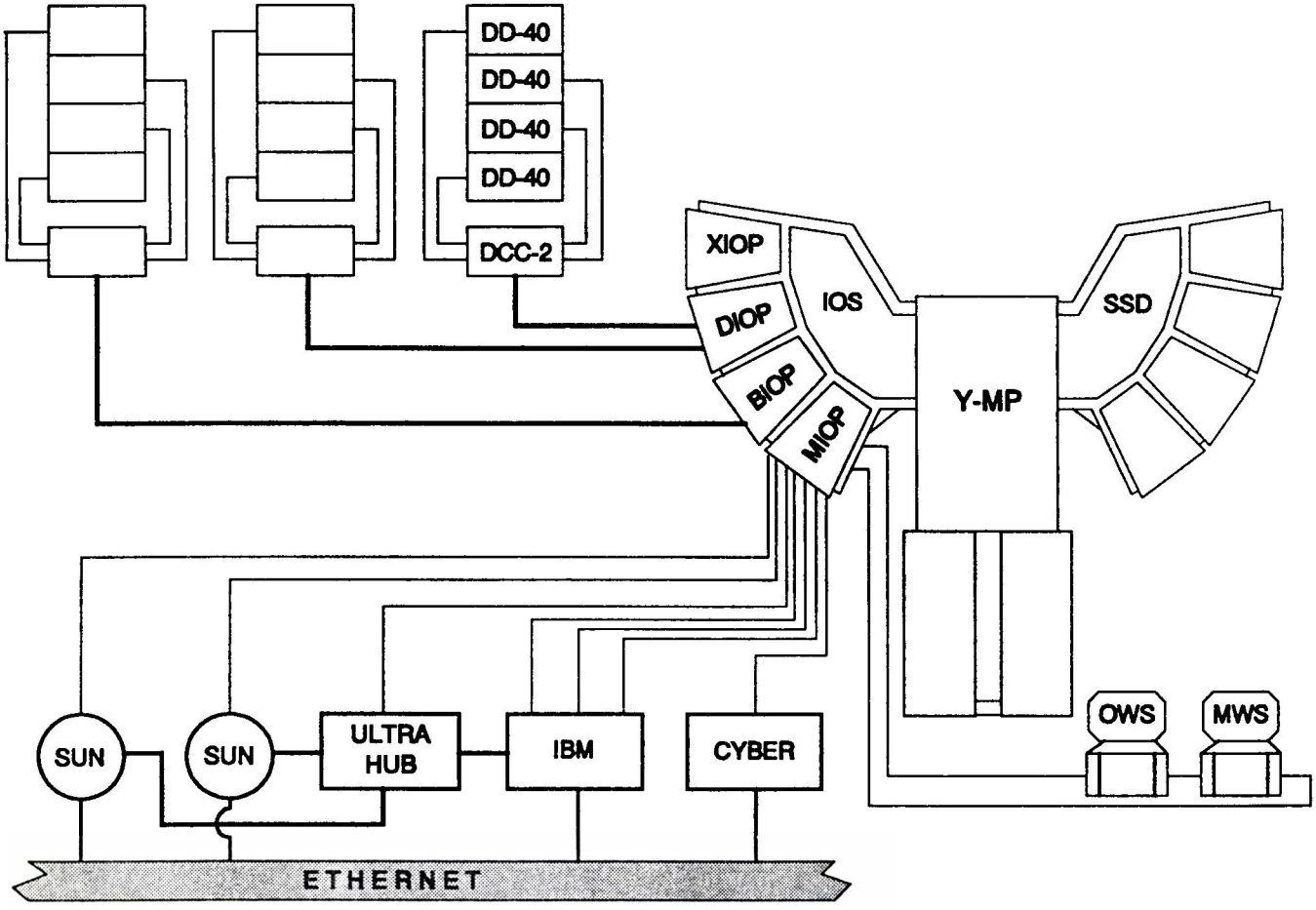
ECMWF Newsletter



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Europäisches Zentrum für mittelfristige Wettervorhersage
Centre européen pour les prévisions météorologiques à moyen terme

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COVER: The Y-MP configuration and connections at ECMWF
(see article on page 8).

This Newsletter is edited and produced by User Support.

The next issue will appear in March 1991.

A number of the articles in this edition of the Newsletter are concerned with the current replacement of the Cray X-MP by the Y-MP for operational forecasting, and the introduction of the UNICOS service, with its first accounting year to start on 31 December 1990. Much of the information on UNICOS, e.g the article on "Registration for, and control of, the UNICOS system" will be of direct relevance to Member States' users of the Centre's computer system and should be carefully noted.

Details of two of the Centre's annually run courses, the Computer User Training Course and the Meteorological Training Course, are included in this Newsletter also.

On a different theme, an article on experimental use of a reduced Gaussian grid in the forecast spectral model gives some indications of potential savings to be made without loss of quality in the products.

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CHANGES TO THE OPERATIONAL FORECASTING SYSTEM

Recent changes

No changes which would have a significant impact on the performance of the ECMWF analysis and forecast system have been introduced during the last three months.

Planned changes

A change will be introduced in the analysis so that the departures of the observations will be calculated against a first-guess at 3, 6 or 9 hours range depending on the actual observation time. This will increase the accuracy of the analyses.

A new procedure for the quality control of satellite temperature profiles will be implemented; a preselection will be performed before the data are passed to the analysis, making use of the high resolution cloud-cleared radiances received from NESDIS.

The first-guess checks of wind and humidity data will be enhanced.

Revisions will be made to the diagnostic cloud scheme, including a reduction in the incidence of non-precipitating cloud over the oceans. For cloud/radiation interaction, maximum overlap assumption will replace the present random overlap assumption.

The annual mean surface albedo will be revised.

A small amount of vertical diffusion in the free atmosphere will be introduced (it was set to zero for statically stable conditions in January 1988; the new setting will be a good deal smaller than the 1987 setting).

- Bernard Strauss

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USE OF REDUCED GAUSSIAN GRIDS IN SPECTRAL MODELS

Introduction

For the global spectral representation of atmospheric variables, resolution is uniform over the sphere when triangular truncation is used, as is the case in the ECMWF model. However, it is customary to integrate spectral models by carrying out much of the computation on a Gaussian Grid which is regular in longitude, and almost regular in latitude, and which is thus far from uniform in its resolution over the sphere. This procedure is called the transform method.

The possibility of integrating spectral models with fewer points around latitude circles away from the equator has been considered twice previously at ECMWF, but was not then pursued to the point of regular use.

