

Plotting of ECMWF forecast products in some Member States

J.A. Woods

Research Department

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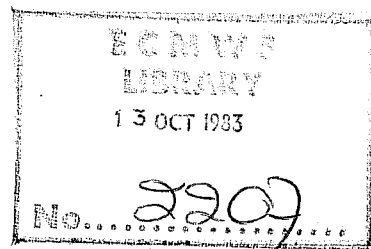
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ABSTRACT

ECMWF products are presented to forecasters in the Member States in the form of plotted charts (as well as in the form of meteograms, numerical values etc.). In this memorandum, examples of charts of ECMWF forecast fields, as plotted in nine Member States, are presented. Different plotting practices result in different characteristics of the resulting charts; the differences are summarised.



1. Presentation of ECMWF forecast products to the forecasters in the Member States is clearly an important link in the chain between the Centre itself and the eventual end users of the forecasts.

2. In order to study specifically the appearance of ECMWF surface fields as plotted in the Member States from the new forecasting system introduced on 21 April 1983, the following Member States were asked to send a copy of the mean sea level pressure (or 1000 mb height) charts for the analysis of 12Z 1 July 1983 and forecasts from that date:

Federal Republic of Germany
France
Greece
Ireland
Italy
Netherlands
Finland
Sweden
United Kingdom

The Member States were also asked if their forecasters had any comments to make about the structure of the surface fields since the introduction of the new orography.

3. Replies were received from all nine Member States to which the request had been sent. No significant comments were made concerning the structure of the surface fields. Although only MSL pressure charts were requested, some Member States sent other levels and parameters, and a selection of these are included in the figures below. Some centres sent 24 hour forecast charts, some 36 hour forecasts. Examples of each received are given.

4. Figures 1a to 1h show the ECMWF 24 hour forecast charts from 1 June 1983, as plotted at ECMWF, and in Sweden, the Netherlands, Finland, United Kingdom, Ireland and Italy. Some of these charts have been reduced in size for presentation here.

Figures 2a to 2f show the ECMWF 36 hour forecast charts from 1 June 1983, as plotted in Sweden, the Netherlands, Finland, France, Germany and Greece. Figure 2g shows the Atlantic European area plotted in Sweden. Some of these charts have also been reduced in size.

5. Considering the surface level charts, effects due to the new orography (which originally stimulated the request to the Member States for these charts) are masked by differences in plotting practices between the different centres. These include:

5.1 Besides geopotential height (or MSL pressure) and temperature, thickness and vertical velocities are plotted by some centres.

5.2 Differing contour values and contour intervals are plotted.

| | 1000mb Z or MSL Pressure/ contour interval | Other parameter | 500mb Z/ contour interval | Other parameter |
|------------------|---|--------------------|---------------------------------|--------------------|
| ECMWF | 1000/5 mb | T850 | 552/4 dam | T500 |
| Sweden | 1000/5 mb | W700 | | Thick.1000/500 |
| Netherlands | 1000/5 mb | T850 | 552/4 dam | W500 |
| Finland | 1000/5 mb | W700, T850 | 552/8 dam | T500 |
| United Kingdom | 0/6 dam | T850 | 552/8 dam | T500 |
| Ireland | 1000/4 mb | - | 552/6 dam | T500 |
| Italy | 1000/4 mb | - | N/R | - |
| France | 1000/5 mb | Thick.1000/700 | N/R | - |
| Fed.Rep.Germany | 1000/5 mb | - | 552/8 dam | - |
| Greece | 1000/4 mb | - | N/R | - |
| Sweden (Atl-Eur) | 1000/5 mb | T850 | | |

Note that the 1000mb chart from Finland has three fields, two plotted as contours, the other (T850) as values at specific points.

5.3 The smoothness of the plotting is different between different charts.

6. Although judgements of the value of the different plotting styles etc. are necessarily subjective, some noticeable characteristics can be seen.

6.1 Compare the treatment of the 500 mb flow over Scotland. A closed low is seen plotted on the ECMWF chart (Fig. 1a). This appears either as a trough or an indication of a low height value on the other charts (except that of Ireland which also shows a closed low). (Figs. 1b to 1f).

6.2 Compare the details of the mean sea level pressure pattern extending from southwest of Ireland to Scandinavia. Some plots show considerably more detail than others.

Presumably the users of these charts have become accustomed to the plotting. Nevertheless, a priori, it would appear advantageous that as much detail as possible (within the constraints of legibility, reasonableness etc.) should be contained in the plotted charts.

7. Figures 3 to 9 show a selection of other charts received. Figure 3 (Netherlands plot) is only slightly reduced from the original plotter output. Note how 28 separate charts, containing 35 meteorological fields, from analysis to 6 days, together with objective guidance (precipitation, max/min T etc.) are contained on one page which, being only slightly bigger than A4 size, gives a useful, easily comprehensible summary of the medium-range forecast.

