European Centre for Medium Range Weather Forecasts

ECMWF NEWSLETTER

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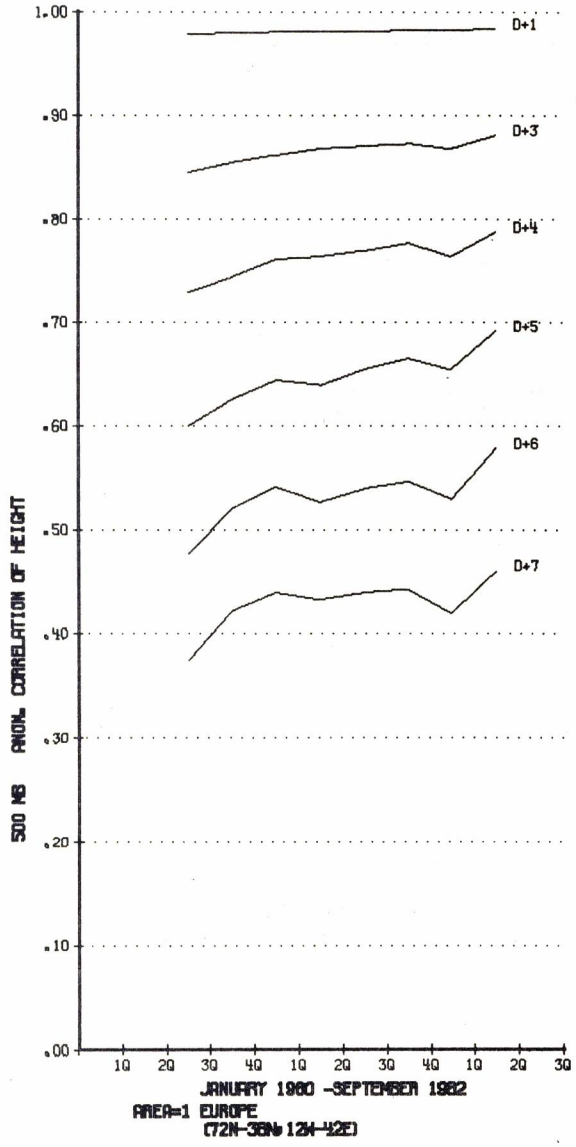

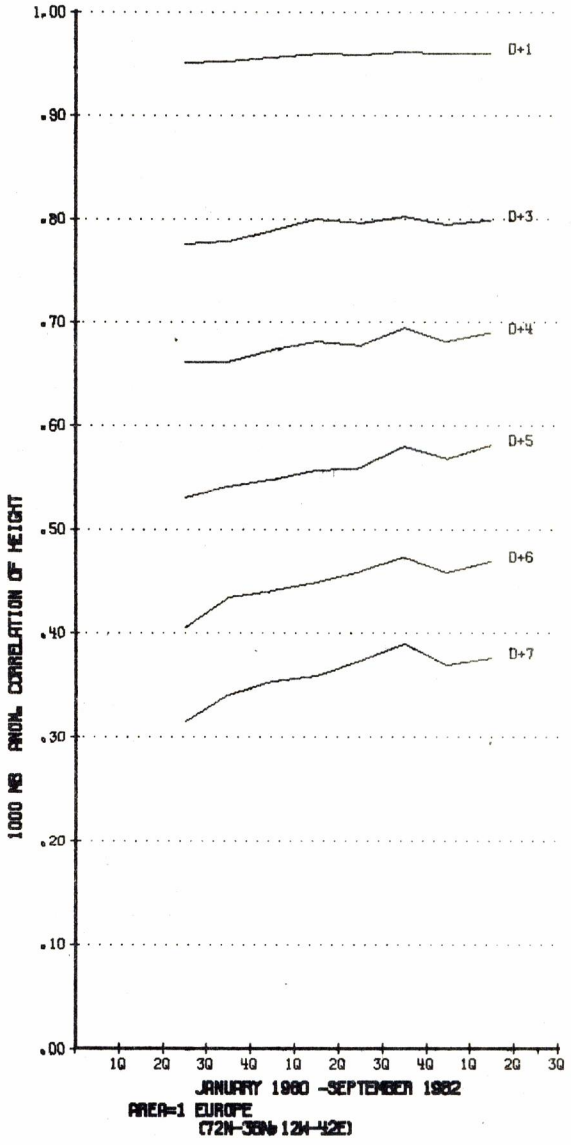

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METEOROLOGICAL

COMPUTING

GENERAL

COVER: Twelve month running mean scores for ECMWF forecasts from January 1980 to September 1982. Accompanying article on p. 11.

This Newsletter is edited and produced by User Support.

The next issue will appear in February 1983.

EXPERIMENTS ON OROGRAPHY AND HIGH RESOLUTION

1. Introduction

In a previous article, ECMWF Newsletter No. 16, it was shown that a better forecast could be obtained by increasing the horizontal resolution of the ECMWF model. The experiments on a case of Genoa cyclogenesis, using the limited area version of the ECMWF grid point model (LAM), showed that the N96(*) resolution was able to produce a better forecast when details of the orography at that resolution were included. In addition, it was found that the forecast of the shape and location of the Genoa cyclone was sensitive to the orographic representation used.

Two representations were tried - an "average" orography derived, as in the operational model, by taking the grid box mean of a high resolution orography and an "envelope" orography. The envelope orography is a representation that tries to simulate the sub-grid scale orographic effects by adding to the average orographic height in each grid box a quantity proportional to its sub grid scale variance.

This article describes further experiments which have shown that, when the horizontal resolution is increased, a smaller amount of variance needs to be added to the average orography in order to give the best results. In the third section, we examine in more detail an experiment performed with very high resolution.

2. Experiments with various orographic representation

Experiments have been performed at N48, N96 and N192 resolutions on the case of lee cyclogenesis in early March 1982. When defining the orography for the respective resolutions, the choice was between the average and an envelope orography. It was found that at the N48 resolution, the envelope orography, with only one variance added, was able to create the right obstacle for the flow to obtain the Genoa cyclone in the right position. Adding twice the variance creates a mountain which is too steep on the western side of the Alps; obstructing the Rhône valley, it forced the flow between the Massif Central and the Pyrenees and displaced the cyclone four to five degrees too far to the west.

When the resolution was increased to N96, the envelope orography with one variance still gave a better forecast than the average orography, but indications that this envelope may be too steep appeared. The forecasts became noisy and, similarly, the centre of the cyclone was displaced to the west. This tendency was evident at the N192 resolution, when the envelope orography with one variance was clearly too steep. However, at this resolution, the average orography is an accurate description of the steepness and height and was able to give a good description of the Genoa cyclone.

3. The high resolution experiment

The following gives more details of the experiment which used the N192 resolution, four times finer than the operational model, and an average orography. In this case, the LAM was used as a fine grid model nested inside the coarser operational model. The N48 operational forecast was used to

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(*) N96 refers to 96 grid points between pole and equator in a regular latitude-longitude grid, i.e. a resolution of 0.9375°, or twice the resolution of the operational ECMWF model.