It is now timely to reconsider this question. A model with increased resolution is planned for operational implementation in 1991, and the idea of using a reduced Gaussian grid is attractive as it implies reduced requirements for SSD storage of model workfiles, for disk storage of history files, for the archiving of grid-point single-level fields and for the computational time of the model.

Description of the grid

The grid used in the experiments reported here is based on the argument that if a certain grid-length is sufficient at the equator for use in the transform method with triangular truncation, then, because of the isotropy of this truncation, the same grid-length should in practice be sufficient everywhere, even if a precise alias-free calculation of quadratic terms is not achieved.

The reduced Gaussian grid is therefore defined by using the same distribution of latitude lines and the same number of points at the latitude line closest to the equator as the usual Gaussian grid, but the number of points at each latitude line on approaching the pole is reduced whenever this reduction produces a longitudinal grid-length which does not exceed the grid-length at the equator, and the number of points allows the use of the FFT routine (having only the prime factors 2, 3 and 5). This gives a much more uniform size for grid-boxes, as can be seen in Fig. 1 where the full Gaussian grid (Fig. 1a) and the reduced Gaussian corresponding to the triangular truncation T106 (Fig. 1b), are represented on a Lambert equal area projection.

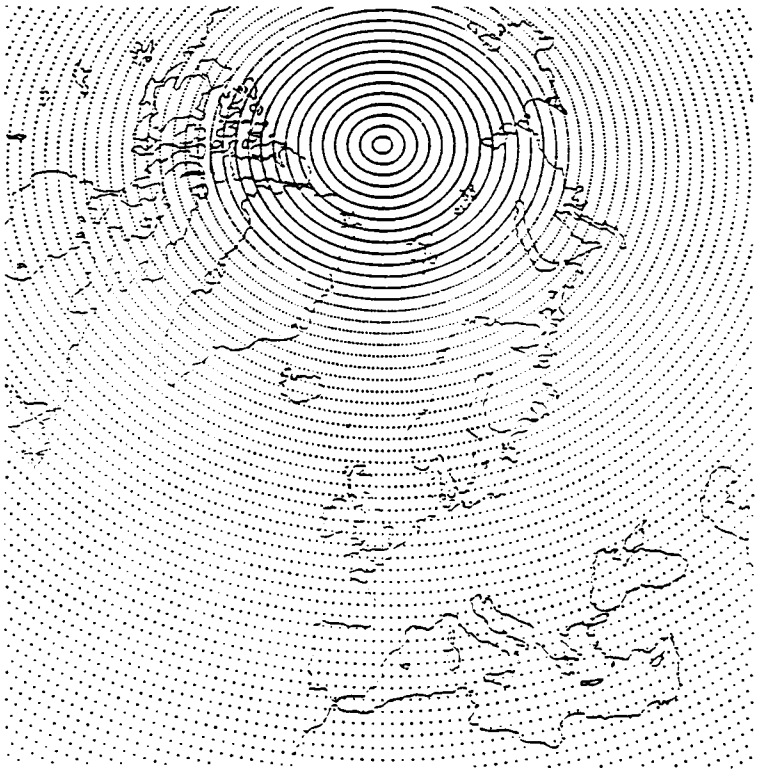

Fig. 1a: Full grid

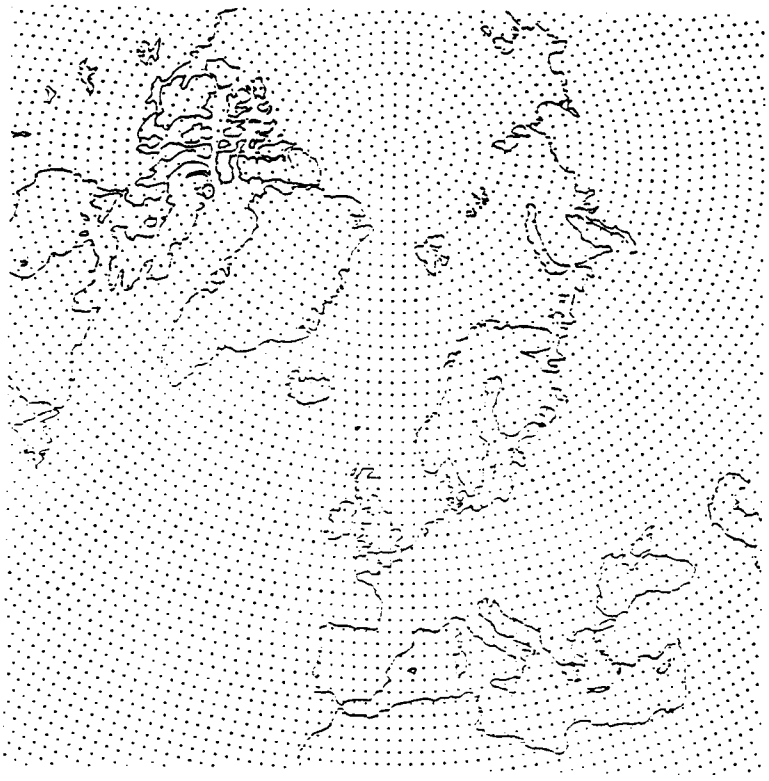

Fig. 1b: Fully reduced grid

While reducing the number of points per row, the number of zonal wave-numbers retained in the FFT's and which are input to the Legendre transforms is correspondingly reduced to (NLN-1)/3 where NLN is the number of points in the row.

In the version of the model used for the present experiments, not all the possible advantages of the reduced grid have been implemented. In fact, the potential savings in SSD and disk storage have not been attempted as

a) the actual I/O package is most efficient when it uses constant length records;

b) the plotting of meteorological fields is not capable at the present time of handling a variable number of grid-points depending on the row number. For this reason the post-processing of the forecast fields linearly interpolates these fields to the full grid;

c) the GRIB code does not allow storage of a "non regular grid" except by the use of a mask.

The changes made to the model were therefore to investigate the viability of the proposed reduction of grid-points in terms of accuracy of the model and to evaluate the savings made in CPU time by the reduced number of points used in the physical space.

At T106 resolution, the number of points in the full grid is 51200 while in the reduced grid it is only 33742, i.e. some 65.9%. In principle, therefore, the grid point calculations should take 33% less CPU time in the reduced grid, but this is not quite so for two reasons:

a) the vectorization in the present code of the model is performed over longitude points at every row; when this quantity becomes less than the vector length of the computer (64) the vectorization is less than ideal in efficiency;

b) the radiation subroutines, which are the most demanding part of the code in terms of computational requirements, represent a special case as the full radiation calculation is performed only over a subset of the grid points. In the present version of the model, the number of points on which the radiation is calculated with the reduced grid is only 17.1% smaller than with the operational grid.