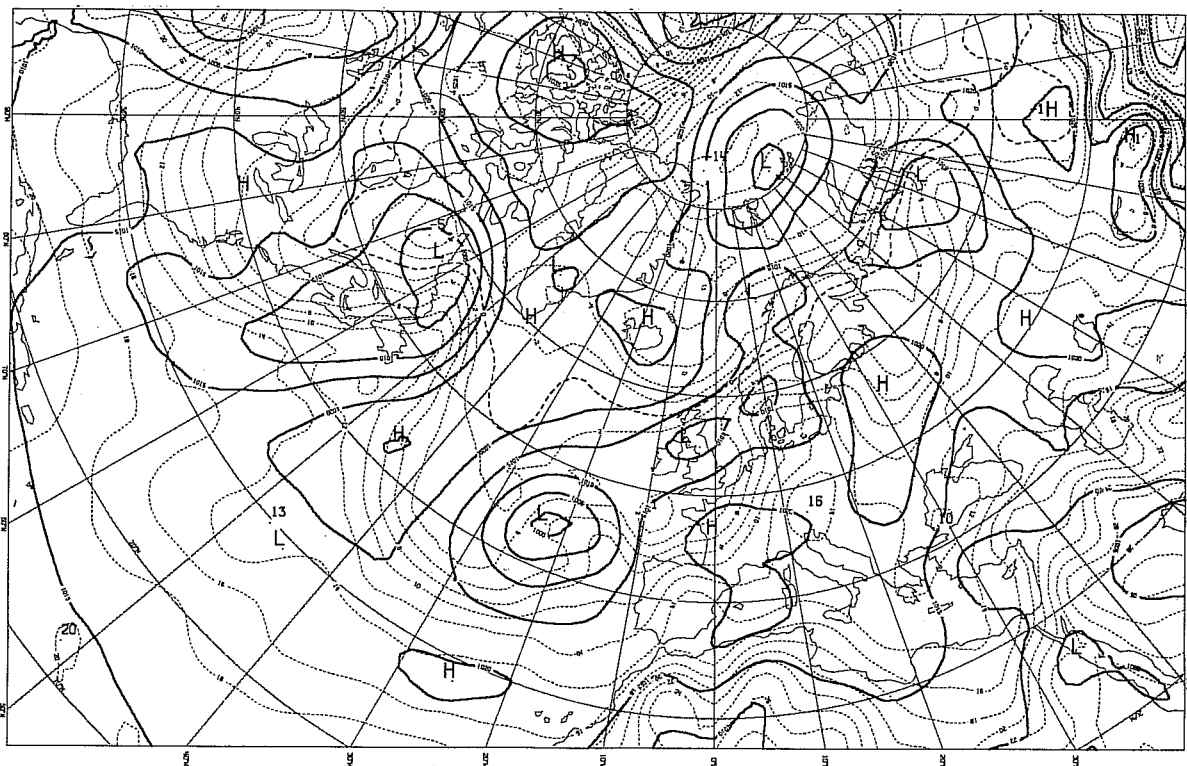
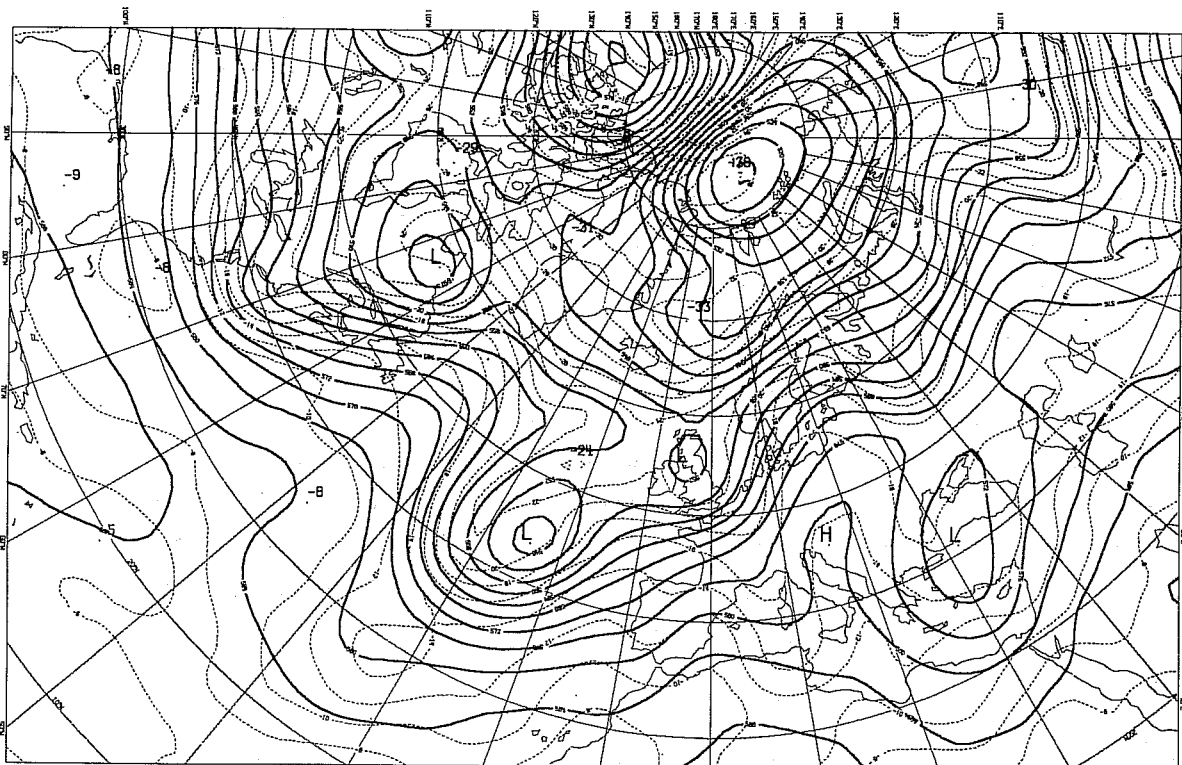
Figure 4 shows humidity and accumulated precipitation fields plotted, together with the MSL pressure, plotted in Sweden.

Figures 5 and 6 show Southern Hemisphere fields.

Figure 7 shows MSL pressure and 10 m wind fields.

Figure 8 shows cloud cover and thunder index ($K=T850-T500+Td850-(T700-Td700)$).

Figure 9 shows a larger area plotted, including vertical velocity fields, plotted in Sweden.



83/06/01. 12Z ECMWF FORECAST D+1 VT: THURSDAY 83/06/02 1200Z

Fig. 1a ECMWF 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted at ECMWF
 TOP: 500 mb height and temperature
 BOTTOM: MSL pressure and 850 mb temperature

