European Centre for Medium Range Weather Forecasts

ECMWF NEWSLETTER

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COVER: Dutch Viking, shortly before landing (Photograph Aero-Camera/Bart Hofmeester); see article on page 3.

This Newsletter is edited and produced by User Support.

The next issue will appear in March 1987.

After their attempt in August 1985, which was foiled by a technical fault after a most promising beginning, we at the Centre are pleased that the team from the Netherlands succeeded this year, with the help of ECMWF forecast products, in making a record breaking crossing of the Atlantic. Details of the venture and the meteorological background are given on page 3.

For the computer community we have some advance information on CFT 77, the new Cray compiler, on page 12.

Remote users of the ECMWF computing facilities should take particular note of the article on page 15 regarding the use of stranger tapes.

CHANGES TO THE OPERATIONAL FORECASTING SYSTEM

Recent changes

(i) New analysis system:

The new analysis system was implemented on 9 September 1986. Details of the new system were given in ECMWF Newsletter No. 35 - September 1986.

No other changes which had any significant impact on the performance of the forecasting system were made during the last three months.

A serious data problem with the satellite soundings from NOAA-6 and NOAA-9 occurred at the beginning of November 1986. NOAA/NESDIS (Washington) informed us of a sudden change in TOVS, HIRS and MSU instrument responses, which may have been caused by a solar event which began on 31 October 1986. The NOAA-6 satellite became unusable for sounding processing as of 11 November 1986 and dissemination of NOAA-9 SATEM data was temporarily suspended until the data quality had improved to near normal levels, on 13 November 1986. There are clear indications that the performance of the ECMWF analysis and forecast system especially over the Southern Hemisphere was adversely affected by these data deficiencies.

Planned changes

No major changes to the ECMWF analysis and forecast system are planned for the coming three months.

- Horst Böttger

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RECORD BREAKING TRANSATLANTIC BALLOON FLIGHT

Four months after their trip which ended so unfortunately in 1985 (ECMWF Newsletter December 1985), balloonist Henk Brink and his wife Evelien decided to have a second try at crossing the Atlantic Ocean. Their motive? "We still have a bone to pick with that ocean!"

In April 1986 the preparations were almost complete and HRH Prince Bernhard of the Netherlands could baptise the new capsule: Dutch Viking (Fig. 1).

The following is an impression of the flight and the meteorological support for which ECMWF provided much of the material.

Tuesday morning, 2 September 1986. It's nearly eight o'clock local time. A cheering crowd at Schiphol Airport's control tower. "Look, there they are!" To the north, only miles away, a huge, white balloon is clearly visible against the greyish morning sky. Dutch Viking drifts majestically into the very heart of Holland, Flevoland, reclaimed from the Zuyderzee and now, wheat covered, providing an ideal landing site.

It was the somewhat bumpy end of a balloon flight that for years to come will be remembered for the speed and the accuracy of its navigation.

From 1 August, captain Henk Brink and co-pilots Evelien Brink and Willem Hageman (a jet fighter pilot and squadron commander) had been waiting at St. John's, Newfoundland, for the weather to turn favourable for the beginning of their daring adventure: crossing the Atlantic. We, the meteorological support team, had had our daily conferences on the weather prospects. Before we could give them the "GO", we had to be very sure about three things: the weather at St. John's had to be good, i.e. no wind, no precipitation and no risk of icing; across the Atlantic there should be a pronounced westerly flow that should be maintained for at least three days and finally the weather conditions over Western Europe should permit a safe landing.

During the first three weeks, prospects were downright gloomy. Weather over North America was quite unsettled with many short wave troughs moving across the continent and into the Atlantic. This gave rise to a very meandering upper level wind pattern. Moreover, most of the troughs were accompanied by depressions of various intensities which all moved along latitudes rather too low for our comfort.

On August 19, tropical storm Charley appeared on the scene, making things even worse. Some of the trajectories we got were really fun: first all the way down to the Bermuda Islands, then in a wide curve to mid-ocean and from there straight back into Canada!

Fig. 1: Just after the baptism of the new capsule, Dutch Viking. From left to right: Captain Henk Brink, Squadron Leader Willem Hageman, HRH Prince Bernhard and Mrs. Evelien Brink

It occurred more than once that consecutive forecasts for the same day differed widely. Therefore, we compared ECMWF's 500 hPa prognoses for +120 and +96 hours for the same day: the magnitude of the deviations is an indication of the reliability of the forecasts. Figs. 2 a-e show how the difference fields changed from Monday to Friday in the week preceding lift-off. In the latitude belt that was our main concern, approx. 45N - 55N, the deviations attained minimum values in the output based on August 27, 1200 UTC (Fig. 1d). We concluded that the upper air prognoses for the weekend of 30 and 31 August seemed reliable.

In the meantime, a cold anticyclone had begun to develop over the United States; it drifted north-eastwards. According to the ECMWF prognostic 1000 hPa charts it was expected near Newfoundland by Saturday. We calculated - and our Canadian colleagues agreed - that there would be no or almost no wind over Newfoundland on the night from Saturday to Sunday, 30 to 31 August.

That was Thursday, August 28. Of course, a lot could happen between then and early Sunday morning, but never during the past weeks had things looked so good. With the highs and the lows at last moving into their climatological positions we knew that at least some sort of a west circulation was being created. The next day, Friday, our trajectories did indeed look promising (Fig. 3). Newspaper men and television crews hurriedly took off for Newfoundland while we kept our fingers crossed.