The total saving obtained in CPU was 23% for T106 resolution and 27% for T213.

Results

After some idealized experiments were performed using a barotropic model and the semi-Lagrangian version of it with both the full and the reduced grid, a series of four 10-day predictions starting 15 July 1989, 15 October 1989, 15 December 1989 and 15 February 1990 was run using both the operational and the

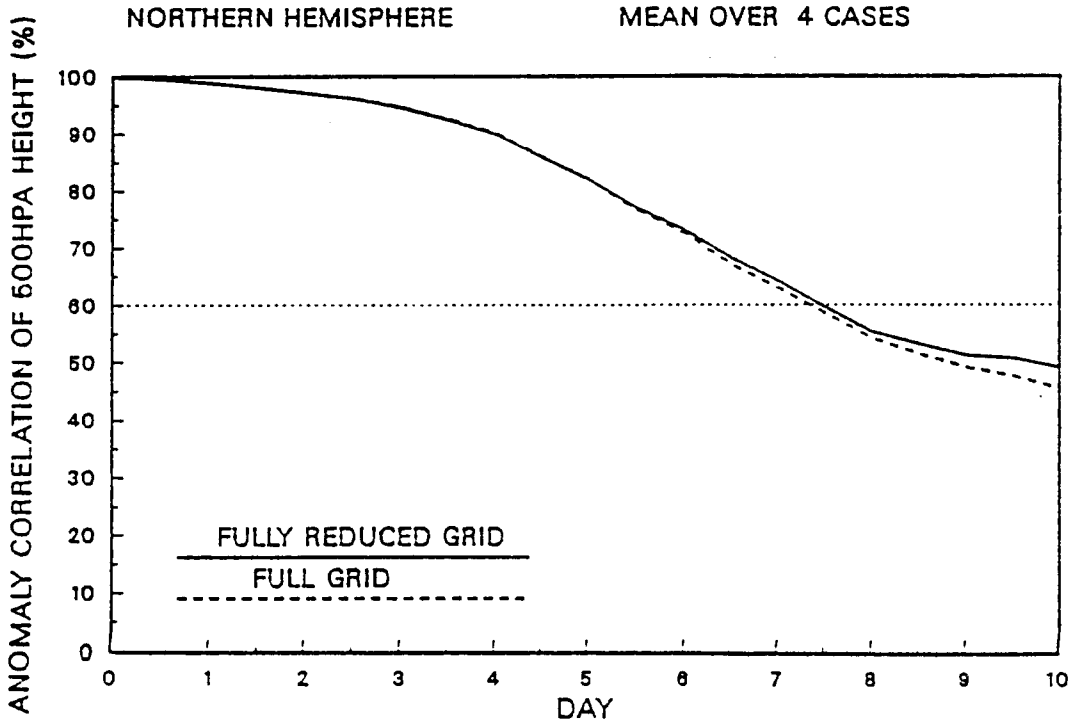

Fig. 2: Mean anomaly correlation of 500 hPa height for four predictions, using the operational and a reduced grid at T106 resolution.

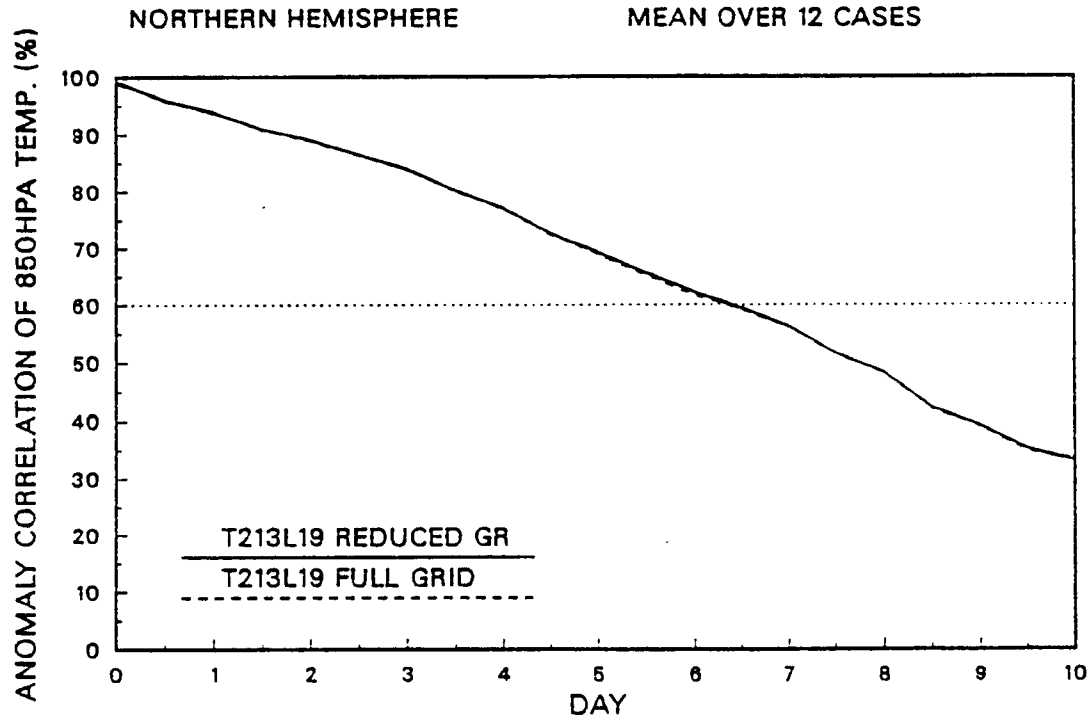

Fig. 3: Mean anomaly correlation of 850 hPa temp for 12 cases, using the operational and reduced grid, on 19 levels at T213 resolution.

reduced grid at T106 resolution. The results for each of these, in terms of averaged anomaly correlation of 500 hPa height, are presented in Fig. 2, from which one can see that the difference is very small. In these four cases the advantage is in any case in favour of the reduced grid.

After the new YMP-8 computer became operational, a series of comparisons between the full and the reduced grid at T213 resolution using both 19 and 31 levels in the vertical was run. The results corresponding to 19 levels are presented in Fig. 3 as a mean over 12 cases for the anomaly correlation of 500 hPa heights. The difference is even smaller than for T106.

The conservation of mass and total physical energy, as judged from the budget values printed in the four T106 experiments is exactly as good as in the operational model.

