. Files of real time weather (we will get counts)</td>
</tr>
<tr>
<td>• 11,000 per month</td>
<td>c. Primary info and data files (~8000)</td>
</tr>
<tr>
<td>• 8,000 of these are real time weather data</td>
<td>— this file count of 8000 was 3000 in 1993</td>
</tr>
<tr>
<td>• 3,000 of these are main dataset and info</td>
<td>— Volume ~ 1600 MB/month</td>
</tr>
<tr>
<td>files taken (the main use to track)</td>
<td>d. Of ~8000/month, 2400 files are for edu., 500 for gov., and 2000 overseas.</td>
</tr>
<tr>
<td>e. About 105 edu. institutions per month</td>
<td>e. About 105 edu. institutions per month</td>
</tr>
<tr>
<td>get data.</td>
<td>get data.</td>
</tr>
</tbody>
</table>

Help users find data located at other places.

Data Support provides information services, not only for our own data holdings, but to help people find data services elsewhere.

The most extensive list of weather, oceanographic and climactic information available.

One example of this is that Ilana Stern continues to maintain, update, and distribute the USENET sci.geo.meteorology Data Sources Frequently Asked Questions list. This list currently (1994) has 48 WWW sites, 26 gopher sites, 56 FTP sites, 18 telnet sites, and sources for 42 CD-ROM sets, along with information on national and international data centers, U.S. State Climatologists, and other meteorological resource information. This set of documents was cited in an article in the Summer 1994 issue of the Department of Commerce's Mariner's Weather Log as "the most extensive list of weather, oceanographic and climatic information available."
DSS Collaborations

Roy Jenne
Oct 1996

1. NCEP/NCAR reanalysis
   - NOAA, NSF, NCAR

2. Model data for GCIP (mesoscale model data, N. America)
   - NOAA, 3 forecast centers

3. US Country Studies (do climate assessment studies)
   - EPA, DOE, 56 countries
   - Our work is now at a low level. (mostly done)

4. COADS surface marine data
   - NCAR, NOAA ERL, NCDC, others
   - This has been a program to develop the world's best set of surface marine data. It is working well.

5. Foreign data exchanges
   - Our DSS at NCAR with: Russia, China, IAI (Inter-American)

6. Sending observations to ECMWF (for a 40-year reanalysis)
   This will be a big project.
   - Update: It starts with the data we sent to NCEP by Mar 1998, and adds a lot more data and updates.
   - Note: All this and more will be sent to NCEP later on for their newer long reanalysis (to start about 2003).