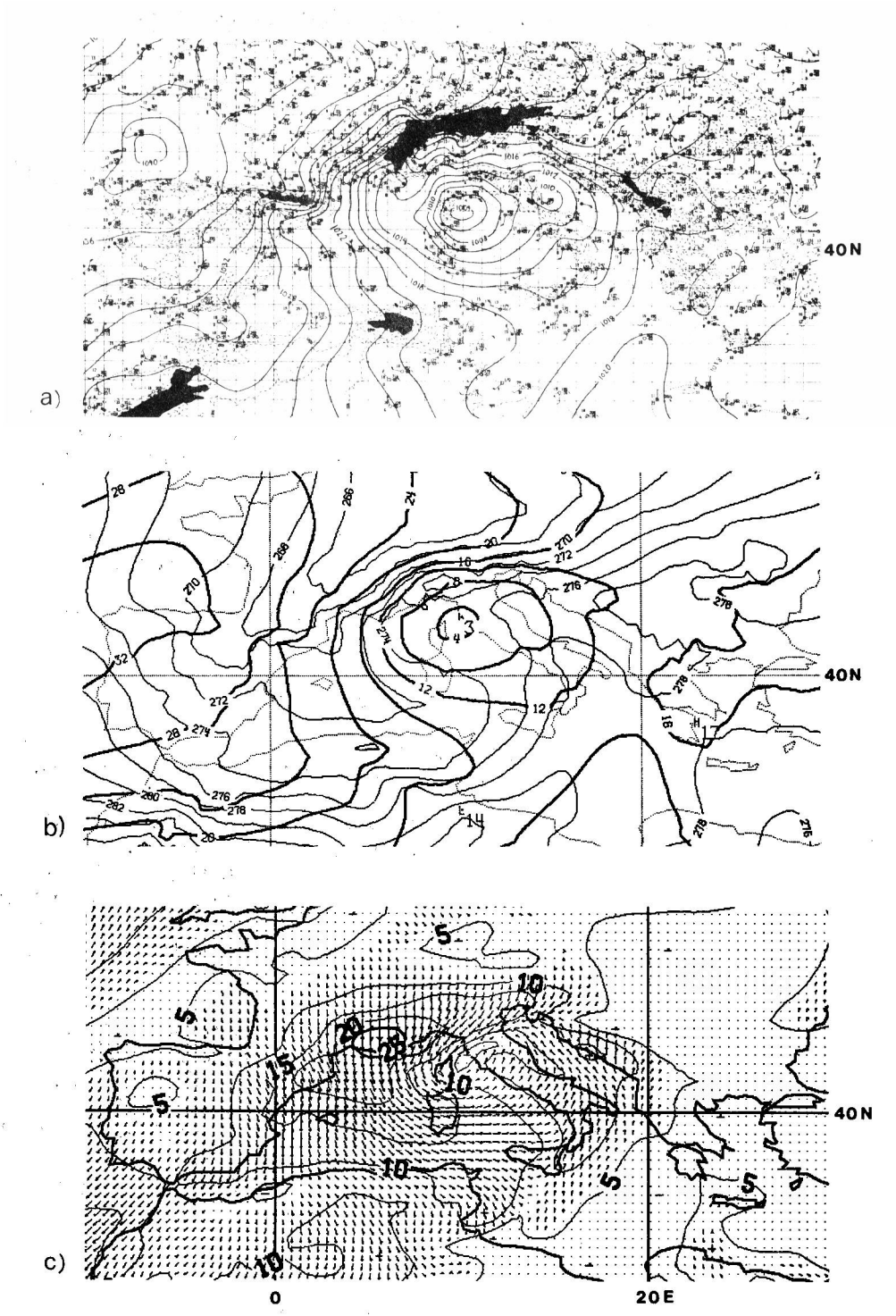

Fig. 1 Maps of a) subjectively analysed MSLP at 12 GMT 5 March 1982, b) 1000mb geopotential height (thick line) and 850mb temperature from the D+2 of the N192 resolution limited area forecast, c) 1000mb wind from the D+2 of the N192 resolution limited area forecast.

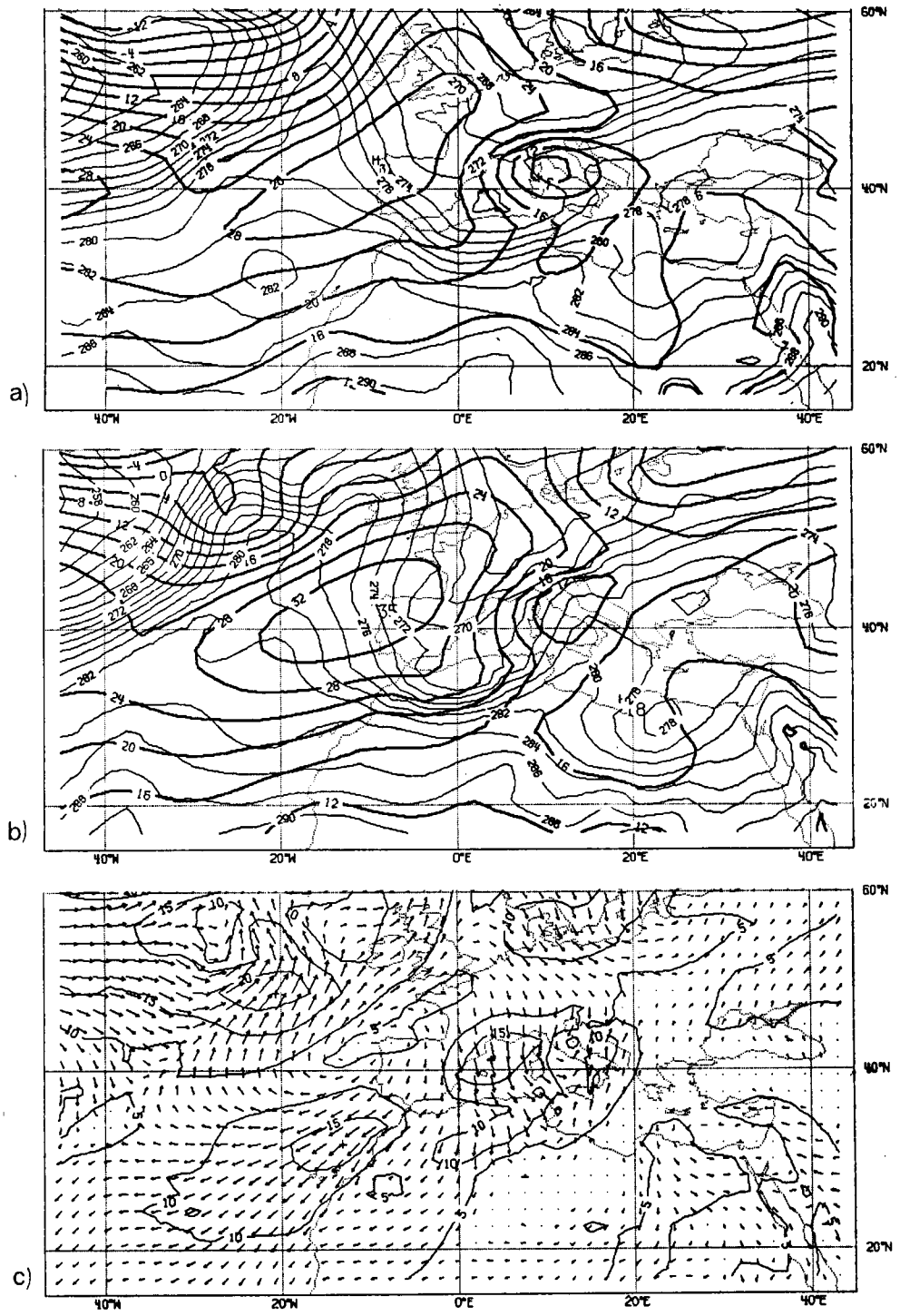

Fig. 2 Maps of a) 1000mb geopotential height (thick lines) and 850mb temperature from the ECMWF N48 resolution objective analysis at 12 GMT 5 March 1982, b) same as a) from the D+2 of the ECMWF N48 global forecast, c) 1000mb wind from the D+2 of the ECMWF global forecast.

provide the boundary conditions to the LAM, updating them every twelve hours. The forecast started on 3 March 1982, 12.00 GMT, and we compare the 48 hour forecast with both the operational and hand drawn analyses.

The cyclogenesis in the lee of the Alps reached its maximum intensity at 12 GMT 5 March 1982. For a description of the evolution of the weather, the reader is referred to the previous article on this subject. Since this case occurred during the Alpex period, a large amount of data is available and the analysis can be drawn with particular accuracy and detail on the maps produced by the International Alpex Data Centre. Comparisons between this analysis, Fig. 1a, and the objective N48 resolution ECMWF analysis, Fig. 2a, are quite interesting. The objective analysis shows the cyclone located in the right position and with the correct shape but the depth of the cyclone is too shallow and all the small features produced by a detailed description of the lower boundary forcing are missing. Comparing the N192 forecast of the 1000mb geopotential height and wind, Figs 1b and c, with the hand drawn analysis, it can be noticed that the double structure of the cyclone is well captured by the forecast, with a lowest contour of 4 dkm that is in good agreement with the observed depth of 1005mb. The observed secondary low, the depth of which is 1009mb, is included in the area delineated by the 8 dkm isoline in the forecast.

The ridge upwind of the Appennines and the trough on their lee are present in the 8 dkm isoline, whilst the 12 dkm contour shows the ridge and trough related to the Dinaric Alps. The region of high pressure over Peloponnesus is present in the forecast. The ridge and trough connected with the orography of the Pyrenees is visible in the deformation of the 20, 24, 26 dkm isolines. The Mistral is captured with a 25 ms^{-1} speed, (50 knots), whilst it was observed at 40 knots. Following the flow, the wind rotates and becomes zonal with a speed of 10 to 15 ms^{-1}, (20-30 knots), which can be compared to the observed 35 knots in north Sardinia. The Scirocco, invading the Adriatic Sea, increases its speed near the southern coast of Yugoslavia. The Bora is also present near Trieste, its speed is forecast 10 to 15 ms^{-1}, (20-30 knots), the observed one is 40 knots. Figures 2b and 2c show the 48 hour N48 resolution global forecast of the 1000mb geopotential height and wind, respectively, comparisons are left to the reader.

Conclusions

The limited area version of the ECMWF model has shown its ability to produce a high resolution forecast in a case where the forcing of the lower boundary is important. However, a more refined analysis is needed, because in other situations, when the presence of small systems in the initial analysis is of great importance, even the highest resolution model could not give the right forecast. More investigation is needed in the field of orography to obtain the most appropriate representation for each model resolution.

- Lorenzo dell'Osso

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ANOTHER NEW USER OF ECMWF PRODUCTS

Since the end of October 1982, the European Space Operation Centre of ESA has been using ECMWF products operationally, namely, the forecast of 24 hour temperature and humidity, in their extraction process of meteorological observations from Meteosat data. The observations, which are disseminated on the GTS, include cloud motion winds, cloud coverage, temperature and pressure level at the top of the clouds, and sea surface temperature. The Centre looks forward to receiving their evaluations of its products in the future.