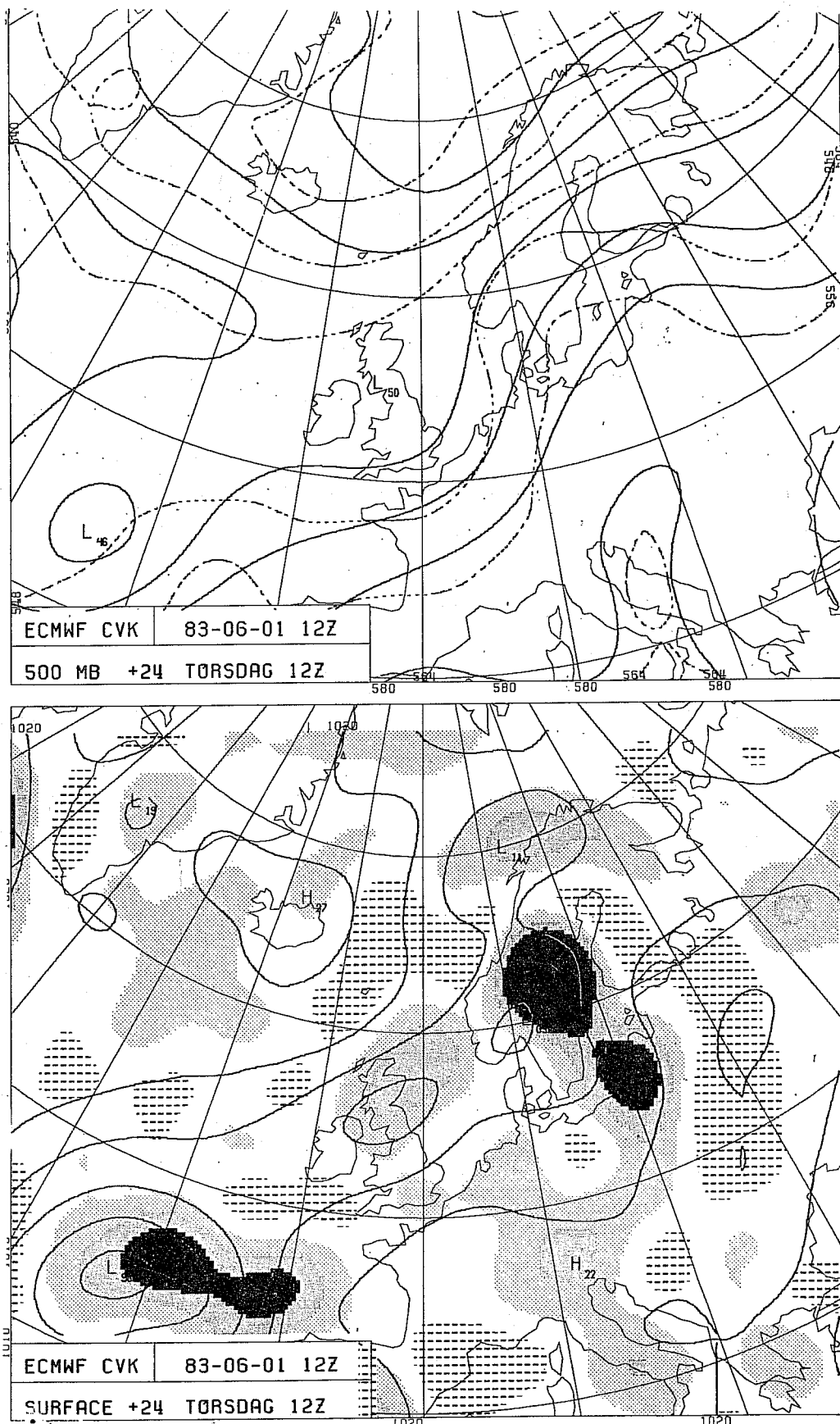


Fig. 1b ECMWF 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted in Sweden

TOP: 500 mb height and 500-1000 mb thickness
 BOTTOM: MSL pressure and vertical velocity at 700 mb