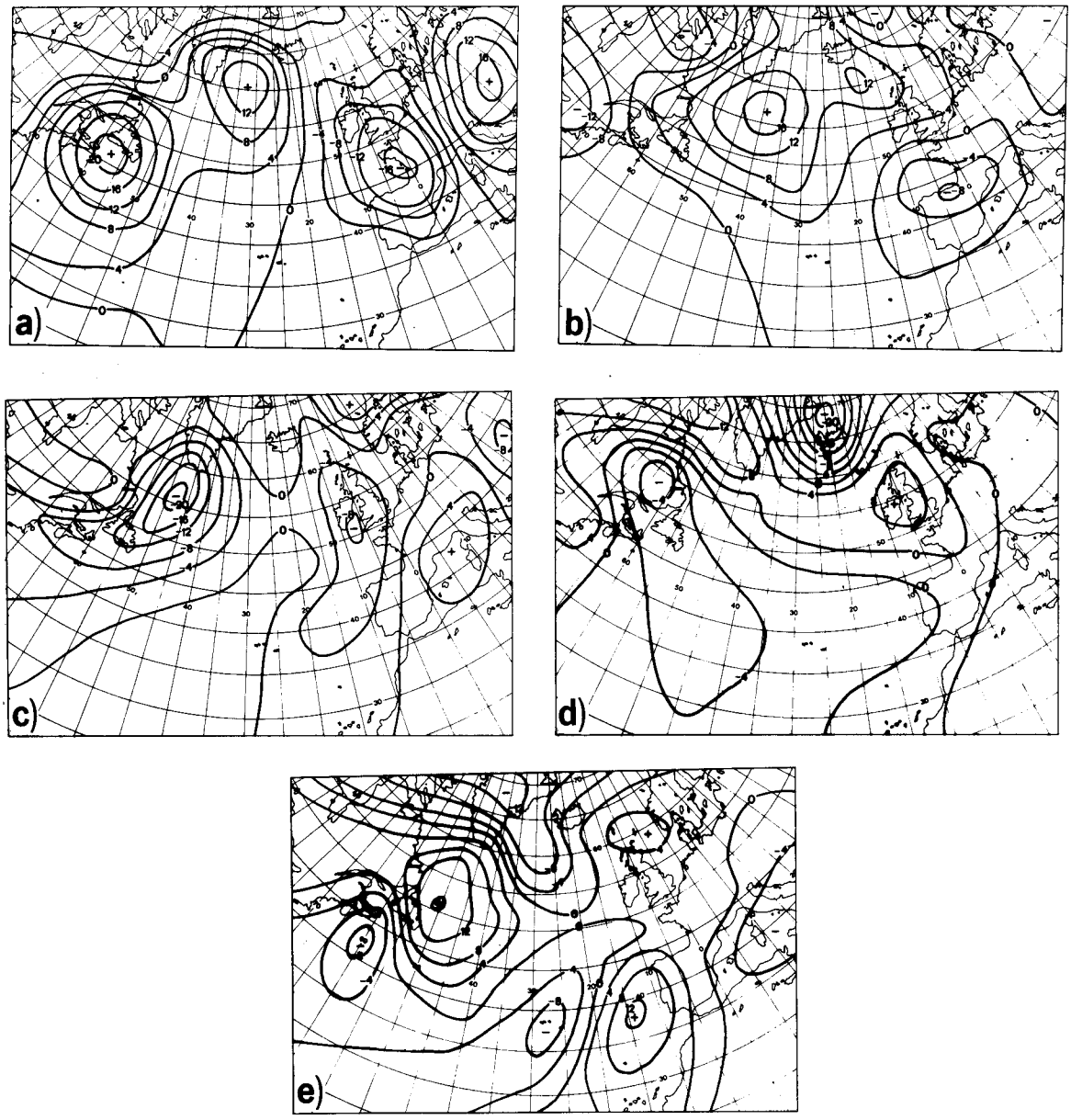

Fig. 2: Isolines, every fourth gpdam, of differences 500 hPa + 96 hrs minus 500 hPa + 120 hrs, valid from Thursday, 28 August 1986, 1200 UTC (a) through Monday, 1 September 1986, 1200 UTC (e)

Saturday morning we four meteorological advisers gathered at Schiphol Airport where the Flight Control Centre had been established. The new trajectories looked much like the day before's and the American high pressure area behaved as it should. So we signalled "GO" and between press and TV interviews began monitoring the weather over Newfoundland. In this we were greatly assisted by our Canadian colleague and friend, Harry Janes, chief met. officer at St. John's weather station who, notwithstanding the at times uncomfortably strong daytime winds, coolly forecast nil wind as from 20.30 local time. And so it was: by nightfall the ground crew could start inflating the 8000 m^3 helium hot air balloon. Everything proceeded smoothly. Communication with the Flight Control Centre at Schiphol via satellite proved excellent. Then, inflation almost complete, a sudden breeze set in, causing a slight panic amongst the roughly 15,000 spectators (abortion of the filling operation would mean some $ 100,000 wasted). However, it was just a down draught of cold air from the surrounding hills and soon it was calm again.

Sunday morning, August 31, fourteen minutes after midnight local time (02.54 UTC): Captain Henk Brink poured just enough water from a container to unbalance lift and weight. Slowly the gigantic balloon headed northeast. "We could follow it until it was a small white spot between the stars" one spectator told us afterwards.

After levelling off at 12,500 ft (approximately 3.6 km) the balloon was in southwesterly winds of between 35 and 40 kts. It was a bit slower than forecast; after twelve hours of flight the balloon had covered 460 nm against a forecast 505 nm. However, it proceeded excellently along the forecast track, never being more than 30 nm off it. Remember, this forecast was based on the ECMWF run of two days ago!