In order to see the extended forecast range behaviour of the reduced grid, a low truncation T42 experiment was run to 91 days from initial data of 1 December 1988, for which a control experiment using the full grid existed. Although the differences found are larger than for the T106 and indeed the T213 resolutions, all the main characteristics of the control forecast are also present in the reduced grid forecast.

Conclusion

The comparison between the performance of the spectral model using the standard gaussian grid and the "reduced grid" presented here shows that such a reduced grid can be used for short- and medium-range prediction (and presumably also for climate studies) with no significant loss of accuracy. The saving in computational time is some 23% for T106 and 27% for T213 and there are also potential reductions in the memory requirement of the model and the storage needed for the archiving of model results.

- Mariano Hortal

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THE Y-MP HARDWARE CONFIGURATION AT ECMWF

This article gives a brief summary of the hardware characteristics of the Cray Y-MP at ECMWF, highlighting the differences from and improvements over, the Cray X-MP.

Table 1 gives a comparative list of the main hardware characteristics of ECMWF's Y-MP and X-MP systems.

HARDWARE CHARACTERISTICS	Y-MP	X-MP
Number of CPUs	8	4
Clock cycle time (ns)	6	9.5
Peak computation rate (Gflops)	2.7	0.8
Size of main memory (MW)	64	8
Size of SSD (MW)	128	32
Peak SSD transfer rate (GBytes/s)	1	1
Type of disks	DD-40	DD-29
Number of disks	12	22
Size of disks (GBytes)	5.2	0.6
Total disk space (GBytes)	62.4	13.2
Disk transfer rate MBytes/s	9.6	4.5

TABLE 1

As can be seen from the schematic diagram on the front page of this Newsletter, the Y-MP configuration and its connections are quite complex. The CPU part of the Y-MP is very similar to that of the X-MP, the basic differences being that there are 8 CPUs in the Y-MP system as opposed to 4, and the CPU cycle time is 6 nsec as opposed to 9.5. The IOS and SSD parts of the Y-MP are also similar to those of the X-MP. The main differences here are the presence of a 100 MByte/s channel connection between the IOS and the SSD, which allows data to be transferred between the disks and the SSD without it having to be copied into main memory first, and the fact that the IOS and SSD are incorporated in the main chassis of the machine, instead of being separate as they were on the X-MP. The main differences in hardware between the Y-MP and the X-MP are in the areas of disks and intermachine connections.

Considering first the disks, we can see that instead of the old technology DD-29 disks that were present on the X-MP, the Y-MP is connected to DD-40 disks. Each of these disks has 8.5 times the capacity of the older disks and can transfer the data at twice the speed. Moreover, on the Y-MP the SSD is used as a cache for these disks (more specifically, for the data on the /tmp filesystem on these disks). This enables frequently accessed data to reside on the SSD and speeds the access time by a factor of up to 100 or more.

In the area of intermachine connections, there is a large difference between the situation as it exists on the Y-MP and that which existed on the X-MP.

The X-MP supported several connections. These were:

- 1 FEI (Front End Interface) connection to the IBM over which the Superlink (OSI) protocol was run, providing the ECFILE service.
- 2 FEI connections to the Cybers over which the Cray proprietary protocol SCP was run, providing station access to NOS/BE.
- 1 NAD (Network Access Device) connection to the LCN network over which the Control Data proprietary protocol RHF was run, providing access to the Cybers and the VAXes.

The Y-MP supports more connections. These are:

- 3 FEI connections to the IBM over which the Superlink (OSI) protocol is run, providing the ECFILE service.
- 1 FEI connection to the Cyber over which the Cray proprietary protocol USCP is run, providing station access to NOS/VE.
- 2 FEI connections to 2 SUNs (Charybdis & Scylla) over which the TCP/IP protocol is run, providing a gateway between the Y-MP and the local Ethernet and hence to all other machines on the Ethernet (SUNs, CDCNET and PCs, VAXes etc.).
- 1 channel connection to the ULTRANET hub over which the TCP/IP and ULTRANET (OSI) protocols are run, providing a high speed gateway between the Y-MP, the IBM and the 2 SUNs (and hence to the local Ethernet).
- 2 FEI connections to the Operator and Maintenance Workstations over which the TCP/IP protocol is run.

Although the plethora of connections seems to make things very complicated, in reality it actually simplifies interconnectivity at the Centre. For example, because both SUNs and the ULTRANET hub "speak" TCP/IP they can be used as backup for the normal gateway to the Y-MP. Hence if the SUN Charybdis, which currently handles the gateway function, fails, then it is a fairly simple matter to offload the gateway function to either the other SUN, Scylla, or to the ULTRANET hub (via Scylla). Similarly in the future the TCP/IP or OSI route to the IBM via the ULTRANET hub may replace, or act as backup for, the Superlink route for ECFILE.

- Neil Storer

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MIGRATION OF ECMWF'S OPERATIONAL METEOROLOGICAL SYSTEM TO UNICOS ON THE CRAY Y-MP

The ECMWF Meteorological Operational System (EMOS) contains approximately 150 separate Cray jobs, some of which are run up to 30 times each day. With the decision to acquire the Cray Y-MP, it became necessary to migrate this system to run under the UNICOS operating system.

First, it was important to define the conventions to be followed. These included proposals for:

* user names and privileges
* file names and permissions
* operational libraries
* temporary files
* script conventions
* script and function utilisation.

The conventions were written into an internal document which has since been updated many times, and which will eventually be made available as a Meteorological Bulletin. Possibly the most difficult part of this exercise was the definition of a typical operational script. The EMOS system relies heavily on being able to intercept all errors, and to report an ABORT state back to the SMS (Supervisor-Monitor-Scheduler) management system, and hence to the attention of operators and analysts. UNIX systems, being designed for interactive use, tend to report errors as messages, then to continue with the next command; thus, the trapping of errors in a batch script requires careful planning.

Next, the individual scripts for each job were written, the required codes migrated, and each job step carefully tested. Since much of the source code had been adapted over the years to isolate as far as possible operating system dependent features, and since UNICOS supports the same FORTRAN compiler and segment loader as previously used on the Cray X-MP, many codes required little more than re-compilation. Some specialised features, such as the fields data base and some aspects of the MARS system, required re-writing and re-implementation of code; in particular, the MARSINT interpolation package was re-written to enable support for higher resolution models in the future.