- Frédéric Delsol

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OPERATIONAL USE OF ECMWF PRODUCTS IN THE AUSTRIAN FORECAST SERVICE

Introduction

The following data are received daily by the Austrian Forecast Service:

12 hour forecast to 84 hour forecast - every 6 hours

	1000	850	700	500	300 mbar
Geopot. height	X	X	X	X	X
Temperature		X	X	X	
Wind speed	X	X	X	X	X
Wind direction	X	X	X	X	X
Vert. velocity		X	X	X	
Rel. humidity		X	X	X	X
Mixing ratio		X	X	X	

Total rainfall
Cloud cover
2m temperature

84 hour forecast to 168 hour forecast - every 24 hours

Geopot. height	1000	850	500mbar

Austria receives ECMWF grid system N3N3=85. This section contains 50.40 gridpoints (mesh width 150 km).

Area forecasts for 5 regions in Austria up to H+72 are available at 02 GMT, the time of the first forecast. Trajectories for 4 points in Austria up to H+48, model output to H+168, model output diagnostics to H+72 and medium range forecasts of 850 mb geopotential and temperature to H+120 are available at 06 GMT. These last are distributed twice a week - on Monday and Thursday - as medium range forecasts. A brief international weather forecast of temperature and precipitation to H+48 at several gridpoints over Europe is also available at 06 GMT.

Area Forecasts

Area forecasts for 5 regions in Austria to H+78 are normally available early in the morning. At present, the model data are extrapolated for certain points. In future, these extrapolations will be replaced by integrated area information modified also by M O S. These include direct model output of cloud cover, precipitation, wind vector 1000 mb (QAN), wind vector 700 mb (QAO), and vertical component of the wind vector for 3 levels.

Also included are indirect or derived quantities, including cumulus cloud cover in octas, Showalter-index, condensation level, cumulus/cumulonimbus tops, convection release temperature, maximum and minimum of temperature, and other temperature information at various levels.

Trajectories

Trajectories are evaluated for the capital cities, Innsbruck, Salzburg, Vienna and Klagenfurt.

There is also the possibility of computing trajectories at any other point with respect to geography and time for every level. Specific time intervals are evaluated especially for Vienna.

Model output diagnostics

A range of over twenty model output diagnostics (M O D), including some derived quantities, are computed for several timesteps to H+168, and some at several levels. Included are the following:

Equivalent humidity index 500/850 mb

This index indicates the percentage of vapour saturation of the layer 500/850 mb. It shows the relation between the existing and the maximum of possible humidity in the atmosphere.

The 80 percent isoline includes, more or less, the cloud cover, whereas 50 percent or less means no, or only small, cloud cover. This parameter is very sensitive. It can be compared with satellite pictures of clouds.

Equivalent index of humidity 500/850 mb

The index indicates the saturation of the layer.

Thermal front parameter evaluated by the equivalent relative topography 500/850 mb

This frontal parameter is a measurement of the modification of the temperature gradient in the direction of the temperature gradient. Its maximum indicates a front.

The front is located at a point where the thermal front parameter shows its maximum and where the third derivation is zero. The front is located in front of the zeroline of the relative and thermal vorticity.

Relative vorticity at 500 mb

This vorticity indicates the rotation in the flow. The zeroline is of interest, normally it is located in the direction of the frontal bands of the satellite picture.

Advection of the absolute vorticity at 500mb

This index shows the modification of vorticity with time; for example, P.V.A. in the frontal area indicates a wave and, in the trough area, a tendency for a movement of the trough.

Thermal vorticity 500/850 mb

This parameter is equal to the relative vorticity of the relative topography 500/850 mb.

The zero line is significant: in a cold front, the line is in the cloud band. In a warm front, there is an anticyclonic bulge on the line in the cloud band.

Thermal vorticity of curvature 500/850 mb

This is the vorticity of curvature of the relative topography 500/850 mb. A minimum is an indicator for the ridge of the layer 500/850 mb. In this layer, there are located certain cloud configurations which are wrongly characterised as warm fronts.

Advection of the temperature in 500/850 mb

Helps to identify warm and cold fronts as well as occlusions.

Showalter-index 850 mb

The index expresses the stability of the atmosphere. It is defined as the difference between temperature and the saturation adiabat at the 500 mb computed lifting condensation level.

IF(SH .GT. 3)	Thermodynamic stable conditions
IF(1.LT.SH.AND.SH.LE.3)	Shower probable, thunderstorm possible
IF(1.GE.SH.AND.SH.GE.-2)	Thunderstorm probable
IF(SH .LE. -3)	Heavy tornadoes

The index will be improved by Model Output Statistics (M O S).

Future programs with ECMWF products

Area forecast:	Integrated area information and M O S
Model Output Diagnosis: (M O D)	Frontogenetic parameter, time till condensation, thermal front parameter H+96, 3-dimensional trajectories.
Model Proved Prognosis: (M P P)	Interactive evaluation of forecast between model and forecaster (the model should signal unrealisible physical correlations). Permanent improvement of the forecast by the model and actual weather (the program should indicate differences between model output and weather and underline modifications in the physical state).
Self-learning M O S:	With the model data (including the actual weather into the statistics)
Now-casting with model data:	No trend analysis, only with 3-dimensional trajectories.

- Dr. Herbert Gmoser
Meteorological Contact Point, Austrian Meteorological Service

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USE OF ECMWF PRODUCTS IN CHINA

Introduction

During a brief visit to ECMWF in November 1982, Dr. Wu from Academia Sinica, the People's Republic of China, described the use being made of ECMWF GRID code products in China and especially in Sinjing province.

Background

Around 10 years ago, a prediction of the zonal index, based in part on forecasts of the Japanese Meteorological Agency to H+48 and extended to H+72, was a principal forecasting tool. Prior to the receipt of ECMWF products, it was not possible to make medium range weather forecasts in China by numerical methods; instead, synoptic and statistical techniques, including, for example, spectral analysis, were used.

From visits made to scientific conferences and meetings, meteorologists in China became more and more aware of the products of ECMWF. Visitors to China from ECMWF Member States brought with them copies of ECMWF products and, in December 1981, a delegation from the Chinese Academy of Sciences, headed by Professor Ye Duzheng, its Vice-President, paid a two-day visit to ECMWF.

The ECMWF forecast products were compared with those already available within China from other major forecasting centres. The result of a detailed comparison indicated that the ECMWF model was much more successful than the others, for example in the prediction of the path and location of tropical storms. Furthermore, the difficult prediction of severe cold outbreaks over China in winter and the motion of cold vortices over Sinjing (Sinkiang) province was accomplished more successfully in the European Centre forecasts. Further investigations were made into systematic characteristics of the ECMWF model; it is hoped that the results of these investigations will be made available to ECMWF.

Following from these evaluations of forecast quality, it was decided to decode the ECMWF GRID code products, including forecasts to D+5, which are available in Peking via the Global Telecommunications System, and to transmit the decoded charts to the regional forecast office in the Sinjing Autonomous Region. This has been done as a daily routine since December 1981.

Use of ECMWF products

Model Output Statistics are computed in the National Meteorological Centre in Peking each day. All 29 provincial centres have a daily responsibility to produce a weather forecast to 5 days but, until the telecommunications system is further improved, it will not be possible to transmit the Centre charts to all of the regions.

A westerly zonal index is computed based on the ECMWF forecasts. Two planetary-scale frontal zones are important for the Chinese area, one near 30°N latitude, which is stable, and one near 45-55°N which meanders. Without numerical guidance, successful forecasts of these frontal zones are not possible. The numerically-based forecasts are then related to local weather. The forecast quality in mountainous regions is found to be variable, with problems occurring in the region west of the Himalayas.

In South China (Kwangtun province) meteorologists use the European Centre products for tropical forecasting.

It is hoped that a more regular flow of information from China on use and interpretation of ECMWF products in this large and important country will be established in the future.

- Austin Woods

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AUSTRALIAN RECEPTION AND ASSESSMENT OF ECMWF FORECASTS

Introduction

ECMWF Member States are making increasing use of the forecasts for ship routing. It is felt, therefore, that the experiences with the operational MSL forecasts for the Southern Hemisphere at WMC Melbourne would be of interest. The following is based on a memorandum by J. Brown, for the Director of Meteorology, at WMC Melbourne, dated 9 September 1982.

Reception

On 90% of occasions, ECMWF GRID code products are received at Melbourne by 0100Z. They are plotted, and transmitted to the regions by landline facsimile.

Assessment

The MSL charts have been assessed subjectively on the scale 5 to 1, a score of 5 being excellent and 1 very poor. A 4-day overall guidance was also assessed on how well the forecasts captured the processes involved in the 4-day period rather than the exact position of the systems or the absolute pressure values. Taking a fair or better rating (3 to 5 score) as indicating a useful forecast, then the +24 hour forecasts were useful on 90% or more of the occasions, +48 hour forecasts on 85% or more of the occasions and at +72 hours, the forecasts were useful on 70% or more of the occasions. At +96 hours, the usefulness dropped off, particularly in the winter season. Nevertheless, the 4 day overall assessment values show that on 60% or more of the occasions, the ECMWF prognoses provided useful guidance throughout the year.