The atmosphere on board the capsule was quite relieved: the crew were happy to be going at last and even the astronauts' food seemed to taste good.

As can be seen from Fig. 3, one trajectory pointed to the Netherlands. Although we would have been quite content with a landing anywhere on the European continent, the possibility of a landing in Holland was tantalising. Good luck was with us: trajectories from an extrapolated position (Fig. 3) confirmed the possibility of a landing very close to our country. In the meantime, the balloon had gone over the top of a ridge of high pressure and was now on an east to southeast track with a speed that, for a while, exceeded 70 kts! That was at about 13,000 ft (4 km) at 300 km northwest of Ireland. Trajectories and extrapolation pointed to an arrival over the continental coastline some time during the night from Monday to Tuesday. As it is impossible to make a safe landing in the dark, the balloon had to be decelerated considerably, so we advised the captain to descend to 9,000 ft (2.8 km), which decreased the balloon's speed to about 45 kts, without changing its direction.

In the meantime, the Flight Control Centre seemed to have turned into something between a film studio and a Wimpy's at rush hour. TV crews, journalists, photographers, relatives and friends of the balloonists and scores of other people moving about, drinking coffee and having sandwiches. When Henk Brink announced that they had just crossed the Irish coastline there was applause and handshaking all around.

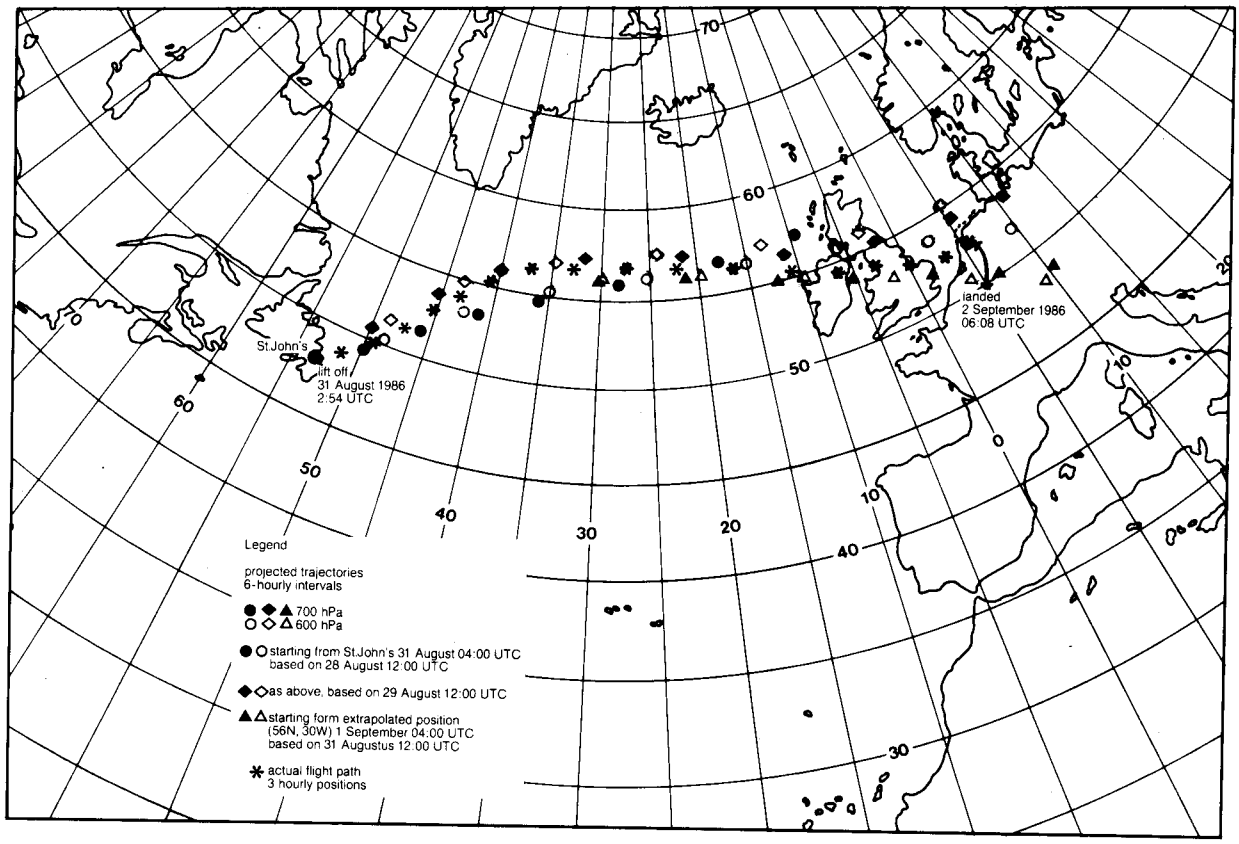

Fig. 3: Projected and actual tracks

Crossing the British Isles by night in a balloon is not entirely without danger. One has to stay high enough to avoid hills but low enough to not interfere with the dense air traffic. Fortunately, all British radar stations were very helpful in steering air traffic clear of the balloon and in relaying the balloon's positions to the Flight Control Centre. So gradually we were able to narrow down the landing window from "anywhere between Hamburg and Bordeaux" to "somewhere between Den Helder and Hook of Holland", a very reassuring feeling! For a landing site Captain Brink wisely preferred a wide stretch of country without obstacles. After descending to 5,000 ft over England, losing another 15 kts from its speed, the balloon was heading for the Rotterdam area. It would cross the Dutch coastline shortly after sunrise. Just off the coast of East Anglia we advised descent to about 2,000 ft to slow down the balloon somewhat more and to give it slightly backed winds: heading for Flevoland.