Cray (UK) Ltd. undertook the task of modifying the SMS system that they had written for the VAX/VMS in co-operation with ECMWF, so that it would operate under UNICOS. Once this modified system was delivered, the necessary jobs to run data assimilation cycles and a 10 day forecast were tested, and, when working, assembled as a test suite under the new SMS. These were run on a daily basis from early October. As further jobs were migrated, these were added, resulting in an almost complete operational suite by late October.

The EMOS system relies heavily on MARS and ECFILE, and it was essential that these components be available as early as possible. Thus, from an early stage

a MARS system was made available to internal users, so that it could be thoroughly debugged by the time it would be required for operations.

By 7 November sufficient confidence had been gained to switch delivery of the operational dissemination products to those generated on the Y-MP. Although some initial problems had to be overcome, every effort has been made to achieve as smooth a transition as possible, and to make the changes as transparent as possible for Member States users. Additionally, a series of planned "disasters" has been run, while the X-MP was still available, including the complete destruction of the Y-MP file base, to ensure that the procedures for recovery are checked out, and amended where necessary. These trials provided much useful information which will be used to reinforce the robustness and reliability of the service in the future.

Finally, at 09.00 on Tuesday, 4 December 1990, the operational processes on the Cray X-MP were discontinued.

- Rex Gibson

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UNICOS SCRIPTS FOR ECMWF METEOROLOGICAL OPERATIONAL SYSTEM

The following is an extract from the conventions drawn up for the migration of the ECMWF Meteorological Operational System (EMOS) to UNICOS. It is reproduced in the belief that it may be of general interest to users of ECMWF's Cray Y-MP computer system.

A standard login script will be used for each EMOS job; it will contain 3 sections:

1) SMS initialisation sequence
2) definition of environmental variables
3) definition of standard search paths, libraries, etc.

The SMS initialisation sequence will, additionally, establish a number of variants with respect to the date/time, stored in environment variables

EMOS_TIME_DIFF_etc, where etc shall include M3, M6, M9, M12, M18, M24, P6, and P24. These will contain yyyymmddtttt values corresponding to the base time minus or plus the increment indicated (eg, EMOS_TIME_DIFF_M24 contains the yyyymmddhh for 24 hours before the base time).

In addition, the environment variables will include:

SMS_NODE	SMS_MONTH	EMOS_MONTH
SMS_SUITE	SMS_DAY	EMOS_DAY
SMS_FAM	EMOS_SUBS	EMOS_TIME_DIGITS
SMS_TASK	EMOS_BASE	EMOS_TIME_STEP_H
SMS_YEAR	EMOS_YEAR	EMOS_TIME_STEP_M

Those values not directly presented via SMS micros will be assembled from such information within the login script; the algorithms used will differentiate between old style family names and new style family names, and assemble the correct information accordingly. Note that CAPITAL letter will be used for global environment variables, lower case letters for variables local to a particular script.

Since the basic UNIX system is more or less unfriendly and cryptic in appearance, the usefulness of the system is based upon the local operating environment and the accepted strategies. When many people access the same files and use the same programs and scripts, it becomes very important that the users know how file names and environment variables are defined, and how to get help from the computer.

When new tools are made, they should be documented immediately and made available for other users. In order to automate the documenting system, UNIX provides some tools, such as "man", but additional tools need to be built locally. Programs (FORTRAN, C or SHELL) can be made self-documented; that is, the documentation is written as comments, then extracted and stored for the man command. This is a logical extension of the DOCTOR type conventions already used throughout ECMWF for FORTRAN source code. Since UNICOS man command does not provide full search facilities, there should be separate man pages to guide the users. The same manual pages should be available for workstations using either the file server or automatic distribution.

Every effort should be made to provide neat, well documented scripts. Each script should have the following information, at least, at the beginning of the file:

* script name (possibly full path name)
* function
* interface - how called
  - environment variables
  - exit value(s)
* externals - other scrips, functions, programmes called
* method
* external documentation
* date of creation and last modification (modifier ID)

The body of each script should be divided into sections, and, if necessary, sub-sections, following the header described above. The only additional items of documentation that should be necessary within the script are the section and sub-section headings; however, documentation should be included to describe any unusual or obscure statements (these should be few and far between, as they are to be avoided wherever possible).

Scripts should be given names which are meaningful, rather than cryptic. It does not matter if the names are long - they are intended for batch, not interactive use. The name should indicate clearly what the script does. This makes other scripts more readable. The time spent searching for information on what some cryptically-named script actually does often far exceeds the time saved by writing short names.

UNICOS 5 limits file names to 14 letters. Use them all! (Do not add .sh for Bourne shell scripts as an appendage - it wastes 3 letters and is not necessary.) As an example:

```
exss                                - is relatively meaningless
extractsubstr  or  extr_sub_str     - makes more sense.
```

There are two types of variables in scripts, local and global (or external). By convention the local variables should be in lower case and EXTERNAL variables in UPPER CASE. This makes it easy to read the script, since it is obvious which is which. Variable names are not limited in length, so use names that really mean something, for example:

```
        string_length or
        str_len
NOT
        sl.
```

Loop counters can be short; "i" is often used in "for" loops.

Attention should be given to the effectiveness of the use of functions defined within an include file. A set of useful functions will be maintained in

/ec/emos_sms/.functions

Bourne shell provides an easy way of creating a simple task to be executed INSIDE the current process by the function definition mechanism. This is similar to the C-shell alias mechanism. It is not obvious when to use a script, a function, eval or a program. The following guidelines are derived from Otto Pesonen's experience of UNIX programming. In most cases it is advisable to begin by writing a script, and if necessary to move to a programme later.

A function should be used:

* when the task is relatively small
* when the task should alter the calling process (environment variables)
* when the task is called many times.

NOTES:

1) Remember to use return instead of exit to terminate the function.
2) Test functions properly!

A script should be used:

* when the task is complex
* when the task is new, or rarely used from other scripts
* when the task only needs to return exit status, and does not alter the caller's environment

"eval" should be used:

* when the script (or program) needs to alter the caller's environment, such as computing an environment variable from given parameters where the use of a function is not acceptable;
* when this is the only way to pass arguments to another script and still alter the caller's environment.

NOTE:

When "eval" is used, the referenced script needs to output commands for the shell to execute. This often means that scripts which are expected to be used as targets of eval must contain two levels of logic; as a result they can look very clumsy, and should be avoided where possible.

The . (dot) command should be used:

* for startup files
* to include a file

NOTE: arguments cannot be used.

A C programme should be used instead of a script:

* when the task needs character handling or is something that is very difficult to execute using script(s) (e.g. mathematics)
* when the task is complex
* when the shell script takes too much time to run or becomes too complicated.