Some of the perceived deficiencies and strengths of the prognoses were:

the high pressure ridges tended to be shifted too far north especially in winter. The central pressures in the highs were more likely to be too low rather than too high;

lows in the southern oceans were suspected of being too deep when verified against pressures at Macquarie Island and Campbell Island; this may be tied to the subtropical ridge being too far north;

generally cut off lows were handled poorly: of the nine that occurred during the year, two were forecast 2 to 3 days ahead and handled reasonably well; two were forecast but treated subsequently as troughs in the westerlies, one was moved steadily eastward whereas the low remained stationary for some time, three were moved erratically and weakened too soon and one was not captured at all;

tropical cyclones were poorly handled;

the West Australian heat trough was handled reasonably well - better than the Queensland heat trough;

the speed of the trough-ridge systems could be either too fast or too slow; there was no detectable bias;

the model correctly weakens deep troughs in the westerlies as they approach dominant highs;

amplification of troughs and ridges in the westerlies is handled well.

Overall, the prognoses have been very much appreciated as giving useful guidance out to four days.

Footnote: "Pseudo-observations" or PAOBs from WMC Melbourne's southern hemisphere numerical analyses, requested especially by ECMWF, are included as data in the Centre's global analysis scheme.

- Austin Woods

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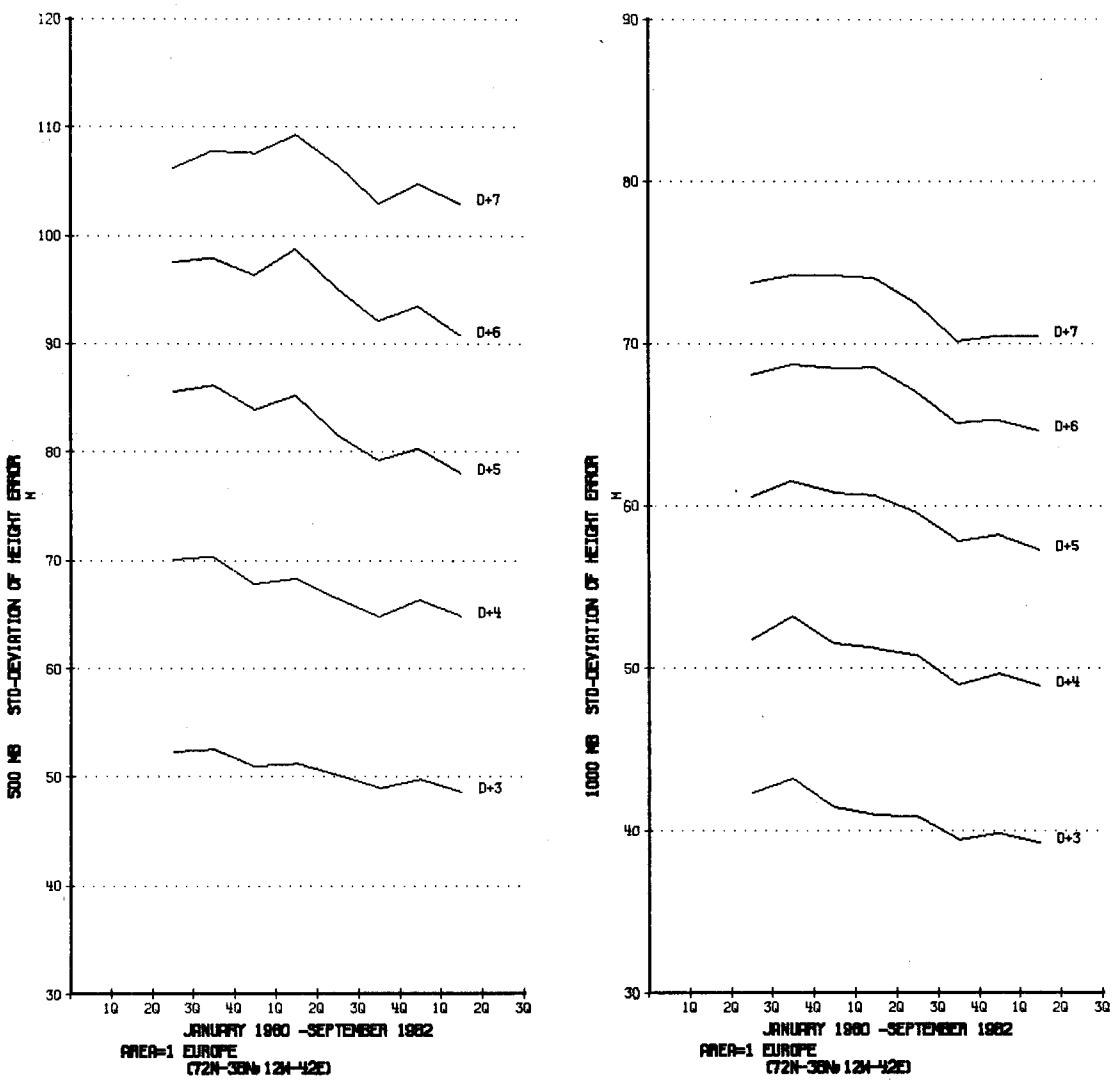

Fig. 2 (see article opposite)

TWELVE MONTH RUNNING MEAN SCORES FOR ECMWF FORECASTS FROM JANUARY 1980 TO SEPTEMBER 1982

Twelve-month running mean scores have the advantage that long-term trends are made obvious, variations due only to monthly and seasonal effects are eliminated, as each score is the average of those for twelve months. Thus, in Figure 1 (front cover), which shows anomaly correlation scores of ECMWF forecasts from January 1980 to September 1982 for the European area, the first point on each curve is the average of the scores for the forecasts from January 1980 to December 1980, the second point is for the average from April 1980 to March 1981 and so on.

The D+5 scores, for example, have increased from a value of 0.6 to almost 0.7 during the period, while the D+6 scores have increased from a value below 0.5 to almost 0.6. Note that the biggest gains in the scores are made in the medium range forecasts, although improvements are also seen in the D+1 to D+3 scores.

Figure 2 (opposite) shows standard deviation of height error scores for the D+3 to D+7 forecasts for the European area; here again, the substantially reduced errors in the later forecasts are clear.

- Rauno Nieminen

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OPERATIONAL SUITE RUN DIAGRAMS

This edition of the Newsletter contains the Operational Suite run diagrams for September and October 1982 (see overleaf, p.12 and 13). The plots show run times for the major Cray components of the daily forecast run. The plotted lines show the elapsed time of each program in different thicknesses, for each day of the month. In addition, the total elapsed time and CPU time for the 10 day forecast, 00F12, are shown.

On 2 October 1982, the operational timetable was changed to run two data assimilation cycles in the early hours of the morning to make the 18Z and 00Z analyses available at the beginning of the working day. In the evening, the 00Z analysis was repeated with a much later data cutoff time followed by the 06Z and 12Z analyses and the 10 day forecast. There was no change to the dissemination schedule to Member States.

The forecast timestep had to be modified in September and October to prevent model instabilities associated with very strong winds in the Southern Hemisphere stratosphere. The timestep was changed three times:

- on 6 September to a 12 minute timestep
- on 4 October to a 10 minute timestep
- on 20 October back to the normal 15 minute timestep

The increased run times for the first guess forecast (00F02) and the 10 day forecast (00F12) can be seen for the periods when the shorter timesteps were in use.