The landing finally occurred at 6.08 UTC, after a record time of 51 hours and 14 minutes. Only seconds later we had champagne - from plastic cups - but never had it tasted so good!

My three colleagues, Roel Blokzijl, Tijmen de Boer, Arie Steenhuisen and I want to express our gratitude for the co-operation that we have experienced from ECMWF before and during the balloon flight. Thank you all.

- Jules Roodenburg
KNMI, De Bilt, Netherlands

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CYCLOGENESIS IN THE SUBTROPICAL PACIFIC

ECMWF recently received the following report from the Fiji Meteorological Service. It draws attention to a case of major cyclogenesis which was very accurately forecast by the ECMWF global numerical forecast model.

As a result of the ECMWF forecast, the National Weather Forecasting Centre of the Fiji Meteorological Service was able to issue a much more accurate forecast for the daily newspapers than would have been likely without your prognosis.

The ECMWF 48 hour forecast of 850 hPa winds of 14 July 1986 predicted the development of a cyclonic circulation south of Fiji and Tonga by 16 July, 12 UT (Fig. 1 overleaf). This forecast was available at Nadi around 15 July, 00 UT. The depression developed about 1,000 km southeast of Fiji and therefore did not cause severe weather conditions over Fiji. Nonetheless, the ECMWF prognosis prompted the forecaster to include the development of a trough of low pressure over Fiji with associated cloud and showers in his press forecast on the afternoon of the 15 July, 03 UT. The trough did develop and featured in the press map the following day.

At the time the forecast was issued there was little other evidence that cyclogenesis would take place. The surface and lower troposphere flow was an undisturbed south-easterly airstream. The 250 hPa flow at 14 July 12 UT was a broad westerly airstream. Such situations are of course known to be inherently subject to baroclinic instability. However, without objective analysis techniques it is difficult to predict where, when or how much cyclogenesis will take place. The 00 UT of 250 hPa chart on 15 July showed more clearly that cyclogenesis was taking place, with a trough developing and the wind maximum splitting either side of the trough. At this stage, forecasters would be expected to recognise that cyclogenesis was likely at the lower levels, however, this chart its not available to the forecaster in analysed form before the deadline for the press forecast.

The Nadi newspaper map of 17 July 1986 (Fig. 2 overleaf) corresponds to the observed weather situation at 00 UT and may serve as a verification of the forecast from two days previously.

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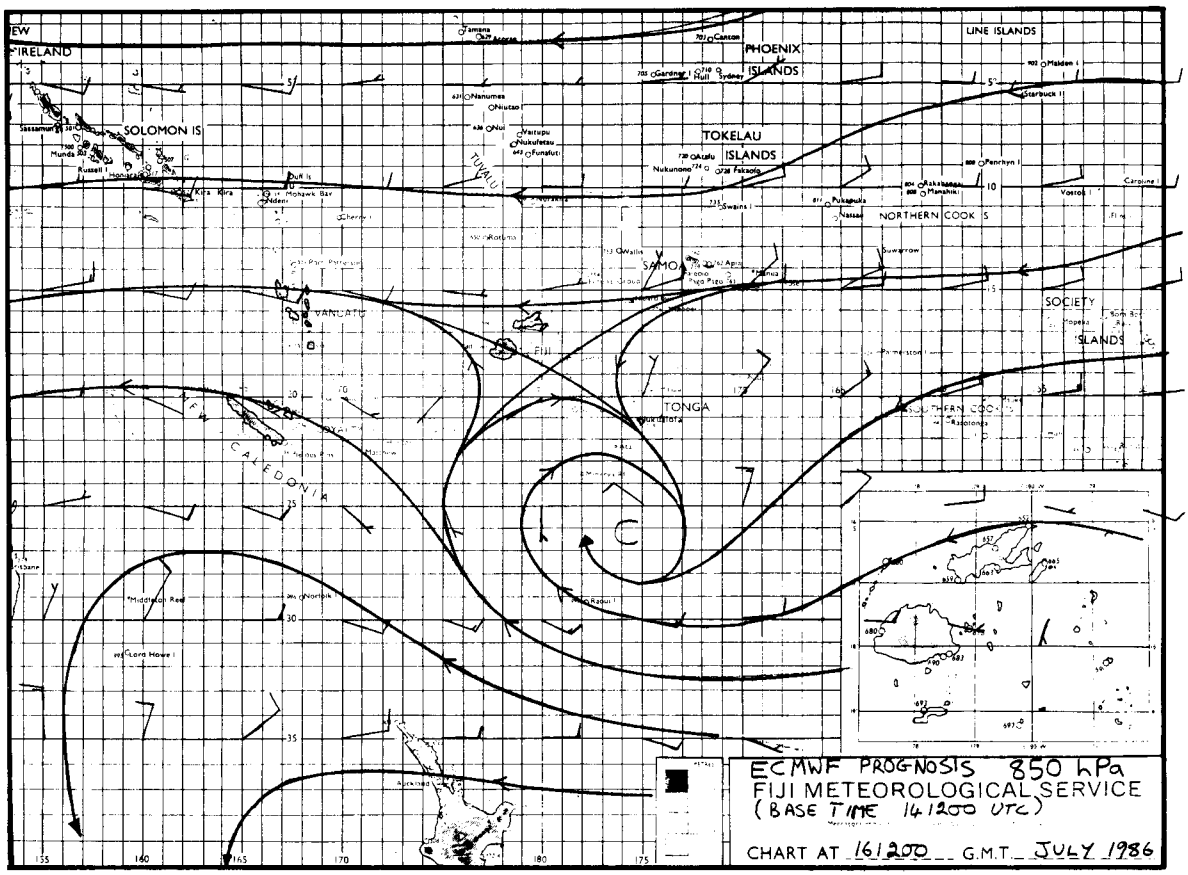

Fig. 1: ECMWF 48 hour forecast of 850 hPa wind, 14 July 1986 valid at 16 July 1986, 12 UT, disseminated over the GTS, plotted and analysed at the Fiji Meteorological Service.