NOTE:

The overhead for starting a small script is greater than that of starting a C programme.

Functions should be subject to similar naming conventions as scripts. Externally defined names should be in UPPER CASE and local names (defined in the current script) in lower case. Names should be readable and they may be as long as required. They are not limited to 14 characters.

When the script terminates itself due to a missing file etc, it should abort, giving the reason why, and also trace information on how the script was

called. A function is available to handle this. To facilitate the clarity of batch job output, and to assist in locating run-time errors, it is necessary for a script to output information on the progress it has made. The use of set -v and set +v for this purpose is rather crude. A more elegant method is use of the "echo" command, or to echo comments from the current shell; alternatively a simple function (info) is available to output, additionally, a trace of all the names of scripts called. Such trace information can enhance the value of the output, assisting in the identification and location of problems. It is recommended that the "info" function be used on entry to each script, and that an "abort" function be specified which can be called to give traceback and additional information in abnormal situations. It is also recommended that a script header sequence, and a section header for each section of the script about to be executed, be passed to the log.

The functions should be gathered into a starting (profile) file to be included into scripts, invoking them by the Bourne shell command . (dot).

```
. /some_path/start_funcs
```

\- Otto Pesonen and Rex Gibson

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COMPUTER SYSTEM - SCHEDULED MAINTENANCE AT ECMWF

Now that the Cray Y-MP/8-64 is in service and the Cybers 855 are to be replaced by a CDC Cyber 962-11, it has been agreed that there will be no routine hardware maintenance carried out on weekdays. All routine maintenance will be done on Saturdays between 0800 and 1200 hrs local time.

If unscheduled maintenance is required during the week it will be carried out with, or instead of, systems development sessions on Wednesdays between 0700 and 1000 hrs local time.

All hardware maintenance and systems development sessions are displayed on the monitors at ECMWF and can also be displayed either via NOS/VE by typing DISPLAY_MAINFRAME_STATUS (DISMS), or via VAX VMS by typing NEWS S.

- Graham Holt

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TIMETABLE FOR INTRODUCTION OF THE UNICOS SERVICE

Articles in the last two ECMWF Newsletters have given the overall plans for, and current status of, the provision of high-speed computing facilities at ECMWF. With the hardware fully installed and accepted, emphasis is now on the introduction of UNICOS, which replaces the COS service. A summary of current progress, and plans for the immediate future, are given below.

TIMETABLE:

17 August	Access was provided to those Member States' users who visit ECMWF, or have NOS/VE access.
1 October	Access was provided to all Member States' users via the telecommunications network.
15 October	Parallel runs of the operational forecast suite began, test products were archived but not distributed.
7 November	Member States receive products from the operational forecast suite running on the Y-MP. Cray X-MP forecast suite still run in parallel and repeat products for Member States obtained from the Cray X-MP version.

14 November	Repeat products for Member States are available from the Cray Y-MP forecast suite. MARS production archive data switched to data generated on the Cray Y-MP.
4 December	The Cray X-MP (COS) forecast suite ceased.
30 December	The COS service terminates, followed by the removal of the Cray X-MP/48.
31 December	Start of the 1991 accounting year for use of UNICOS.

SOFTWARE:

The following additional components of the Centre's software systems have been made available since publication of the last ECMWF Newsletter:

- batch job submission from VAX/VMS;
- batch job submission from Member States via the telecommunication system;
- operational forecast suite, including the supervisor;
- a full release of MARS;
- METGRAM.

- Andrew Lea

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REGISTRATION FOR, AND CONTROL OF, THE UNICOS SYSTEM

Beginning on Monday, 31 December 1990, the UNICOS service will formally become the Centre's main computing service, replacing the COS service which will cease on that day. This article covers several matters related to registration for, and control of, the UNICOS service.

Registration

For Centre staff all existing COS registrations should have been carried over to UNICOS. Any new staff members will be registered using the standard staff arrival/departure form issued through Personnel.

Member State users are registered every year, using the standard Computer Project Registration Form. The 1991 form has been sent to all Member States' Computing Representatives and Special Project Holders.

Every user of the ECMWF computer system is given a separate 3 character user identifier. Both because of security requirements, and because of the way ECFILE files are stored and identified, a given identifier must not be shared by two or more users. The first 2 characters of the user identifier are common to a given section or group of people, (e.g. all User Support identifiers begin US). The third character is then assigned by the ECMWF manager responsible for the user, by the Member State Computing Representative, or by the Special Project Holder, as appropriate.

Groups of users are then assigned to a computer project (or account). Each computer project is assigned a unique account name so that usage can be debited to the correct project. Reports listing usage against each computer project are generated at regular intervals (daily, weekly, 4-weekly, annually), the 4-weekly ones being widely distributed.

Passwords

UNICOS requires that every individual user has a private password. Member States' users who have been registered to date have been given their passwords via their Member State Computing Representative or Special Project Holder.

If those users who are already registered for 1990 are re-registered for 1991, there will be no change of password.

UNICOS passwords for new users will be sent by mail to the Member State Computer Representative or Special Project Holder for distribution to individual users. Initial passwords are always set up as "expired", meaning that they must be changed before the user can run any work on the machine.

Passwords must contain at least one non-alphabetic character. Although passwords can be of any length, only the first 8 characters are significant.

Passwords will expire approximately 30 days after the last change and will then have to be reset. They cannot be changed again within a "week" of their last change. Under UNICOS a new "week" is defined as always starting on a Thursday!

If at any time five consecutive unsuccessful attempts are made to use UNICOS because of an incorrect password, then that user will be prevented from further use of the system, irrespective of whether or not the password has subsequently been given correctly. Under such circumstances ECMWF will only accept instructions to reactivate the user from the Member State Computing Representative or Special Project Holder. Please note that ECMWF will not accept such requests direct from individual users. User Support at ECMWF will arrange for the relevant user identifier to be reactivated, and a new password assigned. That new password will be posted, again in a sealed envelope, to be passed to the user concerned.

Under no circumstances will ECMWF send passwords via telephone, telex or facsimile transmission. It should therefore be noted that if a user is deactivated, it will be several days before he receives his new password, and can use UNICOS again.

If a user forgets his current password, ECMWF will change it using the same procedure as above.

On this subject it may be mentioned that at the next meeting of Member States' Computing Representatives it is intended to raise the question of how to handle password assignment procedures more efficiently. That meeting is planned for May 1991, and details will be sent later.