- John Chambers

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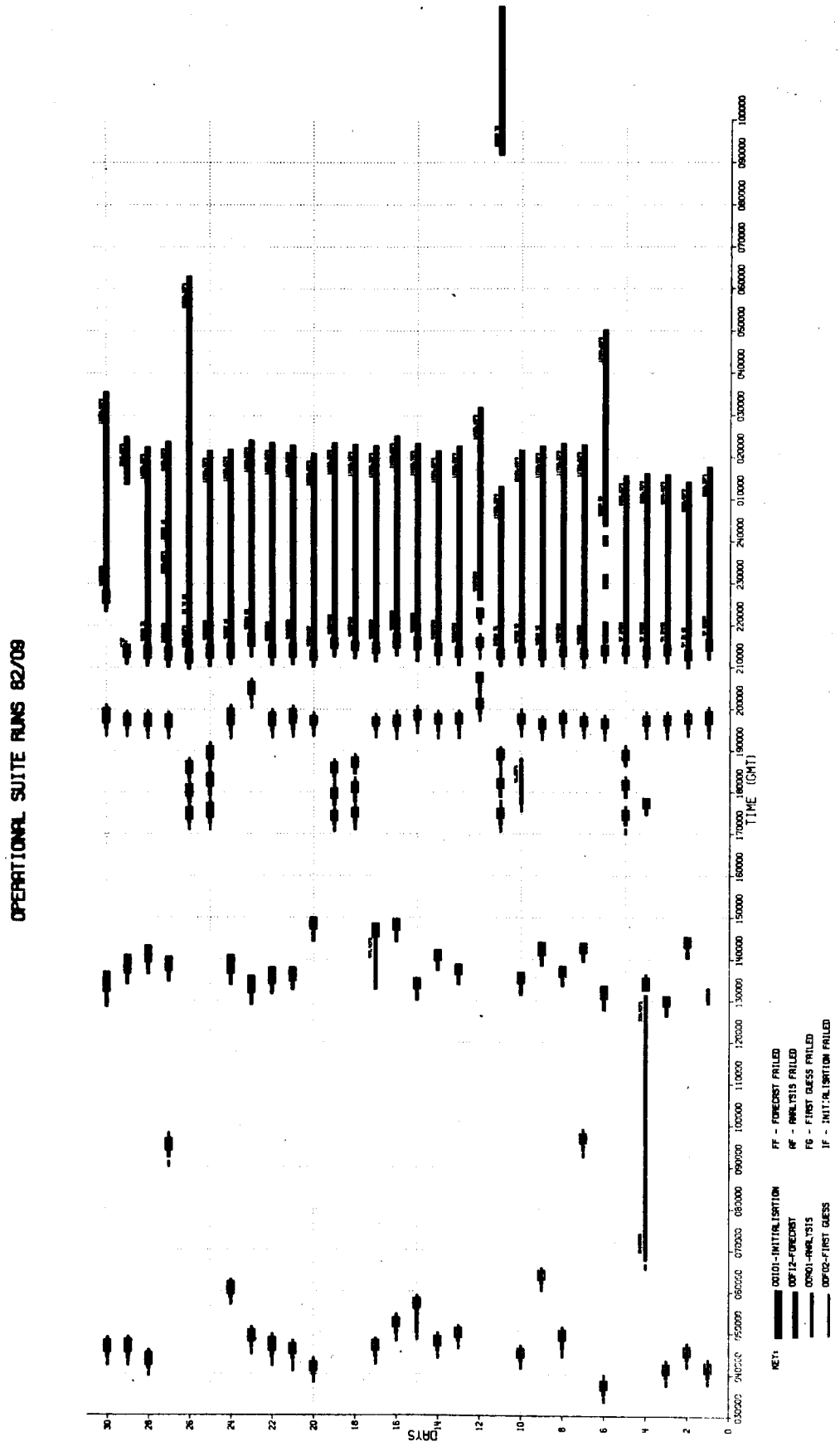
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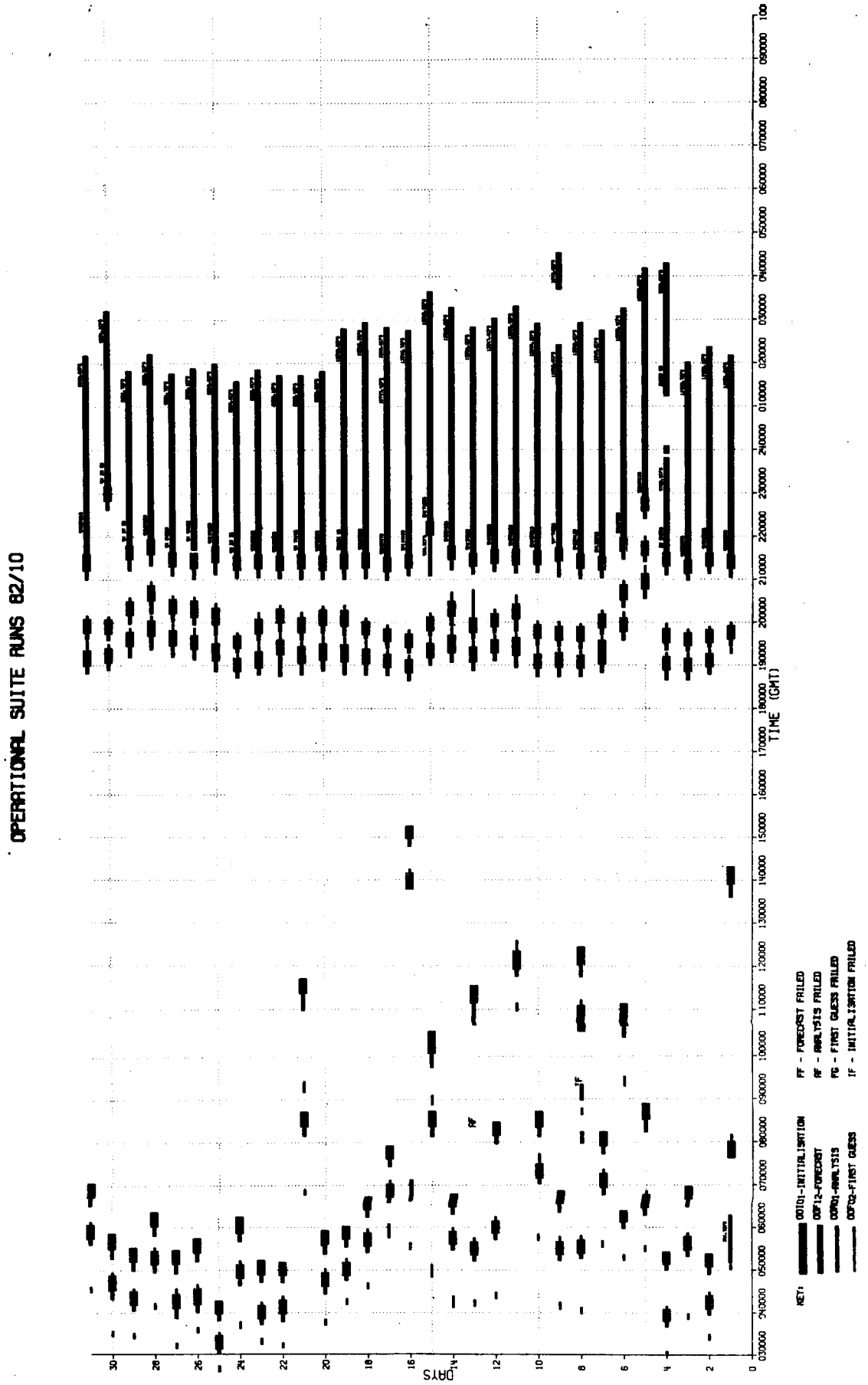
OD712-FORECAST
OD901-ANALYSIS
OD902-FIRST GUESS
FF - FORECAST FAILED
AF - ANALYSIS FAILED
FG - FIRST GUESS FAILED
IF - INITIALISATION FAILED


OPERATIONAL SUITE RUNS 82/10
TIME (GMT)
DAYS
KEY:
CD10-INITIALISATION
CDF12-FORECAST
CDM01-ANALYSIS
CDF02-FIRST GUESS
FF - FORECAST FAILED
AF - ANALYSIS FAILED
FG - FIRST GUESS FAILED
IF - INITIALISATION FAILED

STATUS OF THE CRAY FORTRAN COMPILER (CFT)

The latest CFT release, called CFT 1.10, has now been available on our system through the NEXT statement, for 3 months. What we received in August was really a prerelease which the Centre had agreed to help Cray debug, and it did indeed contain a number of errors. However, since 1 November, the official CFT 1.10 release has been available.

There are 3 incompatibilities between CFT 1.10 and the previous release, which is still running as our "normal" Fortran compiler.

1. So-called illegal jumps into DO-loops will be treated as fatal errors. There is a way around this incompatibility, but it is recommended that users modify their programs, as Cray's support for such GOTOs will be removed soon.

2. CFT 1.10 does not allow short integers or Boolean expressions as parameters to intrinsic functions (ABS, MAX, etc.). ECMWF and Cray have discussed this incompatibility several times. Cray has now promised to change CFT 1.10 so that it allows short integers in intrinsic functions, but is reluctant to also allow Boolean expressions, as this would create real difficulties in the compiler. Instead, they have offered to help ECMWF users in the manual process of converting their programs to conform to the new rule.

3. There seems to be a problem in that certain loops which used to vectorise with CFT 1.09 no longer do so. This can lead to a substantial increase in execution time. Cray is still investigating the problem.

That is the present status. The plans are to make CFT 1.10 the default version as soon as we have received code to allow short integers in intrinsic functions, (having given users reasonable advance warning,) but to keep CFT 1.09 available at least until the problem of vectorisation has been solved. We urge users to try the present CFT 1.10 version, and to contact User Support if they encounter any problems.

To use CFT 1.10 place the control statement:

```
NEXT(PROD=CFT,ID=CFT110)
```

after your account card.

- Claus Hilberg

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EXAMINE your Cyber Files

ECMWF has just acquired a package from CDC designed to help users manage files created by the Cyber Record Manager (Basic Access Methods and Advanced Access Methods) or by standard NOS/BE utilities (compilers, EDITLIB, etc.). It has a big advantage over PRINTBR/BF when used to determine, as far as possible, the file organisation, and display the contents accordingly.