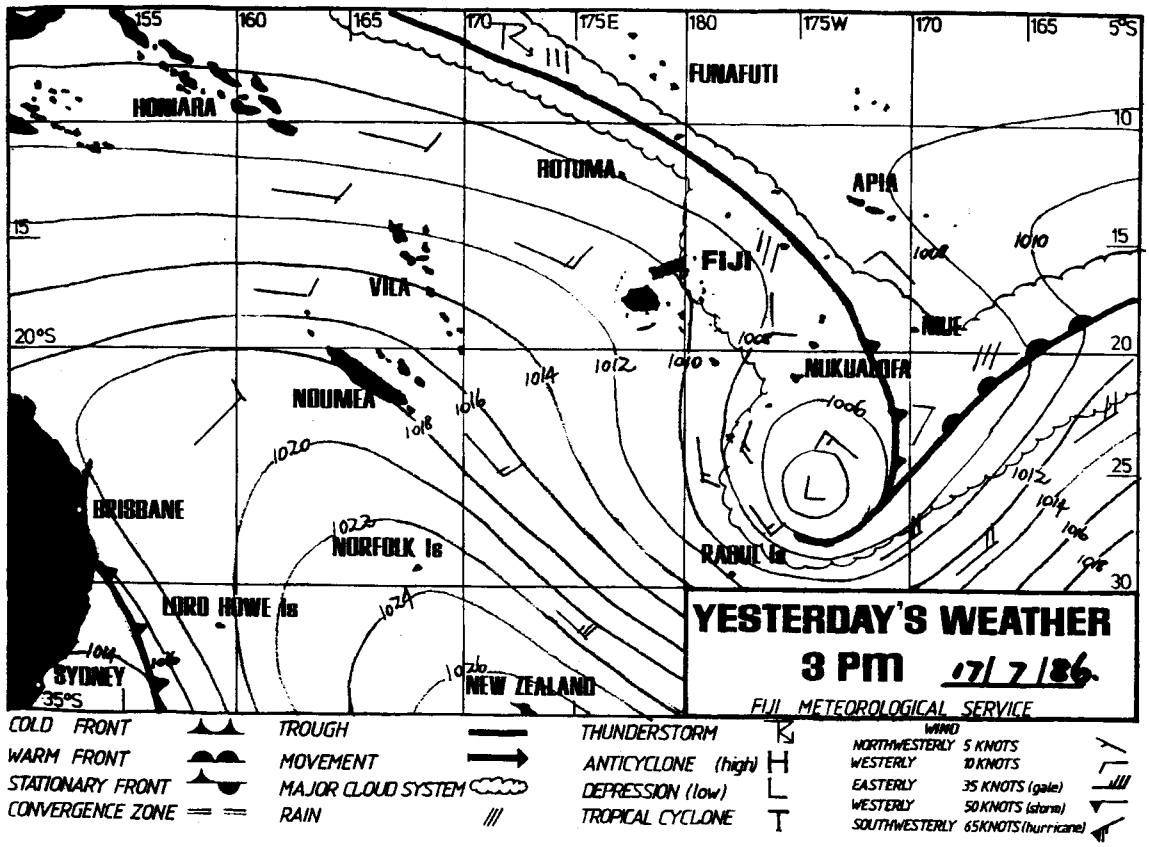

Fig. 2: Surface weather chart of 17 July 1986, 1500 local time (03 UT), published by the Fiji Meteorological Service.

USE OF ECMWF GRID PRODUCTS IN THE METEOROLOGICAL SERVICE OF THE VENEZUELAN AIR FORCE

Introduction

The Meteorological Service of the Venezuelan Air Force is relatively small and responsible for both general and aeronautical forecasting. Within the WWW framework, Maracay is the Regional Telecommunications Hub for South America north of the equator.

The article below describes the Venezuelan attempts to incorporate ECMWF analyses and 72-hour wind forecasts for the tropical belt into their operational analysis and forecast schemes.

Problems of analysis in the tropics

The main problems of analysis in the tropics are well known. Here we wish to emphasise, from experience, that these problems acquire extra large dimensions in small services with limited resources. Daily forecasting in tropical South America still poses an immense and complex task for the meteorologist, not only because there still remain many theoretical unknowns, but especially because of a low density upper air network with irregular observations and deficiencies in data forwarding. Therefore, no reliable initial data set of the atmosphere can be obtained either for subjective or objective analyses. Another problem is that analysis and forecasting methods in small tropical services are highly subjective and dependent on the meteorologist's experience in local climatology and based upon years of working with an inadequate data set and using classical mid-latitude meteorology. Therefore no reliable initial state of the atmosphere can be specified and, evidently, these methods cannot be very successful particularly in the case of predicting the onset and ending of sudden major weather events.

We strongly believe that a main aim of services with limited resources should be to make optimum use of Numerical Weather Prediction products from large automated centres to help improve their regional data sets and prediction.

Use of ECMWF tropical wind analyses

The European Centre for Medium Range Weather Forecasts undoubtedly possesses an excellent data collection system that assimilates both conventional and non-conventional observations on a global base. The gap over South America still remains, but non-conventional observations such as SATOB, SATEM and AIREP over adjacent areas are received. The data is submitted to rigorous and automated quality control procedures in near real-time, before being validated. The analyses, being objective and numerical, can be of great value in small non-automated services struggling with data problems.