Control of usage

The control of usage under each project account will be broadly similar to that for COS. The main points are:

- every 24 hours usage on every project will be calculated and added to the total usage (cumulative from the beginning of the year);
- that total usage will be compared to the annual allocation. If it exceeds the allocation, then no further use will be allowed under that project;
- unused resources can be moved from project to project, initially, by contacting User Support. It is hoped to allow Member States' Computing Representatives to perform this task themselves later.

As UNICOS does not have a system of job priority levels similar to COS, a different procedure is being adopted regarding high priority jobs; there will be no division of allocation into high and normal priorities. Instead any job can be run at high priority, but it will then be charged at 5 times the rate for a normal job. This factor of 5 may be adjusted in future in the light of experience.

IDs registered on more than one Project account

For IDs that are registered on more than one Project account there are two aspects to be borne in mind - one concerning groups and the other the use of another account. Users who will use their ID on more than one account should thus be aware of the following:

Project accounts

Where a user ID is registered on more than one account, the first account on its list of accounts is its **default account**. To see the list of accounts on which a user is registered, use the command

```
accounts uid
```

where uid is the user ID concerned.

If a user does not specify a particular account on a UNICOS job, then all usage is automatically credited to the default account. To allocate usage to another account the user must either

(i) at the beginning of the UNICOS job, use the command

newacct acct

where acct is the new account to credit usage against. Note that under this method the initial user prolog (profile) will still execute under the default account, as the change to the new account does not take place until the "newacct" command is executed. Thus, if the default account has exhausted its resources completely, the job will not execute at all;

or

(ii) users submitting UNICOS jobs from NOS/VE, or from within UNICOS itself, may specify the following QSUB parameter to attribute usage immediately against a different account

#QSUB -A acct

where acct is the new account against which to attribute usage. This method avoids the problem mentioned above under method (i). However, there is no equivalent of this -A parameter for users submitting jobs via the RJE link or interactively from the VAX. Such users **must** use newacct.

Finally please note that the job accounting summary only gives the usage of the last account used.

Assigned groups

When a user ID is registered, it is assigned to one or more "groups". By default, all users in a given group can read each others files, whereas files belonging to other groups are not accessible.

By default all IDs in one Member State are assigned to the same group, whereas each Special Project is assigned to a different (separate) group.

Where it is required that a given set of users be able to share files in a group which is not the default group, then this should be specified on the registration form. Note that all users under a given project account will be assigned to the same groups. If this is not required, then ECMWF should be informed in writing of exact requirements. This should preferably be done at the time of registration.

Any user can see the list of groups his ID is assigned to by using the command

groups uid

where uid is the user ID concerned.

The first group listed is the default group. Any file the user creates is automatically assigned to that group first. To change the assignment, the user must use the following command after the file has been created:

chgrp newgroup filename

where newgroup is the new group the file is to be assigned to, and filename is the name of the file(s) concerned.

- Andrew Lea

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COMPUTER USER TRAINING COURSE

The Centre is offering a computer user training course for Member States' personnel and ECMWF staff from 4 - 22 March 1991. Full information and a request for nominations has been sent out.

Based on experience gained, the structure of this course has been altered since the last course was held (September 1990). The course is now divided into three one-week modules, and attendees can register for each module separately.

Week 1: An introduction to UNIX is offered, for those who have no knowledge of this operating system.

Week 2: Covers UNICOS extensions to UNIX, ECMWF utilities and the ECFILE file system.

Week 3: MAGICS and MARS are being extended slightly and will occupy the third week.

As before, each week will consist partly of lectures and partly of practicals. In more detail, the three modules will consist of:

MODULE 1 (4 - 8 March 1991) UNIX

Introduction to UNIX history and basis structure

Introduction for the file system

Basic commands

File manipulation and attributes

I/O commands

Basic shell scripts

More advance shell script handling.

MODULE 2 (11 - 15 March 1991) ECMWF'S UNICOS Service

System and hardware overview
UNICOS batch jobs
FORTRAN
ECFILE file storage system
Specialist file services, including sendtm.

MODULE 3 (18 - 22 March 1991) MAGICS & MARS

MAGICS
- Introduction and overview
- Concepts
- Parameters
  - Subroutines
  - Action and pseudo-action routines
  - Data input
- Plotting features
- MicroMAGICS

MARS
- Overview
- MARS data
  - Data format
  - Archive contents
- MARS utility
  - System description
  - User interface.

- Andrew Lea

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STILL VALID NEWS SHEETS

Below is a list of News Sheets that still contain some valid information which has not been incorporated into the Bulletin set or republished in this Newsletter series (up to News Sheet 256). All other News Sheets are redundant and can be thrown away.

No.	Still Valid Article
89	Minimum field length for Cray jobs
135	Local print file size limitations
158	Reduction in maximum print size for AB and AC
187	Maximum memory size for Cray jobs
194	Preventive maintenance schedules
201	New Cray job classes
204	VAX disk space control
205(8/7)	Mispositioned cursor under NOS/VE full screen editor
207	FORMAL changes under NOS/VE
	Job submission from within a Cray job, using LAUNCH
208	Restriction of Cray JCL statement length
212	MFICHE command from NOS/VE
214	NAG Fortran Library Mark 12
	News Sheets on-line
215	MARS - data retrievals and model changes
219	MARS-Retrieval of most recent fields extraction utility
223	Corrections to ECFILE bulletin
	Aborting programs under VAX VMS
224	CRAY deferred class
	Job information cards
226	CRAY Class X
227	Extension of NOS/VE SUBCJ.
229	ECFILE audit facility
230	Access to AB printer via NOS/VE CDCNET
	Replot facility of DISPLOT
231	METGRAM under NOS/VE
232	NOS/VE passwords - how to change
235	VAX public directory - how to create
236	Alternative VAX graphics service for in house users
241	SENDTM - Cray file transfer to Member States
242	MARS - various changes
243	Member State file transfer
	Disposal of NOS/BE documentation
246	User registration on the VAX systems
247	Stranger tape transfer service on the IBM
	Use of CFSPATH/TARGET parameter within MARS retrievals
248	Changes to the Meteogram system
250	Introduction of the NOS/VE interface to ECFILE
251	Removal of VAX Menu System
253	Copying/archiving NOS/VE catalogs to ECFILE
	Copying complete UNICOS directories to ECFILE
254	UNICOS carriage control

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THE METEOROLOGICAL TRAINING COURSE, 8 APRIL - 7 JUNE 1991

In spring 1991 ECMWF will again organise a meteorological training course. The objective of the course is to assist Member States in advanced training in the field of numerical weather forecasting. Students attending the course should have a good meteorological background. Some practical experience in numerical weather prediction is an advantage.