A brief description of the utility, taken from the EXAMINE Reference Manual, follows with a real example of what can be achieved by using it. A Computer Bulletin describing the calling sequence will be produced shortly; in the meantime, users can contact the Advisory Office where a copy of the Reference Manual is kept.

Package Capabilities
(From EXAMINE UTILITY Reference Manual)

EXAMINE is a general purpose utility to display the content of files in various formats. EXAMINE will determine the file organisation and file content and tailor the output accordingly for the following:

1. Sequential files containing:
   - CCL procedures
   - binary modules (absolute, relocatable, capsule, etc.)

2. Extended IS, DA, AK or Initial IS files
   (Indexed Sequential, Direct Access, Actual Key)

3. Extended MIP (Multiple Index Processor) files

The simplest calling sequence is: EXAMINE(lfn). , but the user may use Keyword parameters to:

- modify the output format
- change the default parameter
- select special purpose functions

(lfn is the name of the file to be processed by EXAMINE).

Type of information displayed by EXAMINE

1. Sequential files:
   - CCL procedures: RECORDS are displayed
   - Binary files: Loader 77 Table

2. AAM files (except MIP)

   FSTT (File Statistics Table)
   BLOCKS (Index or Data)
   KEYS
   RECORDS

3. MIP files

   FSTT and BLOCKS

4. Others

   BLOCKS

EXAMINE writes to OUTPUT by default.

Example of utilisation

One useful feature of EXAMINE is the SPACE function which causes the generation of summary statistics of the empty space in an AAM file. This can be illustrated by a real example we had to investigate, namely, why an Indexed Sequential file had gone to two levels of Index, severely degrading the access performance and causing a waste of disk space of over 56% (as we realised later). The user had spotted the "abnormal" growth of his file and index levels using FLSTAT; we then ran EXAMINE,ISFILE,SPACE. against his file ISFILE which produced the following output:

```
EXAMINE 1.2 LFN-ISFILE AAM FILE SPACE STATISTICS

THE FILE CONTAINS -
     6069 RECORDS
      289 BLOCKS

THE AVERAGE BLOCKING FACTOR IS 21 RECORDS PER BLOCK

THERE EXISTS -
      148 BLOCKS BETWEEN  0 and  9 PERCENT EMPTY
       17 BLOCKS BETWEEN 10 AND 19 PERCENT EMPTY
       19 BLOCKS BETWEEN 20 AND 29 PERCENT EMPTY
        2 BLOCKS BETWEEN 30 AND 39 PERCENT EMPTY
        5 BLOCKS BETWEEN 60 AND 69 PERCENT EMPTY
       15 BLOCKS BETWEEN 70 AND 79 PERCENT EMPTY
        3 BLOCKS BETWEEN 80 AND 89 PERCENT EMPTY
       80 BLOCKS BETWEEN 90 AND 99 PERCENT EMPTY
```

We used FORM along with FILE control statements (to describe the file structures) to create a new file ISFIL2 from ISFILE and then EXAMINE'd ISFIL2:

```
EXAMINE 1.2 LFN-ISFIL2 AAM FILE SPACE STATISTICS

THE FILE CONTAINS -
     6069 RECORDS
      185 BLOCKS

THE AVERAGE BLOCKING FACTOR IS 33 RECORDS PER BLOCK

THERE EXISTS -
      183 BLOCKS BETWEEN  0 AND  9 PERCENT EMPTY
        1 BLOCK  BETWEEN 10 AND 19 PERCENT EMPTY
        1 BLOCK  BETWEEN 20 AND 29 PERCENT EMPTY
```

The result was a saving of wasted space and the return to one level of index as FLSTAT showed.

\- Michel Miqueu

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'COMMAND' AND FILESET OPERATIONS

The subroutine COMMAND is a very powerful tool which enables any NOS/BE control statement (or series of control statements) to be initiated from within a Fortran program, FTN or FTN5, (see Computer Bulletin B7.7/1 for details).

However, it is important to realise the expense of such an operation if COMMAND is used many times within a program. Each CALL COMMAND causes your program to be swapped out of memory and then swapped in again after completion of the requested operations. If this is repeated many times, the resulting program execution time will be substantially increased. The use of COMMAND should therefore be minimised for common operations such as ATTACH, CATALOG, etc. when more efficient alternatives exist in ECLIB (see Computer Bulletin B6.1/3).

For repeated fileset operations such as GF, AF, RF similar inefficiency will result. Therefore, a direct Fortran interface to these operations is now available. The fileset operation:

GF,lfn,group/element,fsn.

may be carried out by means of:

CALL GF(NF,'lfn,group/element,fsn.') (using FTN5)

or CALL GF(NF,"lfn,group/element,fsn.") (using FTN)

The integer variable NF is returned = 0 after a successful operation. NF = 0 if a failure has occurred.

A similar interface exists for AF, RF and DF. All other fileset commands are used less frequently and may be invoked using CALL COMMAND. The routines GF, AF, RF and DF together with all subsidiary fileset routines are contained in the public library FSLIB.

- David Dent

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'SYSTEMS' BOOKINGS

Under the present arrangements, the following periods may be booked on our computer systems. Normally, the bookings are made by systems analysts to test new systems or engineers to trace and fix faults, but if changes to cable connections, power supplies or similar have to be done, they are also scheduled in these periods if possible. Times are local.

	CYBER 835	CYBER 175	CRAY-1A
MONDAY	7 am - 9 am	7 am - 9 am	7 am - 9 am (2)
TUESDAY	7 am - 9 am (1)	7 am - 9 am	7 am - 9 am
WEDNESDAY	7 am - 10 am (3)	7 am - 10 am	7 am - 10 am (2)
THURSDAY	6 pm - 8 pm	7 am - 9 am	7 am - 9 am
FRIDAY	7 am - 9 am (1)	7 am - 9 am	7 am - 9 am
SATURDAY	8 am - 2 pm	8 am - 2 pm	8 am - Noon
SUNDAY	No regular booking periods		

(1) On Tuesday and Friday, either the 175 or the 835 is available for 'systems' bookings, leaving the other system to support Intercom.

(2) The Cray analysts normally take one or both of these sessions each week but rarely take the Thursday or Friday period.

(3) The period 9 am - 10 am is not always taken because Intercom should be available, if possible, from 9 am.

If more time than can be provided during these periods is needed, extra time is made available outside the working week (i.e. Monday - Friday, 0830 - 1730), usually after 2 pm on Saturday or during the day on Sunday.

However, Member States should note that the NFEP is normally available all the time, and is able to store incoming jobs, if the Cybers are not available.

- Eric Walton

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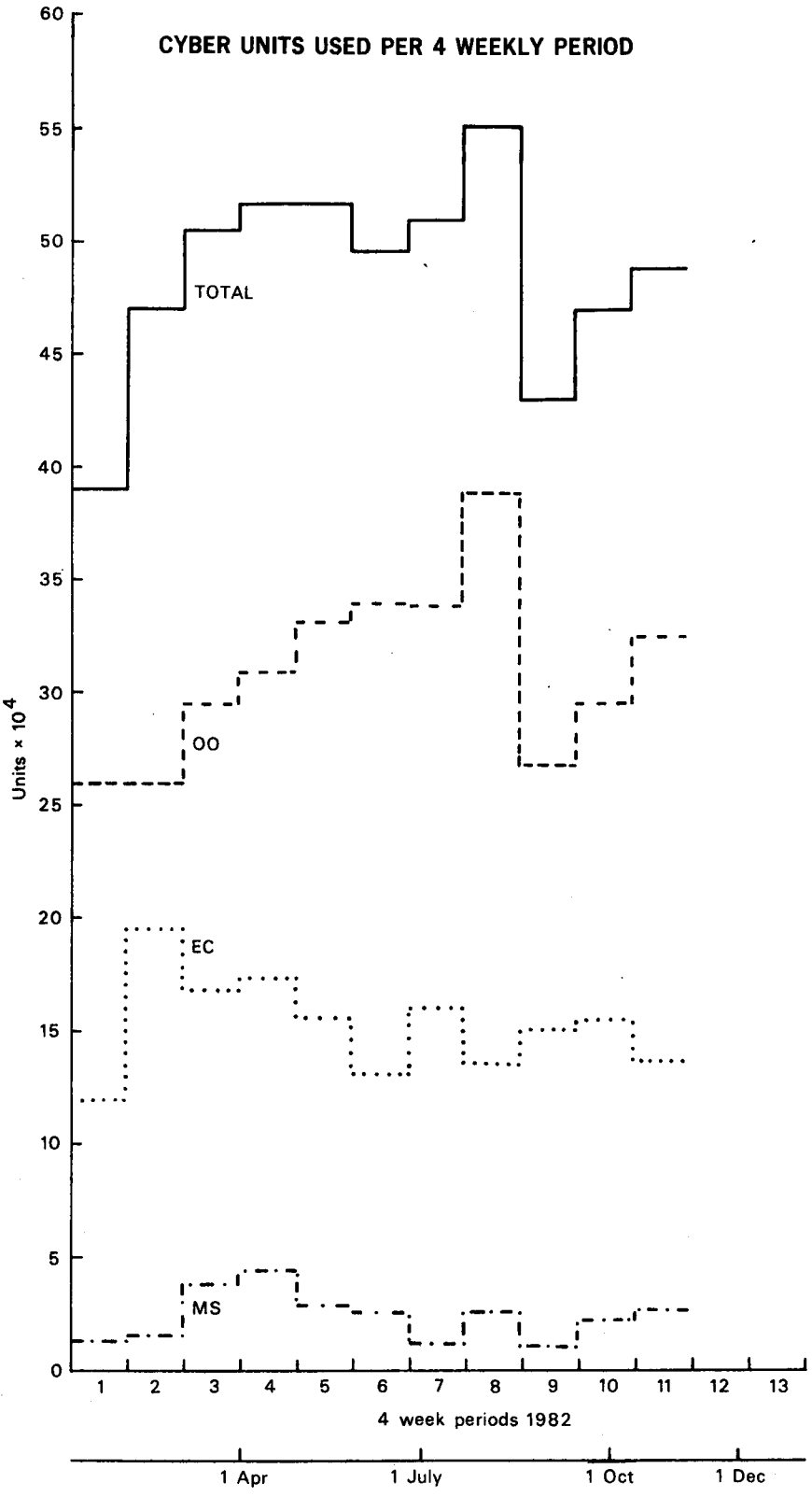
COMPUTER USAGE STATISTICS 1982