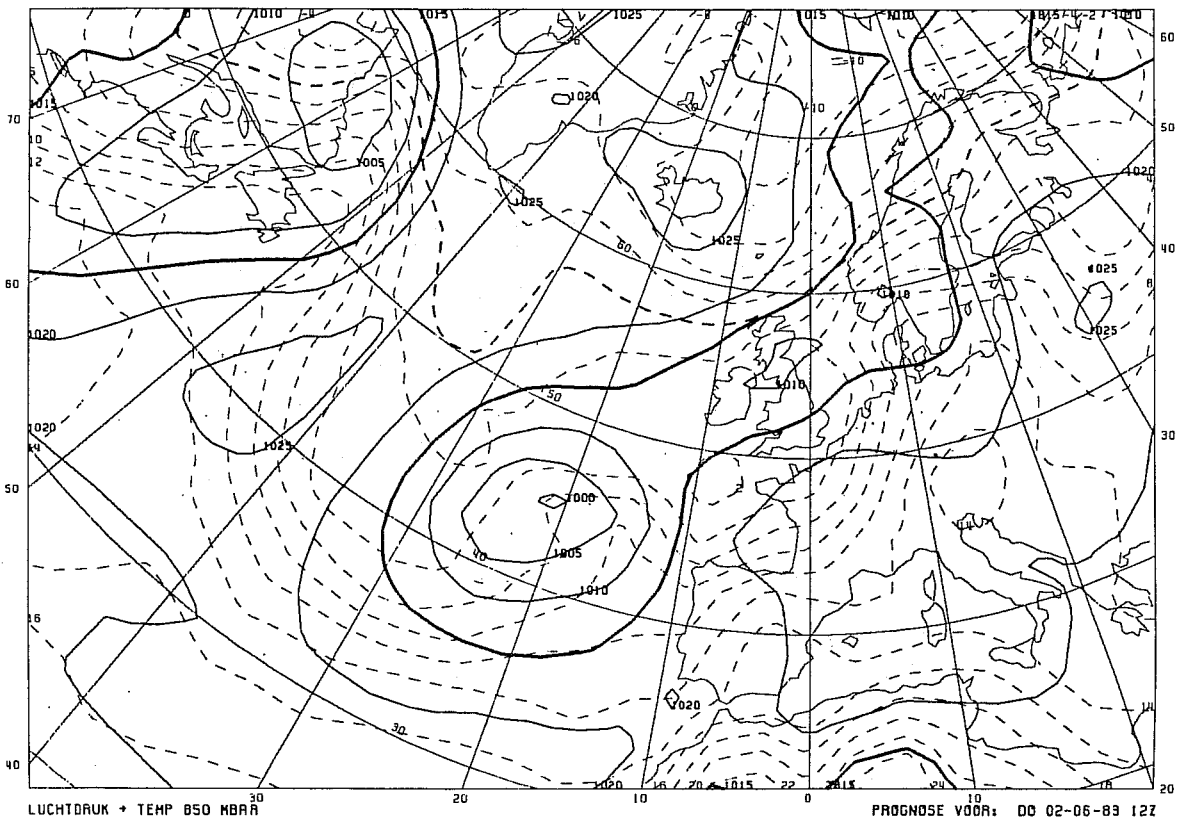
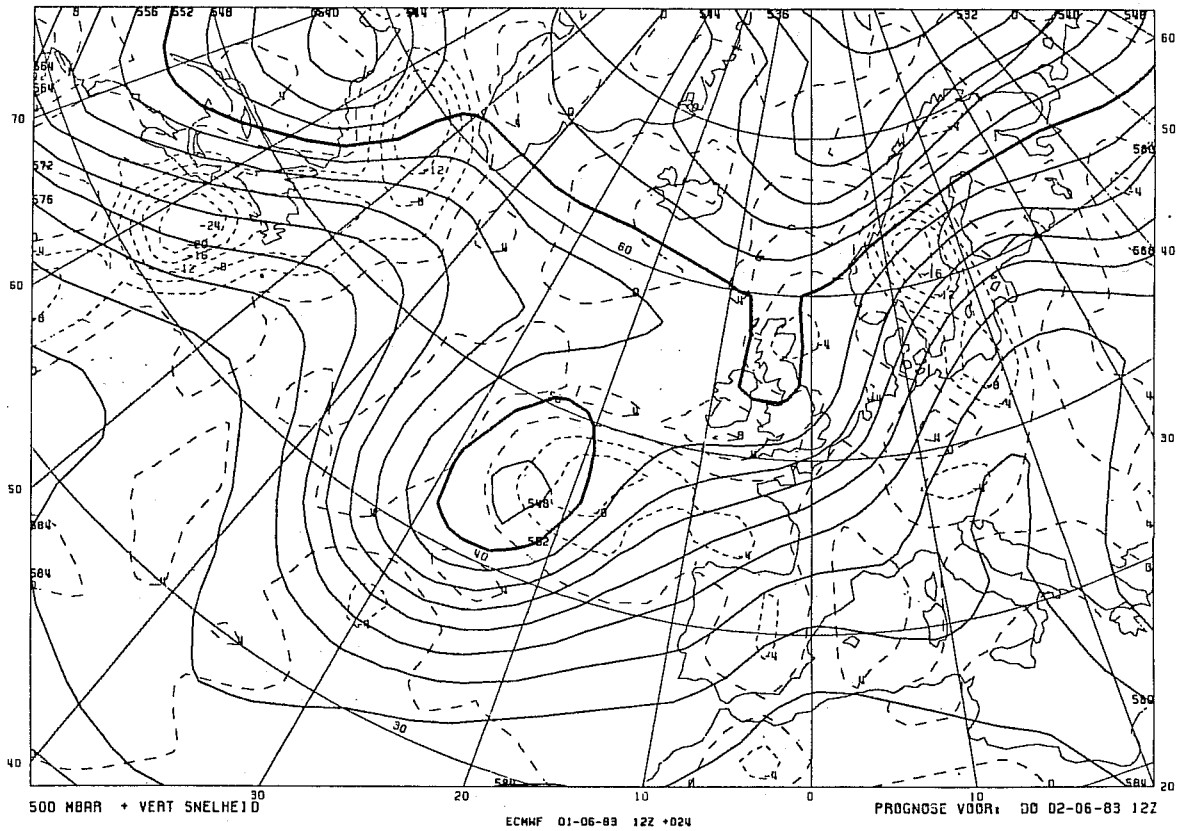


Fig. 1c ECMWF 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted in the Netherlands