The course is divided into three modules:

Numerical Weather Prediction I

Met 1 - (8 - 26 April 1991).
Numerical methods, adiabatic formulation of models, data assimilation and use of satellite data

Numerical Weather Prediction II

Met 2A - (29 April - 10 May 1991).
Parametrization of diabatic processes

Met 2B - (13 - 17 May 1991).
General circulation, systematic model errors and predictability

ECMWF Products

Met 3 - (28 May - 7 June 1991)
Use and interpretation of ECMWF products

Modules Met 1 and Met 2 will be of most interest to young scientists who are involved in the development of numerical models for operational forecasting or research. Module Met 3 is more directed towards those staff in the meteorological services who are (or will be) using ECMWF products, either directly as forecasting staff, or in development work aimed at maximising the benefits to users of the Centre's products.

Students may attend any combination of the modules. However, those attending Met 2 only are expected to have a good knowledge of the topics covered in Met 1. The courses Met 2A and 2B can be taken independently. Participation in Met 3 does not require attendance at the other modules.

In each module there will be lectures, exercises and problem or laboratory sessions. Participants are encouraged to take an interest in the work of ECMWF and to discuss their own work and interests with the staff of the Centre. All the lectures will be given in English and a comprehensive set of Lecture Notes will be provided. Copies of the Lecture Notes will be sent to participants prior to the course. It is advisable to read them in advance.

Application forms and booklets describing the course in more detail will be mailed to meteorological services of Member States and many universities and institutions by December 1990. If you do not have access to one of these, copies as well as further information on the course can be obtained from Els Kooij-Connally at ECMWF.

All applications from within Member States should be channelled through the relevant national meteorological service, but those from non-Member States should be sent to the Secretary-General of WMO.

- Els Kooij-Connally

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ECMWF CALENDAR 1991

1 January	**ECMWF holiday**
4-22 March	Computer user training course
6-7 March	Finance Committee - 46th session
28 March (pm)-1 April	**ECMWF holiday**
8 April - 7 June	Meteorological training course:
	Met 1 Numerical methods, adiabatic formulation, data assimilation, satellite data - 8-26 April
	Met 2A Parametrisation - 29 April-10 May
	Met 2B General circulation, systematic errors & predictability - 13-17 May
	Met 3 Use & interpretation of ECMWF products - 28 May-7 June
6 May	**ECMWF holiday**
24-27 May	**ECMWF holiday**
11-14 June	Symposium: Use of NWP products in medium-range weather forecasting in Europe
18-19 June	Council - 34th session

26 August	**ECMWF holiday**
9-13 September	Workshop: Fine-scale modelling for parametrisation schemes
30 Sept.-2 October	Scientific Advisory Committee - 19th session
2-4 October	Technical Advisory Committee - 16th session
8-10 October	Finance Committee - 47th session
13-15 November	Workshop: Predictability
18-22 November	Workshop: Meteorological operational systems
3-4 December	Council - 35th session
24-26 December	**ECMWF holiday**

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ECMWF PUBLICATIONS

Seminar	Ten years of medium-range weather forecasting 4-8 September 1989 2 volumes
Technical Report 65	The ECMWF analysis-forecast system during AMEX (Puri, K., P. Lönnberg and M. Miller)
Technical Report 66	The calculation of geopotential and the pressure gradient in the ECMWF atmospheric model: Influence on the simulation of the polar atmosphere and on temperature analyses (Simmons, A.J. and Chen Jiabin)
Technical Memorandum 171	Report on the pilot study to establish the value of information exchange between ECMWF and national focal points for radiosonde systems
Technical Memorandum 172	Surface fluxes from short range forecasts
Technical Memorandum 173	Momentum budgets

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INDEX OF STILL VALID NEWSLETTER ARTICLES

This is an index of the major articles published in the ECMWF Newsletter plus those in the original ECMWF Technical Newsletter series. As one goes back in time, some points in these articles may have been superseded. When in doubt, contact the author or User Support.

METEOROLOGY (cont.)

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* T indicates the original Technical Newsletter series

USEFUL NAMES AND 'PHONE NUMBERS WITHIN ECMWF

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Director	- Lennart Bengtsson	OB 202	2001
Head of Operations Department	- Michel Jarraud	OB 010A	2003
ADVISORY OFFICE - Open 9-12, 14-17 daily		CB Hall	2801 (Bleeper 139)
Other methods of quick contact:	- Telex (No. 847908) - Telefax (No. 869450) - VMS MAIL addressed to ADVISORY		
REGISTRATION			
Project Identifiers	- Pam Prior	OB 225	2384
User Identifiers	- Tape Librarian	CB Hall	2315
COMPUTER OPERATIONS			
Console	- Shift Leaders	CB Hall	3333
Reception Counter	- Tape Librarian	CB Hall	2315
Tape Requests	- Tape Librarian	CB Hall	2315
Terminal Queries	- Norman Wiggins	CB 028	2308
Telecoms Fault Reporting	- Michel O'Brien	CB 035	2306
DOCUMENTATION - Distribution	- Els Kooij-Connally	Library	2751
LIBRARIES (ECLIB, NAG, etc.)	- John Greenaway	OB 226	2385
METEOROLOGICAL DIVISION			
Division Head	- Horst Böttger	OB 007	2060
Applications Section Head	- Rex Gibson	OB 101	2400
Operations Section Head	- Bernard Strauss	OB 004	2420
Meteorological Analysts	- Taskin Tuna	OB 005	2424
	- Alan Radford	OB 002	2421
	- Alex Rubli	OB 003	2425
Meteorological Operations Room	-	CB Hall	2426/2427
COMPUTER DIVISION			
Division Head	- Geerd-R. Hoffmann	OB 009A	2050
Systems Software Section Head	- Claus Hilberg	CB 133	2350
User Support Section Head	- Andrew Lea	OB 227	2380
Computer Operations Section Head	- Peter Gray	CB 023	2300
GRAPHICS GROUP			
Group Leader	- Jens Daabeck	OB 016	2375
RESEARCH DEPARTMENT			
Head of Research Department	- David Burridge	OB 119A	2005
Computer Co-ordinator	- David Dent	OB 123	2702

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* CB - Computer Block OB - Office Block

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EARN/Bitnet: The ECMWF address on the EARN/Bitnet network is UKECMWF. Individual staff addresses are the first 8 characters of their surname, e.g. the Director's address is BENGTSSO@UKECMWF

DEC MAIL: Contact scientific and technical staff via VMS MAIL, addressed to surname