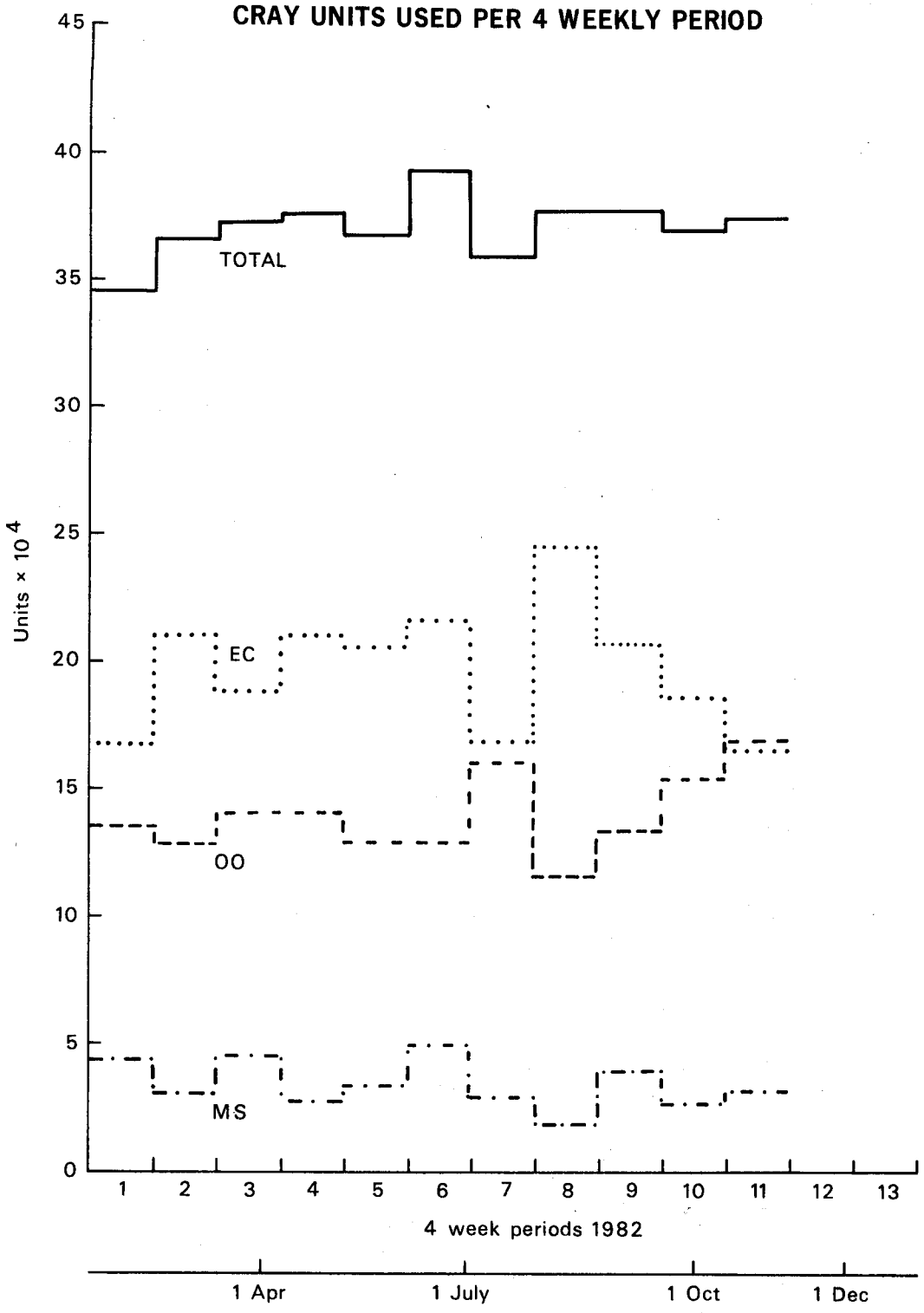


Total = total usage less those jobs classed as systems overheads

OO = operational suite running

EC = Centre users

MS = Member State users, including Special Projects



SOME DECISIONS CONCERNING MEMBER STATES' USE OF THE ECMWF COMPUTER SYSTEM, TAKEN AT THE 16TH SESSION OF COUNCIL ON 18-19 NOVEMBER 1982

Council rules for the distribution of computer resources to Member States

At its 12th session (20-21 November 1980) Council adopted, for a trial period of 2 years, a set of rules which are set down in Appendix C of ECMWF Computer Bulletin Bl.2/1. Now that the 2 years are over, Council has adopted a new set of rules, which are given below. They are based on the previous rules with the following changes:

- a 10% share of the Cyber resources is included
- any resources returned by a Member State will be put at the disposal of special projects initially
- rules (viii), (ix) and (x) have been added; these were based on guidelines adopted previously by the Technical Advisory Committee.

The new rules are:

(i) At least 25% of the available CPU time of the CRAY computer and 10% of the available CYBER resources should be made available to the Member States.

(ii) A maximum of 10% of the computer time available to the Member States may be allocated for "special projects" approved by Council; 35% of the remainder should be allocated equally among the Member States and 65% allocated proportionally to their financial contribution to the Centre. This method of allocation should only be used if the amount of time requested exceeds that available. In this case, if some Member States do not require the time allocated to them, that time should be re-allocated (according to the above formula) to other Member States.

(iii) Each Member State should submit an estimate, by 31 March each year, of its computing requirements on the ECMWF computer system for each of the three following years. If any "special projects" are included, details of these are also to be submitted by 31 March.

(iv) No charge should be made to the Member States for use of the Centre's computer time.

(v) The Centre should continue to give a series of training courses designed to train a few people from each Member State in the use of the Centre's computer system.

(vi) If a request is received from a Member State for an increased allocation of computer resources, the Director, after consultation with the Chairman of the Technical Advisory Committee, may alter the allocation to that Member State, providing that, firstly, the total allocated to all Member States does not exceed the annual total laid down by Council; secondly, that the resources allocated do not exceed those which would be available to that Member State if the annual total were distributed among Member States according to the formula determined by the first sentence of recommendation (ii).

(vii) If a Member State, during the current year, finds that full use will not be made of the resources allocated, modified estimates should be submitted to the Centre; in this case, the additional resources thus made available will, in the first place, be put at the disposal of the Special Projects for that year, provided that total resources allocated to special projects do not exceed 15% of the total resources allocated to Member States.

(viii) A small amount of computer resources should be reserved for Member States who have initially not expressed requirements but later require small resources for certain tasks such as retrieval of data from archives, the amount reserved being 10% of the CRAY-1 and CYBER units that would have been allocated to these Member States under the Council rules.

(ix) Unused resources should be put at the disposal of the Centre.

(x) There should be a possibility to convert up to 25% of a Member State's CRAY-1 resources to CYBER units on the basis of the relative cost to the Centre in providing these units.

Council also adopted a set of guidelines for handling applications from Member States for computer resources for "special projects". Such "special projects" are experiments or investigations of a scientific nature, undertaken by one or more Member States, likely to be of interest to the general scientific community. The guidelines adopted are given below. When submitting a special project, please note the suggested format of the documentation (guideline 2) and that, once a project has been approved, periodic reports to Council will be required (guideline 6):

1. Requests for the allocation of computer resources for "special projects" should be made by 31 March each year via the Directors of the meteorological services of the appropriate Member States.