TOP: 500 mb height and vertical velocity

BOTTOM: MSL pressure and 850 mb temperature

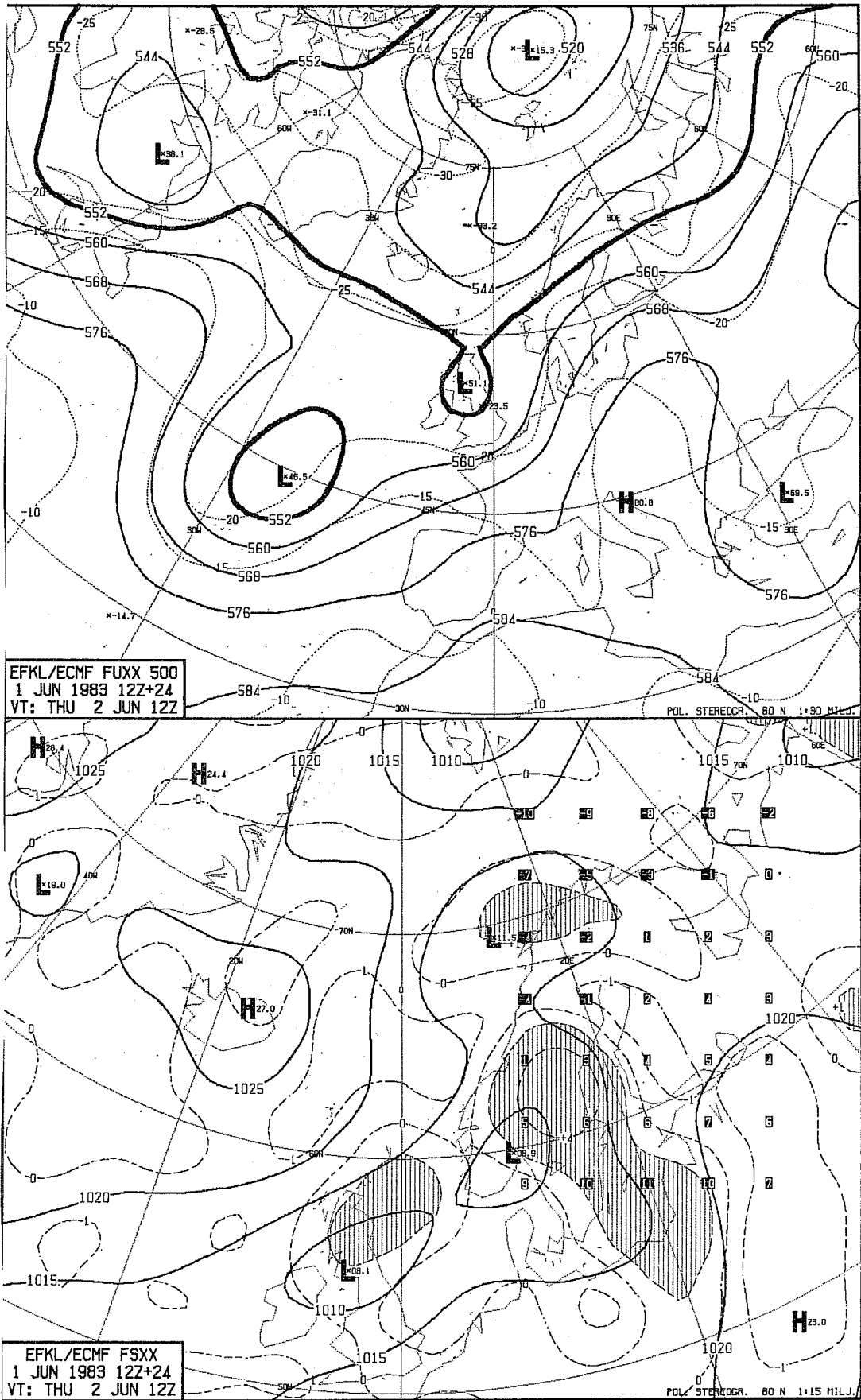


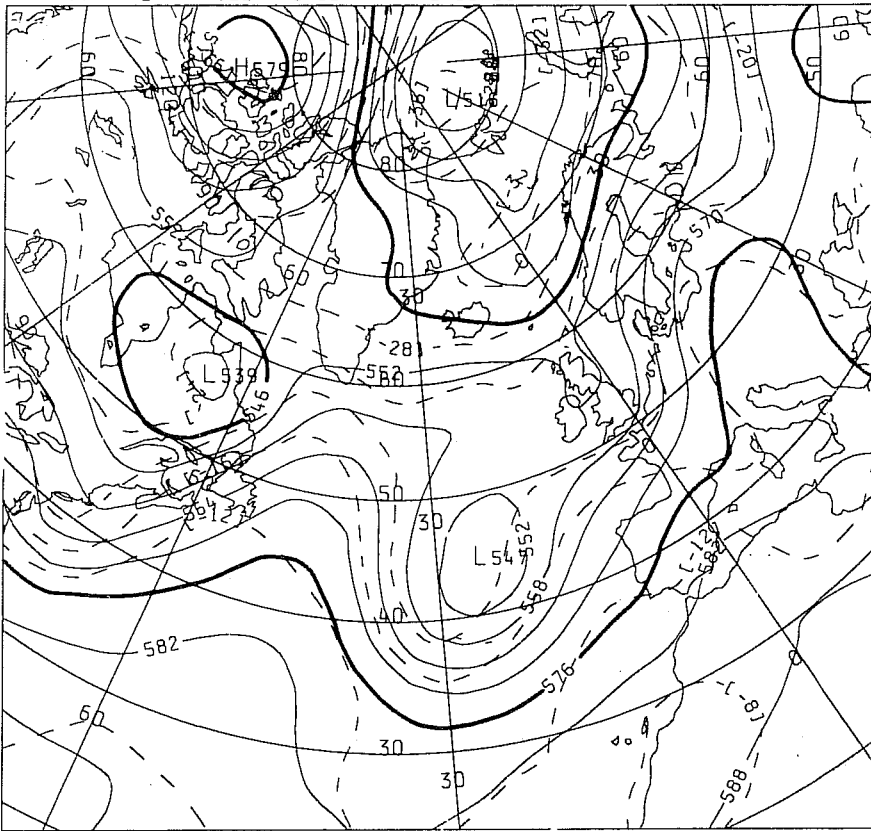
Fig. 1d ECMWF 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted in Finland

