

Annual Report of the British Atmospheric Data
Centre

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1. SUMMARY

This report covers the work of the British Atmospheric Data Centre during the period September 1994 to August 1995. It describes the new datasets made available during this time, development of existing datasets, the migration of the BADC to Unix, the World Wide Web interface, the UGAMP service, production of CD-ROMs, international links, usage statistics, hardware charges and staff training.

2. NEW DATASETS

2.1 General

The most notable achievement during the year was the implementation of the UARS datasets. The datasets initially available through the BADC related to the Microwave Limb Sounder (MLS), the Improved Stratospheric And Mesospheric Sounder (ISAMS), the Halogen Occultation Experiment (HALOE) and UK Met Office Assimilated Data. Later in the year, we added data from the Cryogenic Limb Array Etalon Spectrometer (CLAES). A workshop was held at RAL in November 1994 to demonstrate how to access the datasets and how to obtain software to process them. We also took the opportunity of announcing the World Wide Web interface to the BADC.

The NERC and the Met Office are about to sign an agreement that will allow the BADC and BODC obtain data at cost of access for distribution to approved scientists for research purposes. The purpose of this agreement is to remove the need for individual scientists having to deal with the Met Office and pay charges that were a drain on their research funds, yet do not directly benefit the Met Office either. We have obtained two datasets under the new agreement, prior to the formal signing. Effectively, the BADC and BODC are acting as a cache, so that popular datasets will be more readily available.

While much of the meteorological data will be obtained as a direct response to user requests, the BADC is being pro-active in acquiring model data from the ECMWF re-analysis programme currently in operation. This dataset is required in its entirety by the UGAMP programme and subsets of it are needed by a variety of scientists. We expect the period covering the operation of the ERS satellites to be particularly popular.

2.2 Detailed of Specific Datasets

2.2.1 ISAMS

The level 3A data was replaced by version 9 and version 10. The version 9 data is still the preferred version to use for water vapour. The total amount of ISAMS L3 data is 5 GB. ISAMS level 2 data is in the process of being transferred from the GDF menu system to the WWW interface. When complete, the dataset will be 6 GB.

2.2.2 MLS

The WWW interface was developed. The data currently stand at version 3. We are expecting version 4 to be available soon. The volume of data currently held is 10 GB.

2.2.3 HALOE

The WWW interface was developed. Version 16 of the HALOE data was replaced by version 17. An additional year's worth of data was archived and catalogued. The volume of data currently held is 14 GB. The WWW interface was developed.

2.2.4 UKMO assimilated data

The WWW interface was developed and made available. A further year's worth of data was archived, giving a total of 10 GB. Software to produce monthly zonal means was developed and the monthly means generated from the beginning of UARS operation. A set of 8 CD-ROMs was produced, containing the binary data files in IEEE, big-endian format (as used by most Unix platforms) for the period October 1991 to July 1995. A facility for interactively viewing animations of UKMO data through the WWW, plus a facility to order GIF images of the data was developed. There is the possibility of extending this service to automatically produce videos for the GIF files, depending on the user demand.

2.2.5 CLAES

Three and a half years worth of data were acquired, converted to ASCII, compressed and catalogued. The WWW interface and help files are under development. The volume of data held is currently 9 GB.

2.2.6 ECMWF model re-analysis

We are beginning to obtain ECMWF data through a post-doctoral student at Reading. We have software for reading the GRIB format used at ECMWF and we have asked for software to convert the spectral data to gridded data. Our goal is to store the full 16 years worth of data in spectral form and generate gridded products as needed. We plan to generate and store gridded data at a 2.5° resolution for the years covered by the operation of ERS and UARS.

2.2.7 Meteorological Data

Four years worth of radiosonde data, from 32 stations, has been obtained from the Met Office under the new NERC - UKMO agreement as a result of a request from the University of Birmingham.

Meteorological data from the Greenland Sea area, covering the period December 1992 to May 1993, was obtained from the Met Office as a result of a request from the Scott Polar Institute.