For some time we have received on the GTS from ECMWF analysis in GRID code for 850 and 200 hPa winds for 1200 GMT. They come in daily on a quite regular basis between 2000 and 2200 local time (i.e. 0000 - 0200 GMT next day) with a delay of

about 12 hours with respect to the observation time. By that time, the 1200 GMT regional charts have already been analysed with the following considerations: absolute scarcity of data over vast oceanic and continental areas; no quality control of the plotted data performed. Therefore, subjective interpolation to obtain winds on latitude/longitude gridpoints, for instance for aeronautical purposes, cannot even be attempted.

ECMWF wind analysis for 850 and 200 hPa for the tropical belt are thus extremely helpful for completion and correction of the day's 1200 analysis and as a starting point for the next day's 0000 GMT analysis.

ECMWF 72-hour tropical wind forecasts

ECMWF 72-hour tropical wind forecasts for 850 and 200 hPa were received with some regularity between November and December 1985. In the first week of December, Northern Venezuela was struck by heavy rains that caused severe floods and damage to roads, bridges and other civilian works and took a high toll in human lives. The impact of these rains was much stronger since December traditionally is considered to be a relatively dry month, under the influence of strong low level anticyclonic flow over the north. During this rain episode, no radiosonde data from nearby countries were received at the RTH Maracay, while national sonde stations were having supply problems. The ECMWF GRID analysis and 3-day forecasts provided the only source of wind data available. The three day forecasts, particularly, were essential in forecasting the persistence of the weather event during the week, together with some changes in intensity and displacement of the maximum activity centres.

The analysis and forecasts showed abnormal flow types at high levels over northern Venezuela for the time of year and we believe this might have had a dominant influence on the state of the weather experienced that first week of December.

Conclusions

ECMWF tropical wind analyses and forecasts have proved to be extremely useful in our Service and at times have been, in fact, the only reliable data available.

Good knowledge is required of the objective analysis, data assimilation and numerical prediction schemes in order to evaluate these ECMWF products specifically for the tropics.

- Antonio Domingo Con
Meteorological Service,
Venezuelan Air Force,
Maracay, Mariscal Sucre AF Base

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CFT 77

CFT 77 is the new FORTRAN compiler produced by Cray Research. It was designed with several goals in mind, the main ones being:

- to produce a compiler which could easily be ported to other Cray machines - CRAY-2, etc.;
- to incorporate some of the latest ideas on optimisation;
- to produce a compiler capable of partitioning codes automatically for multi-tasking;
- to produce a modular compiling system for use also by the PASCAL, C and 'FORTRAN 8X' compilers;
- to ensure that the compiler is much more maintainable than CFT.

These goals have not all been realised with the first release of the compiler, notably in the area of optimisation and multi-tasking partitioning. It is hoped to have some automatic partitioning in the compiler next year. As regards optimisation, CFT 77 approaches this by a method different from that of CFT. CFT optimises the program at the block level, while CFT 77 does a global optimisation, which means that the entire subprogram is analysed to determine the control and data flow, enabling much more scalar optimisation and instruction scheduling to be done. Data from this analysis is also used in the vectorisation analysis and this is where the initial release of the compiler is a little weak. We have seen several instances of loops which are trivial to vectorise for which the compiler has generated scalar code, and they have required 'CDIR$ IVDEP' directives to force the compiler to vectorise them.

A major requirement for CFT 77 was that it had to be compatible with CFT. With a few minor exceptions to do with Cray extensions, it is source-compatible and also relocatable - compatible using the same runtime libraries as CFT.

CFT does more extensive error checking than CFT, so some constructs that may appear to work with CFT will be detected as errors by CFT 77. Processing of POINTER variables has also been tightened up, e.g. it is no longer possible to assign a real-value to a pointer variable.

As a result of all this extra analysis and the fact that the current CFT 77 has been compiled with a non-vectorising PASCAL compiler, the compilation speed of the compiler is relatively poor. On average it appears to take 5 times as long as CFT to compile, but we have seen instances (notably with large Analysis codes) where it has taken 12 times longer. These times will reduce when the vectorising PASCAL compiler (soon to be released) is employed, but realistically it is expected that CFT 77 will always be slower at compiling than CFT, with an

average ratio of about 3:1. The code produced, however, should execute faster. To alleviate this 'problem' it may be necessary for some users to change their working practices and instead of compiling programs and subprograms every time, employ libraries or absolute binaries instead.

CFT 77 has extra facilities which are not available in CFT, these are 31-character symbolic names, array expressions and array sections. If users start to employ these features, then they will no longer have the option of using CFT, as those features would produce compilation errors. An example of some of these features is:

```
DIMENSION A(10), B(10), C(10,2), THE_MAXIMUM_VALUE(10)
   .
   .
   .
A = SIN(B)
C(:2) = A * B
THE_MAXIMUM_VALUE = MAX (A,B,C(:1),C(:2))
   .
   .
   .
```

These extra features are intended to anticipate FORTRAN 8X syntax, however, '8X' is not yet a standard and the syntax could still change. In fact, CFT 77 allows statements such as 'A(INDX) = B(INDX)' where A, B and INDX are all arrays, but it now looks as if this will not be allowed in FORTRAN 8X.