TOP: 500 mb height and temperature

BOTTOM: MSL pressure, 700 mb vertical velocity and 850 mb temperature

DT 12Z WEDNESDAY 1/06/8

VT T+24 12Z THURSDAY 2/06/83 500MB HT AND TEMP----



VT T+24 12Z THURSDAY 2/06/83 1000MB HT 850MB TEMP---

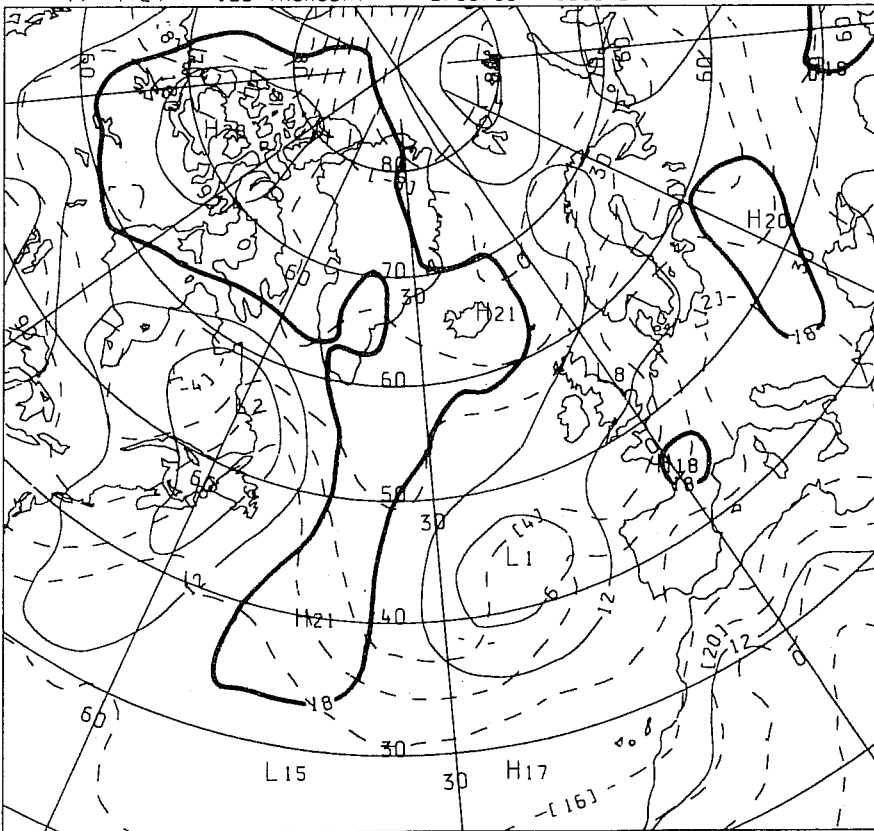