These data will be made available to others once the agreement has been signed.

2.2.8 NDSC

RAL is one of the designated secondary archive sites for data from the Network for the Detection of Stratospheric Change. We have investigate means of transferred the data from NDSC. At present, NDSC are in the process of changing their computing system to Unix and we are waiting for them to complete the move before acquiring the data.

3. EXISTING DATASETS

Although much of the interest focuses on new datasets, it is important to maintain existing datasets in order to ensure their long term viability. For datasets that are complete, this involves copying the data to new media when appropriate, updating the catalogue and incorporating the dataset into new systems such as the World Wide Web. There are also datasets that are still actively having new data added to them.

This year has seen considerable work on both copying data to new media and incorporating datasets into the World Wide Web interface. At the beginning of the year, the StorageWorks file server had recently begun operation. During the year, most of the data held on the old optical jukebox has been transferred to the StorageWorks. This is more complex than just copying files as the data has to be re-catalogued. The optical jukebox should be decommissioned early in 1996.

Work has proceeded on making existing datasets available through the World Wide Web. Most of the work consists of formatting existing information into a form suitable for the web. Datasets now available are TOMS, MST radar and SAMS (Stratospheric and Mesospheric Sounder). Datasets awaiting release are AAM (Atmospheric Angular Momentum) and TOVS (TIROS Operational Vertical Sounder).

Work on making other datasets available through the web proceeds at a pace that balances the wish to develop new datasets and the need to maintain existing ones.

3.1 Details of Specific Datasets

3.1.1 ATSR

The GDF microVAX holds data from the ATSR instrument on ERS-1. This is the average sea surface temperature product with a half degree spatial resolution. There is considerable interest in the BADC holding a more up to date version of this and we intend to obtain a CD containing such data as soon as the ATSR project releases it. The CD contains data written as two byte integers. If there is sufficient demand, the BADC could put some effort into making the data available in a more portable format, as we do with the UARS data. It is worth noting that the BADC does not hold any high resolution ATSR data. Such data has to be requested through ESA and is processed on demand rather than extracted from an archive. Within the UK, the processing is done by the UK-PAF for commercial requests and by the ATSR team at RAL for requests for scientific use. The BADC is currently examining the possibility of regularly producing monthly, gridded, average sea-surface temperature maps.

3.1.2 MST

A WWW interface was developed. The file format was changed to improve the portability of the data. RAL is the primary archive for MST data and the data is available the day after it is collected at the radar site. The data amounts to 9 GB.

3.1.3 TOVS

A revised version of this dataset in a new format and amounting to 3 GB was obtained from the Met Office. It was archived and re-catalogued. A WWW interface is being tested.

3.1.4 AAM

The data from the Met Office has been prepared for on-line access and a WWW interface developed. Help files are being prepared.

3.1.5 TOMS

We have acquired all the TOMS data up until the instrument failed in December 1994, a total of 2 GB. A video of 13 years worth of data, showing both hemispheres, was produced. One hundred copies were made for distribution to the community as a test for whether a video service would be popular (see UKMO assimilated data).

4. MIGRATION TO UNIX

Prior to this year, the BADC computer system was almost entirely based computers running the VMS operating system. It had been clear for some time that the atmospheric science community was moving to Unix, so in order to serve the community as well as possible, the BADC began to move to Unix as well. We currently have two Unix workstations and two Unix servers. At present, the bulk of our on-line storage space is still provided through a VMS computer, although it is readily accessible from the Unix machines.

5. WORLD WIDE WEB INTERFACE

As part of the move to Unix, the primary interface to the BADC is now through the World Wide Web. We provide information on the BADC, the data holdings, news items, software to process the data, the instruments used to gather the data, contact persons and links to related data and information services. Extensive help pages are available describing how to obtain the data, how to decompress the files (large files are compressed with the GNU gzip utility), how to build the software that is used to restore the data to its original form and extract the data in a meaningful form.