The control statement for CFT 77 has parameters similar to those for CFT, but there are some new parameters and some of the old ones have different options. The format of the control statement is:

```
CFT 77 (ALLOC = alloc, B = bin, C = cal, CPU = cpu:hdw
       ,E = lvl, INTEGER = n, L = list, OFF = str, ON = str
       ,OPT = optim, TRUNC = n, DEBUG, LIST, STANDARD)
```

Of these parameters: ALLOC, B, C, CPU, E, L, TRUNC have the same values and meanings as for CFT.

Of the others:

- the values for INTEGER = n may be 46 or 64 with 46 the default, while for CFT the values are 64 or 24 with 64 the default;

- the values for OPT = optim may only be FULL, OFF, NOVECTOR, ZEROINC, NOZEROINC, which form a subset of the CFT options;

- DEBUG is the same as CFT's 'ON=Z' and is ON by default at ECMWF and cannot be switched off;

- LIST sets ON=CGSX (see below);

- STANDARD is the same as CFT's 'ANSI' parameter;

- ON = str/OFF = str can have the following options:

  ACFGHJOPQRSX
  which form a subset of the CFT options and which have the same (or similar) meanings as for CFT.

The defaults at ECMWF are:

```
CFT 77 (ALLOC = STATIC, B = $BLD, CPU = CRAY-XMP:CIGS:EMA:VPOP
       ,E = 3, I = $IN, INTEGER = 46, L = $OUT, OFF = ACFGHJOP
       ,ON = PQRSX, OPT = FULL:ZEROINC,TRUNC = 0)
```

To use the CFT 77 compiler include the statement

```
NEXT.    or    NEXT(PROD=CFT77)
```

before the CFT 77 control card. Once the level 1.15 libraries and products are made the default (hopefully early in the New Year), the NEXT statement will not be required.

If you do try to use CFT 77, then please note the following:

1. Compilation times will increase, probably by a factor of 5. Judicious use of libraries can alleviate this to some extent.

2. Some loops which vectorise with CFT may not vectorise with CFT 77. A 'CDIR$ IVDEP' directive may get round this, but in any case report the problem to User Support, supplying a copy of the subroutine so that we can, in turn, inform Cray Research.

3. Report any instances of bad results (none are known so far) to User Support, again with a copy of the subroutine.

4. If you use the extra, non-standard extensions, remember that you can no longer use CFT as a 'fall-back' compiler.

5. If you have any comments to make, either favourable or unfavourable, let me know. CFT 77 is a new product and we are in a fair position to influence Cray's development of it.

- Neil Storer

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USE OF SLOT NUMBERS WITH STRANGER TAPES

When a tape comes from, or is destined for, another installation, the user supplies the VSN label. In order to uniquely identify the tape, a slot number is supplied by the ECMWF Tape Librarian. Subsequently when a job which uses the tape is submitted, the slot number must be specified as a comment, on either the REQUEST or LABEL statements.

If users have either not provided the slot number or have put it on the wrong statement, the job is likely to be dropped.

The slot number should be specified on the statement at which the tape is to be physically mounted. Here are a few examples to illustrate how to provide the information correctly.

In these examples

xxxxxx	represents the VSN
nnn	represents the Slot Number
label	represents the File Header Label.

1. Cyber job - Unlabelled tape, Stranger mode being read at 1600 bpi:

```
REQUEST,TAPE,PE,NORING,S,VSN=xxxxxx. SLOT NO. = nnn
```

2. Cyber job - Labelled Stranger tape, Single file, Write mode at 1600 bpi:

```
LABEL,TAPE,D=PE,RING,F=S,W,VSN=xxxxxx. SLOT NO. = nnn
```

3. Cyber job - Labelled Multifile, System Internal (SI) tape read at 6250 density:

```
REQUEST,MFN,GE,NORING,VSN=xxxxxx,E. SLOT NO. = nnn
LABEL,TAPE,M=MFN,L=label,R.
```

   Note the slot number goes on the REQUEST statement, not the LABEL statement.

4. VSN statement

   When the VSN statement is used, it is still preferable to put the Slot Number on the LABEL or REQUEST as shown above.

5. Use of tapes with Slot Numbers from Cray jobs

The above method applies equally to Cray jobs except that when a statement containing a Slot Number occurs, then the whole statement must be enclosed by

< >

or

[ ]

otherwise the slot number will be taken as a separate control statement and the job will fail. Thus

```
TEXT='[REQUEST,MFN,GE,E,NORING,VSN=xxxxxx. SLOT NO. = nnn]'↑
     'LABEL,TAPE,M=MFN,L=label,R.'.
```

Note that, in general, S (Stranger Mode) tapes cannot be used from Cray jobs.

- John Greenaway

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THE NAG FORTRAN LIBRARY AT MARKS 11 AND 12

The NAG Library at Mark 11 has been made available as a NEXT product on both the Cyber and the Cray. In addition to the new routines added at Mark 11, some routines have been modified, which may slightly alter the results obtained. See section 3 below for further details.

Users are urged to try these routines, as it is intended to make them the default versions early next year. To use the Mark 11 versions of the library, the following control statement should be added to the job:

On the Cyber	NEXT(NAGLIB)	
On the Cray either	NEXT(PROD=NAGLIB)	to access just the NAG library
or	NEXT.	to get all the NEXT products.

The Cyber Mark 11 library has only been made available under FTN5, the CDC Fortran 77 Library, since Mark 12 will contain Fortran 77 code.

1. New routines at Mark 11

35 new routines have been included in the Mark 11 Fortran Library. One routine (D01FAF) has been withdrawn and is replaced by D01GBF. In addition, the routine A00AAF, which prints details of the library, has now been documented for general users in the Essential Introduction. There will be a total of 525 user-callable routines in the Mark 11 Library.