Fig. 1e ECMWF 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted in UKMO

TOP: 500 mb height and temperature
BOTTOM: 1000 mb height and 850 mb temperature

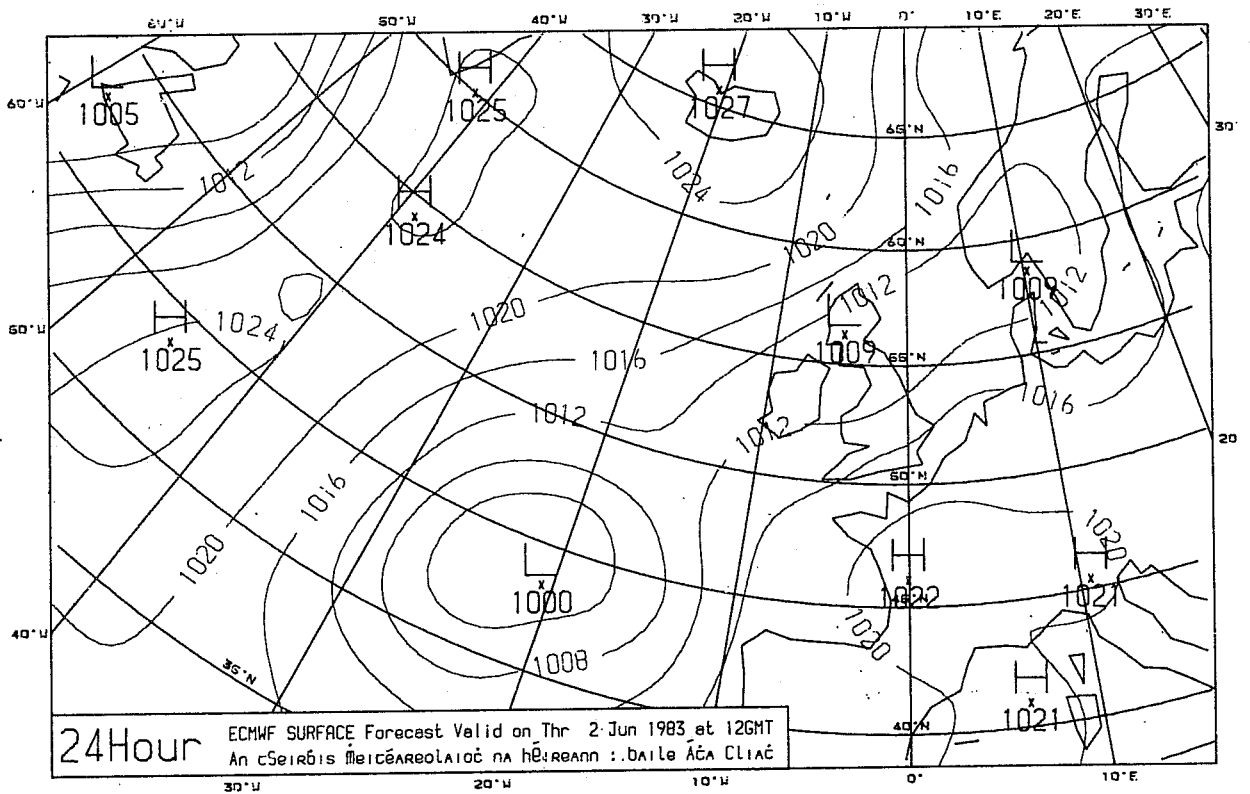
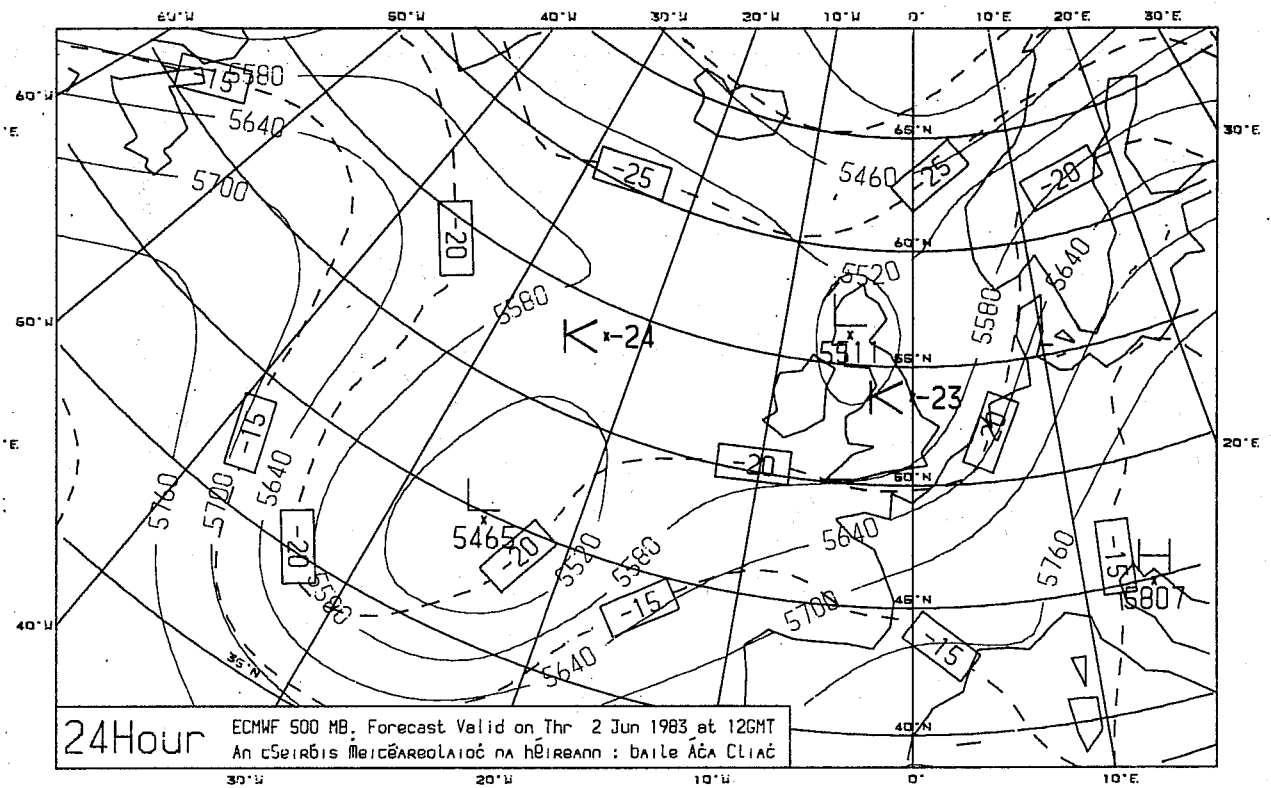
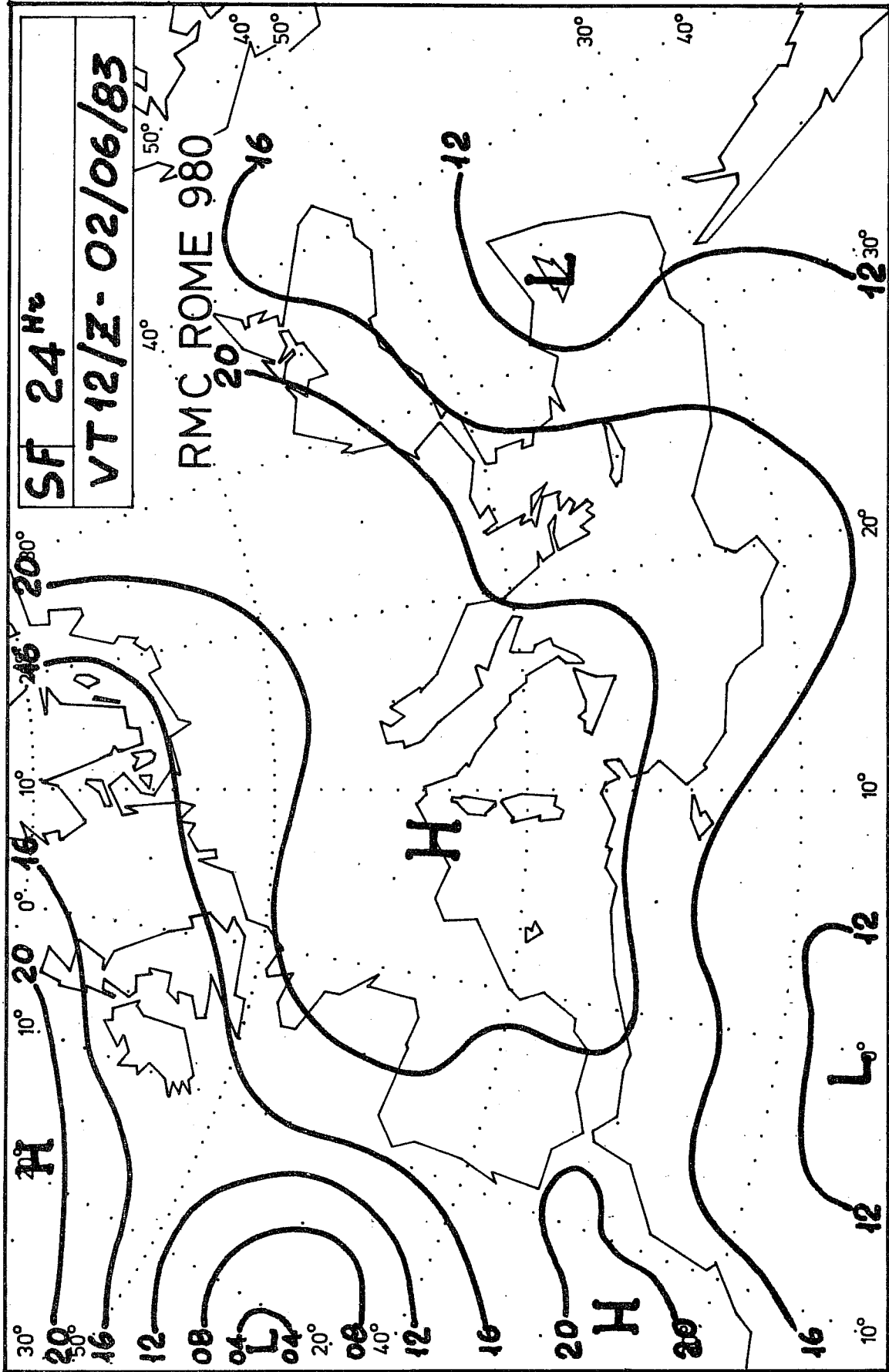