We have developed a WWW interface to the BADC catalogue allowing basic searches from a Web client.

In order to minimise costs, the BADC makes use of software freely available off the Internet whenever this is practical. We provide links to archives of this software so that users can obtain up to date versions of the software at their convenience.

6. UGAMP SERVICE

Since April 1995, we have allocated part of one member of staff to providing a service to the UGAMP community research programme. The aim is to provide them with tools tailored to their needs, while watching for ones that will have wider applicability. We have developed a browser to provide easy access to plots of the assimilated UKMO data from the UARS programme. The browser uses very general tools and can be adapted to work with other datasets.

We have also provided 8 GB of disk space for UGAMP to store Met Office data for use by software running on the Cray Y-MP at RAL. This storage space can be mounted from anywhere in that UK using NFS, thus eliminating the need for duplication of the data on local disks.

The UGAMP community are our largest known customers for the model re-analysis data that we are beginning to get from ECMWF. The data is actually being acquired and delivered to the BADC by a post-doctoral researcher at Reading.

7. CD-ROM PRODUCTION

Although the BADC stores all of its data on-line so that anyone can copy data files across the network, this can take up a lot of disk space on the recipient's computer. It has been our experience that meteorological data has the widest use across the atmospheric science community. Consequently, we have begun to supply assimilated UKMO data on CD-ROMs. This data can be read directly from the CD-ROM on most Unix workstations¹, so no extra storage space is needed.

8. INTERNATIONAL LINKS

8.1 CEO

THE BADC has taken part in two studies for the Centre For Earth Observation. The first was the Pathfinder Study to gather user requirements in the area of Global Change Atmosphere. The study was led by the Hadley centre and conducted in depth interviews with 75 organisations across the whole of Europe. The BADC developed the Experimental Demonstrator for this study, which was a World Wide Web system based on the existing BADC one. It was accessed from 1238 locations in over 33 countries.

The BADC was the prime contractor for an Independent Concept Design Study for the CEO. This study defined the concept of the CEO from the point of view of non-profit research organisations and will form one of the major inputs to the final CEO design. The study team has members from the UK, Ireland, Norway, the Netherlands and Greece.

8.2 EOSDIS

The BADC is involved with the development of the NASA EOSDIS programme. There are two reasons for this. Firstly, the EOS programme will generate a large amount of EO data and UK scientists will wish to access this. We are monitoring the development of the EOSDIS Core System software to allow the UK to obtain maximum benefit from the tools being developed. Secondly, the UK is a major partner in building the High Resolution Dynamic Limb Sounder (HIRDLS) instrument. The UK members of the science team will need to be assured of ready access to the data as soon as the instrument is launched.

Dr. Peter Allan is a member of the EOSDIS data panel, the body that oversees the development of the entire system. He is also a member of the UK HIRDLS programme committee. Dr. Lesley Gray is a member of the Goddard DAAC User Working Group, the scientific steering committee for the DAAC. Prof. Richard Holdaway, the head of the Space Systems Division at RAL, is a member of the EOS Program Manager's Group and chairs the UK HIRDLS programme committee.

¹ We believe that it will work on most Unix workstations, but we have only been able to test it on Sun, DEC, and IBM RS/6000 workstations, these being the machines available to the BADC.

9. USAGE OF THE BADC

The Web server is accessed about 800 times each week and has been accessed from 3366 machines in total, 962 of which are in the UK. The Web server only keeps track of machines rather than individual users, so the number of UK users who have accessed the BADC will be larger than the figure of 962 as some of the machines will be multi-user ones. The most popular pages are the links to other atmospheric science servers, the search of the catalogue and the news page. The CEO demonstrator has also been popular since its inception on 21 April. The popularity of the page that gives links to other data services shows that we are having some success in being the first point of contact when someone needs to find information on atmospheric science.