2. Each request for "special project" time should be accompanied by documentation setting out the scientific basis of the project and a reasoned estimate of the resources required. The following format is suggested:

   (i) Name of applicants and their affiliation;

   (ii) Title of project;

   (iii) Description of the project and an indication of its relevance to numerical weather prediction - if this request is for the continuation of a previous "special project" then an interim report should be included;

   (iv) Estimates of computer resources required in each of the three following years.

3. The Centre should comment on each individual proposal.

4. The SAC should review the scientific aspects of each proposal and, having regard to the resources available, rank them in order of their relevance to the Centre's objectives.

5. The TAC should, on the basis of the Centre's comments and the SAC review, recommend for approval by Council the allocation of "special project" computer time and resources.

6. Interim and final reports on the results of research conducted using "special project" computer resources should be made available to Council.

Computer resource allocation to Member States in 1983

Council approved the allocation of computer resources to Member States for 1983 as shown below. These allocation will come into effect on Monday, 3 January.

Details of how a unit is constructed are given in ECMWF Computer Bulletin Bl.2/1. For guidance, note that for the "average" job:

- 1000 Cray units equals approximately 1 Cray CP hour
- 1650 Cyber units equals approximately 1 Cyber CP hour.

	1983 ALLOCATIONS		
Member State	CRAY-1 units (1000s)	CYBER units (1000s)	CYBER mass storage (Mwords)
Belgium	30	5	0.5
Denmark	40	16	1.8
Germany	200	50	9.7
Spain	67	28	3.0
France	158	64	7.5
Greece	32	12	1.4
Ireland	26	10	1.2
Italy	96	38	4.8
Yugoslavia	30	16	1.9
Netherlands	58	23	2.6
Austria	27	15	0
Portugal	28	11	1.0
Switzerland	44	18	0
Finland	32	12	1.6
Sweden	49	19	2.5
Turkey	4	15	0
United Kingdom	114	46	5.5
Special projects (1)	115	42	5.0
TOTAL	1150	440	50.0

Notes

1. This allocation is distributed between 6 special projects as shown in the table opposite.

Special Projects

MEMBER STATE	SPECIAL PROJECT	ALLOCATION		
		CRAY-1 units (1000's)	CYBER units (1000's)	CYBER mass storage (Mwords)
Germany	Global wave prediction	24	5	-
France	1. Project NEPHOS	3	2	-
	2. Convection parameterisation	26	5	-
France	Aerosol climate experimentation (IRC)	21	5	-
Finland	CAS/NWP inter-comparison	15	10	4
Sweden	Cloud prediction	26	15	1

Telecommunications schedule

Council also approved a revised implementation schedule for the 6 remaining medium-speed circuits, as shown below:

Member State	Date previously approved	Speed (bits/second)	Revised date
Belgium	January 1983	2400	April 1983
Greece	May 1982	2400	May 1983
Italy	January 1983	4800	June 1983
Yugoslavia	January 1983	2400	July 1983
Switzerland	July 1984	2400	None
Turkey	January 1985	2400	July 1984

- Andrew Lea

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NFEP TERMINAL STATISTICS

From 13.9.82 to 7.11.82

COUNTRY	AVERAGE TOTAL DATA (KCHAR/DAY)		DATA RATE (CH/SEC)	
	INPUT	OUTPUT	INPUT	OUTPUT
Denmark	13.4	2492.4	119.9	237.2
F.R. Germany	5351.3	3536.3	73.6	261.8
Ireland	6.2	2898.0	61.2	195.4
Spain	12.5	699.2	190.0	171.7
France	51.5	1724.9	133.4	224.7
*Greece	0.0	556.0	0.0	13.3
*Italy	0.0	300.2	0.0	12.9
*Yugoslavia	0.0	48.6	0.0	6.4
Netherlands	107.6	1288.3	158.0	165.1
Austria	0.3	1210.0	60.0	171.4
Portugal	20.4	1004.8	232.3	135.0
Finland	107.7	2411.7	372.2	248.4
Sweden	401.3	5917.4	305.8	271.9
*Turkey	0.0	69.7	0.0	6.7
United Kingdom	6158.7	1120.7	77.4	191.9

*Low speed line only

Explanations

TOTAL DATA — Input data is data acquisition (UK and Germany only) plus remote job entry (medium speed lines only). Output data is batch output (medium speed lines only) plus dissemination data.

DATA RATE — gives the average transmission speed in characters per second for an input or output file respectively, including overheads at all levels per protocol.

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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 (up to News Sheet 138). All other News Sheets are redundant and can be thrown away.

No.	Still Valid Article
16	Checkpointing and program termination
19	CRAY UPDATE (temporary datasets used)
47	Libraries on the Cray-1
53	Writing 6250 bpi tapes (EEC parameter)
54	Things not to do to the Station
56	DISP
67	Attention Cyber BUFFER IN users
73	Minimum Cyber field length
89	Minimum field length for Cray jobs
93	Stranger tapes
118	Terminal timeout
120	Non-permanent ACQUIRE to the Cray
121	Cyber job class structure
122	Mixing FTN4 and FTN5 compiled routines
127	(25.1.82) IMSL Library
130	Cyber software: PACKS, SPACE
	Contouring package: addition of highs and lows
131	File storage on TEMP
132	(21.6.82) NOS/BE level 552, including SORT/MERGE5.
135	Local print file size limitations
136	Use of TEMP disk space
	Care of terminals in offices
138	COS 1.11 introduction
	CFT 1.10 trial version

The following bulletins can be discarded since this list was last issued:
98, 108, 114, 126, 129, 134 and 137.

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COMPUTER USER TRAINING COURSES

The Centre is offering another series of training courses for Member States personnel and ECMWF staff. Information has been sent to the Member States and nominations to attend are now invited. Nominations from ECMWF staff will shortly be invited via Section Heads.

Course B BASIC USAGE 7-10/11 March 1983

This is intended for anyone who will be actually programming the Cray-1, to give them sufficient experience to run simple work. It will also introduce them to some of the Cyber facilities they may need to complement their Cray activity. Prior knowledge of another computing system, plus a knowledge of Fortran is required. An optional fifth day (11 March) is devoted to explaining how to use ECMWF's meteorological database and archive system.

Course C CRAY USER COURSE 14-18 March 1983

An in-depth course for those who will make heavy use of the Cray-1 and its many unique facilities. Intending participants will be expected to know how to run simple jobs on the Cray-1.

- Andrew Lea

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ECMWF PUBLICATIONS

Technical Report No. 33	Numerical simulations of a case blocking - the effects of orography and land-sea contrast.
Technical Memorandum No. 64	Optimal verification of ECMWF surface temperature forecasts at two locations in Europe.
Technical Memorandum No. 65	The ECMWF grid-point model simulator.
Technical Memorandum No. 66	Self sorting mixed radix fast Fourier transform.
Technical Memorandum No. 67	Local Area Networks - Why - What - How.
Annual Report 1981	French version
ECMWF Forecast and Verification Charts	to 15 September 1982 to 31 October 1982
Forecast Report No. 17	January - March 1982
Forecast Report No. 18	April - June 1982

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CALENDAR OF EVENTS AT ECMWF

22-23 February 1983	Meeting of the TAC subgroup on new computing facilities.
7-10/11 March 1983) 14-18 March 1983)	Computer user training courses. See article above for details.
21-22 March 1983	Fifth session of Technical Advisory Committee
23-25 March 1983	29th session of Finance Committee
20-21 April 1983	17th session of Council

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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.

*T indicates the original Technical Newsletter series

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- telex (No. 847908)			
- COMFILE (See Bulletin Bl.5/1)			
Computer Division Head	- Geerd Hoffmann	OB 009A	340/342
Communications & Graphics Section Head	- Peter Gray	OB 227	448
COMPUTER OPERATIONS			
Console	- Shift Leaders	CB Hall	334
Reception Counter)			
Tape Requests)	- John Hawkins	CB Hall	332
Terminal Queries	- Norman Wiggins	035	209
Operations Section Head	- Eric Walton	CB 023	351
Deputy Ops. Section Head	- Graham Holt	CB 024	306
DOCUMENTATION	- Pam Prior	OB 016	355
Libraries (ECMWF, NAG, CERN, etc.)	- John Greenaway	OB 017	354
METEOROLOGICAL DIVISION			
Division Head	- Frédéric Delsol	OB 008	343
Applications Section Head	- John Chambers	OB 007	344
Operations Section Head	- Austin Woods	OB 107	406
Meteorological Analysts	- Ove Akesson	OB 106	380
	- Veli Akyildiz	OB 104A	379
	- Horst Böttger	OB 104A	378
	- Rauno Nieminen	OB 104A	378
	- Herbert Pümpel	OB 106	380
Meteorological Operations Room		CB Hall	328/443
REGISTRATION (User and Project Identifiers, INTERCOM)	- Pam Prior	OB 016	355
RESEARCH DEPARTMENT			
Computer Coordinator	- Rex Gibson	OB 126	384
Systems Software Section Head	- Claus Hilberg	CB 133	323
Telecommunications Fault Reporting	- Stuart Andell	CB 035	209
User Support Section Head	- Andrew Lea	OB 003	348

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* CB - Computer Block
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