Summary of new routines

C06 - Summation of series
C06FFF,C06FJF,C06EKF,C06FKF

E04 - Maximising or minimising a function
These routines supercede and replace those in chapter H
E04MBF,E04NAF,E04VCF,E04VDF,E04YCF,E04ZCF

F01 - Matrix operations, including inversion
F01LEF,F01MAF,F01NAF

F02 - Eigenvalues and Eigenvectors
F02FHF,F02FJF

F04 - Simultaneous linear equations
F04EAF,F04FAF,F04LEF,F04MAF,F04MBF,F04NAF,F04QAF,F04YAF

G13 - Times series analysis
G13BBF,G13BDF,G13BEF,G13BFF,G13BGF,G13BJF,G13DAF,G13DBF

S19 - Approximations of special functions
S19AAF,S19ABF,S19ACF,S19ADF

If further information regarding these new routines is required, please refer to the Mark 11 Mini-manual or contact either John Greenaway or Dimitris Maretis from the User Support section.

2. Routines to be withdrawn at Mark 12

It is proposed to withdraw the following routines at Mark 12, as improved routines are being included at Mark 11.

Routine to be withdrawn	Recommended replacement
C06ACF	C06EKF or C06FKF
C06ADF	C06FFF
E04VAF, E04VBF, E04WAF	E04VDF(easy-to-use) or E04WAF(comprehensive)
E04ZAF	E04ZCF
E04ZBF	(no longer needed after E04WAF has been withdrawn)
H01ABF, H01ADF, H01AFF, H01BAF	E04MFB(easy-to-use) or E04NAF(comprehensive)
HO2AAF	E04NAF

3. Routines revised at Mark 11

In addition to routines which have been corrected since the release of Mark 10, a number of routines have been revised to incorporate improvements to algorithms.

3.1 D02GBF now makes more elaborate checks on the validity of the boundary conditions; additional error exits have been introduced.

3.2 The following optimisation routines have been revised by improving the tolerances set for internal line-searches. This will avoid the failures to converge, which very occasionally arose, and should, on balance, result in a reduction in the number of iterations and function evaluations; however, for some problems a slight increase in the number of iterations or function evaluations may be observed and occasionally routines may exit with IFAIL=3 or 5 rather than 0.

E04CGF	E04GBF	E04JAF	E04LAF
E04DEF	E04GCF	E04JBF	E04LBF
E04DFF	E04GDF	E04KAF	E04UAF
E04EBF	E04GEF	E04KBF	E04VAF
E04FCF	E04HEF	E04KCF	E04VBF
E04FDF	E04HFF	E04KDF	E04WAF

3.3 The following linear algebra routines have been restructured, so that they perform more efficiently on vector or pipeline processors and on machines with a paged or cache memory. There will be some insignificant differences in the results from these routines.

F01ADF	F01AMF	F01CSF	FO4AGF
FO1AEF	F01ANF	FO2APF	F04AJF
F01AFF	F01AXF	FO2AQF	F04AKF
F01AGF	F01AYF	FO2ARF	F04ANF
F01AJF	F01BCF	FO2AEF	
F01AKF	F01CKF	FO3AFF	
F01ALF	F01CLF	FO3AHF	

\- John Greenaway

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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 195). 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)
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	Contouring package: addition of highs and lows
135	Local print file size limitations
136	Care of terminals in offices
140	PURGE policy change
141	AUTOLOGOUT - time limit increases
144	DISSPLA FTN5 version
152	Job information card
158	Change of behaviour of EDIT features SAVE, SAVEX.
	Reduction in maximum print size for AB and AC
164	CFT New Calling Sequence on the Cray X-MP
166	Corrections to the Contouring Package
172	Change to CFT Compiler default parameter (ON=A)
174	Warning against mixing FTN4 and FTN5 compiled routines.
176	Archival of Cyber permanent files onto IBM mass storage
177	RETURNX, REWINDX
178	TIDs on Cray include 2 chara. TID plus 3 chara source computer ID.
	Caution with ACQUIRE on RERUN jobs
183	NEXT version of Cray ECLIB and CONVERT
	DAYFILE/DAYFIL commands
186	PROCLIB changes
187	CFT 1.14. Bugfix 4
	Maximum memory size for Cray jobs
189	ROUTEDF
190	Using ROUTE to direct RJE output to the Centre
194	NOS/BE level 664
	Preventive maintenance schedules

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ECMWF PUBLICATIONS

TECHNICAL MEMORANDUM NO. 124:	A second generation field database
TECHNICAL MEMORANDUM NO. 125:	The new analysis system
TECHNICAL MEMORANDUM NO. 126:	FGGE re-analyses and their use at ECMWF
TECHNICAL MEMORANDUM NO. 127:	Forecast skill and predictability
TECHNICAL REPORT NO. 56:	Sensitivity of medium-range weather forecasts to the use of an envelope orography
TECHNICAL REPORT NO. 57:	Zonal diagnostics of the ECMWF 1984-85 operational analyses and forecasts
TECHNICAL REPORT NO. 58:	An evaluation of the performance of the ECMWF operational forecasting system in analysing and forecasting tropical easterly wave disturbances. Part 1: Synoptic investigation

DAILY GLOBAL ANALYSIS - JANUARY-MARCH 1985

ANNUAL REPORT 1985

RESEARCH MANUAL 4:	User guide to PREPEXP (Meteorological Bulletin M4.0(1) (distribution at ECMWF only)

ECMWF FORECAST AND VERIFICATION CHARTS: 30 JUNE 1986

COMPUTER BULLETIN B5.2/5:	The ECMWF meteogram system

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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.

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*T indicates the original Technical Newsletter series

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	-	Liam Campbell	OB 003	348
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