A companion service to the World Wide Web is the ftp service as this allows a user to transfer many files with a single command, something that would be tedious using the web. There are 61 registered users of the file server, excluding BADC staff. An important statistic to gather is the number of bytes being transferred by ftp. Unfortunately we have been unable to do this as the ftp service is provided by a VMS machine and this does not gather statistic on the amount of data being transferred, only on the number of network logins. We expect this situation to improve as the main ftp server is moved to a Unix platform.

The menu interface on the GDF microVAX is still being actively used. There are 293 registered external users although not all are active. During the year, 99 users logged on a total of 1926 times. A measure of how much of the work has been transferred to the Web interface is that the number of logins for the period January 1995 to August 1995 is only 804. This is only one third of the rate of usage prior to the web interface becoming available, but demonstrates that considerable work remains to be done before the move to Unix will be complete.

10. HARDWARE CHANGES

During the year, we have purchased two Unix servers. The larger is a dual processor Digital AXP 2100 which will provide the main Unix service to the users of the BADC for the next few years. We also purchased a Sun SPARCserver 5 to provide a general purpose system on which we can test software before supplying it to our users, most of whom use Sun workstations, and to provide a way of running software that is not available for Digital Unix.

Most of the data held by the Geophysical Data Facility (the predecessor of the BADC) was stored on an optical jukebox system. Although 'high tech' in its day, it is now obsolete and we have almost completed the migration of data to a Digital StorageWorks system that has a capacity of 120 GB. This highlights the fact that in order to remain a leading Data Centre, the BADC has to use the most up to date storage technology, with the consequent costs involved in changing media every few years.

11. STAFF TRAINING

Several of the BADC staff have been on training courses in the last year.

11.1.1 *Peter Allan*

- Interviewing for Selection and Promotion
- JTS Management II
- JTS Management Development for Senior Grades
- JTS Project Management

11.1.2 *Peter Chiu*

- Unix Management
- JTS Management I

11.1.3 *Bernard Cooper*

- NT fundamentals
- NT server

11.1.4 *Lesley Gray*

- JTS Management II

11.1.5 *Andy Jackson*

- LAN training course

11.1.6 *Chunkey Lepine*

- Building a better team

12. LIST OF ACRONYMS

ACSOE	Atmospheric Chemistry Studies in the Oceanic Environment
ASTB	Atmospheric Science and Technology Board
ATSR	Along Track Scanning Radiometer
BADC	British Atmospheric Data Centre
BODC	British Oceanographic Data Centre
CAST	Centre for Atmospheric Science and Technology
CEC	Commission of the European Communities
CEO	Centre for Earth Observation
CLAES	Cryogenic Limb Array Etalon Spectrometer
DAAC	Distributed Active Archive Center
DEC	Digital Equipment Corporation
DoE	Department of the Environment
ECMWF	European Centre for Medium-range Weather Forecasts
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
EU	European Union
FTP	File Transfer Protocol
GDF	Geophysical Data Facility
GENIE	Global Environmental Network for Information Exchange in the UK
GER	Global Environmental Research
GOME	Global Ozone Monitoring Experiment
HALOE	Halogen Occultation Experiment
HDF	Hierarchical Data Format
HRDI	High Resolution Doppler Imager
ISAMS	Improved Stratospheric And Mesospheric Sounder
MLS	Microwave Limb Sounder
MST	Mesosphere/Stratosphere/Troposphere
NASA	National Aeronautics and Space Administration
NDSC	Network for the Detection of Stratospheric Change
NDSG	NERC Data Strategy Group
RMS	Royal Meteorological Society
SERC	Science and Engineering Research Council (now defunct)
SUSIM	Solar Ultraviolet Spectral Irradiance Monitor
TOMS	Total Ozone Mapping Spectrometer
TOVS	TIROS Operational Vertical Sounder
UARS	Upper Atmosphere Research Satellite
UGAMP	UK Universities Global Atmospheric Modelling Project
UKMO	United Kingdom Meteorological Office
WMO	World Meteorological Office