Fig. 1f ECMWF 24 hr forecasts on 2 June 1983 at 12 GMT plotted in Ireland

TOP: 500 mb height and temperature
 BOTTOM: MSL pressure

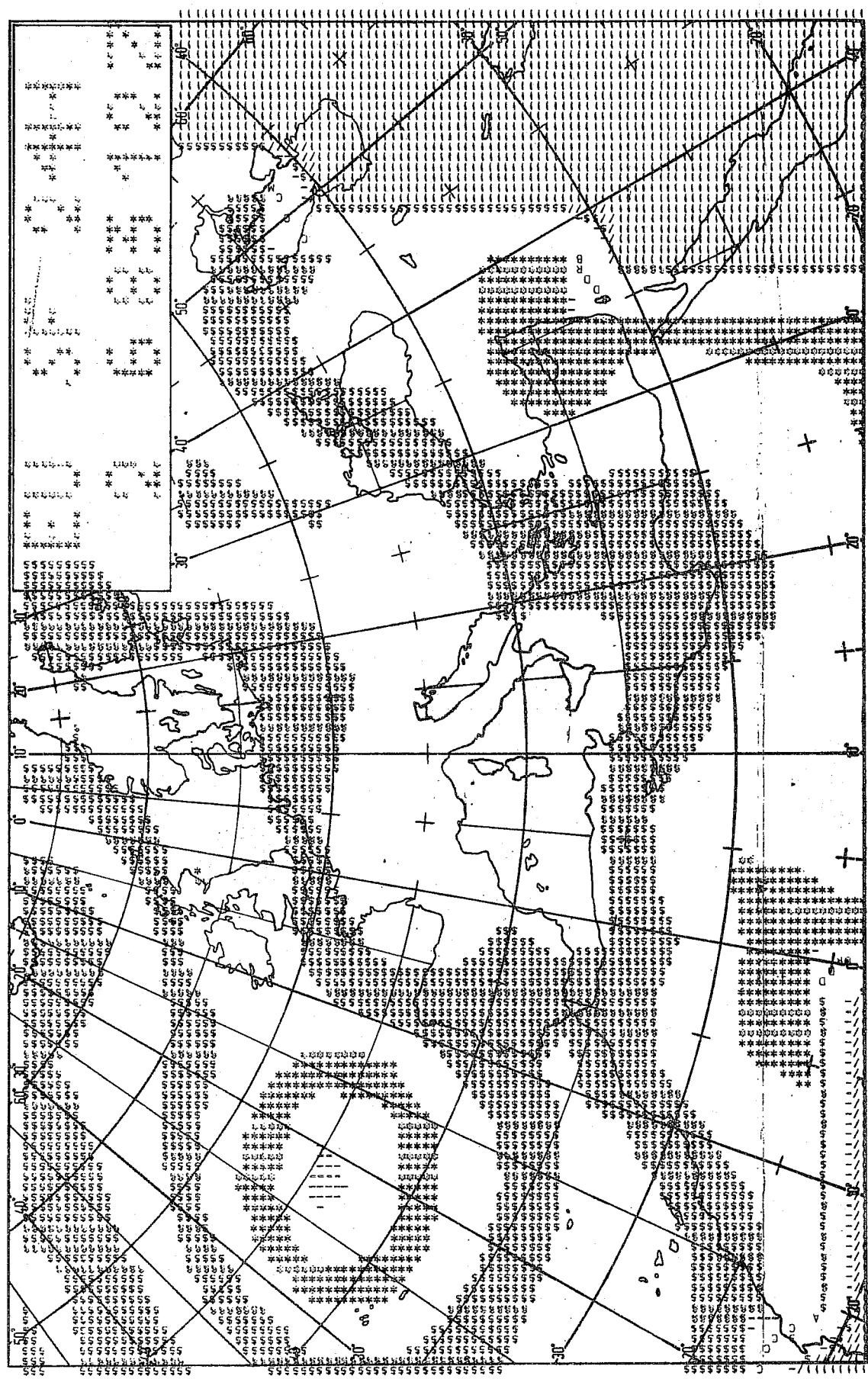


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POLAR STEREOGR. PROJEC. SCALE 1:20000000 at 60°N

Fig. 1g ECMWF 24 hr forecasts on 2 June 1983 at 12 GMT plotted in Italy, MSL pressure

Fig. 1h Zebra plot from which Fig. 1g is derived



POLAR STEREOGRAPHIC PROJECTION 1:2000000 at 60° N

55 101212**13083

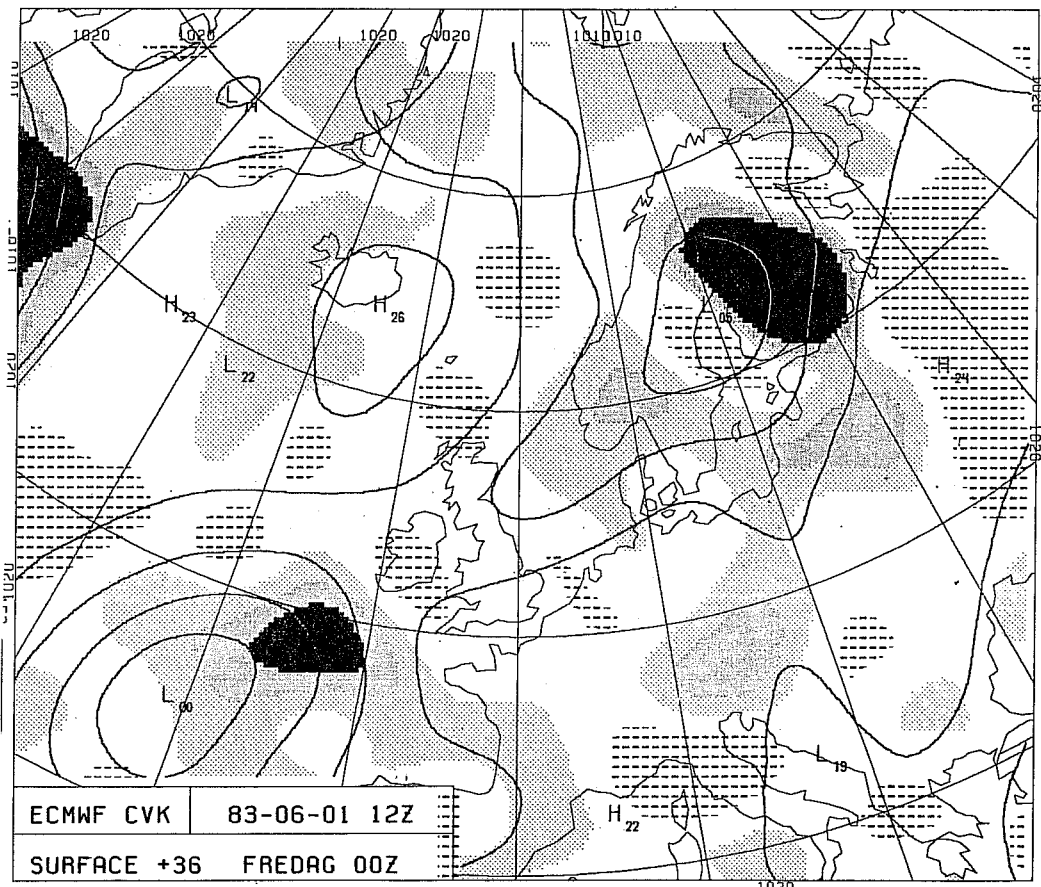
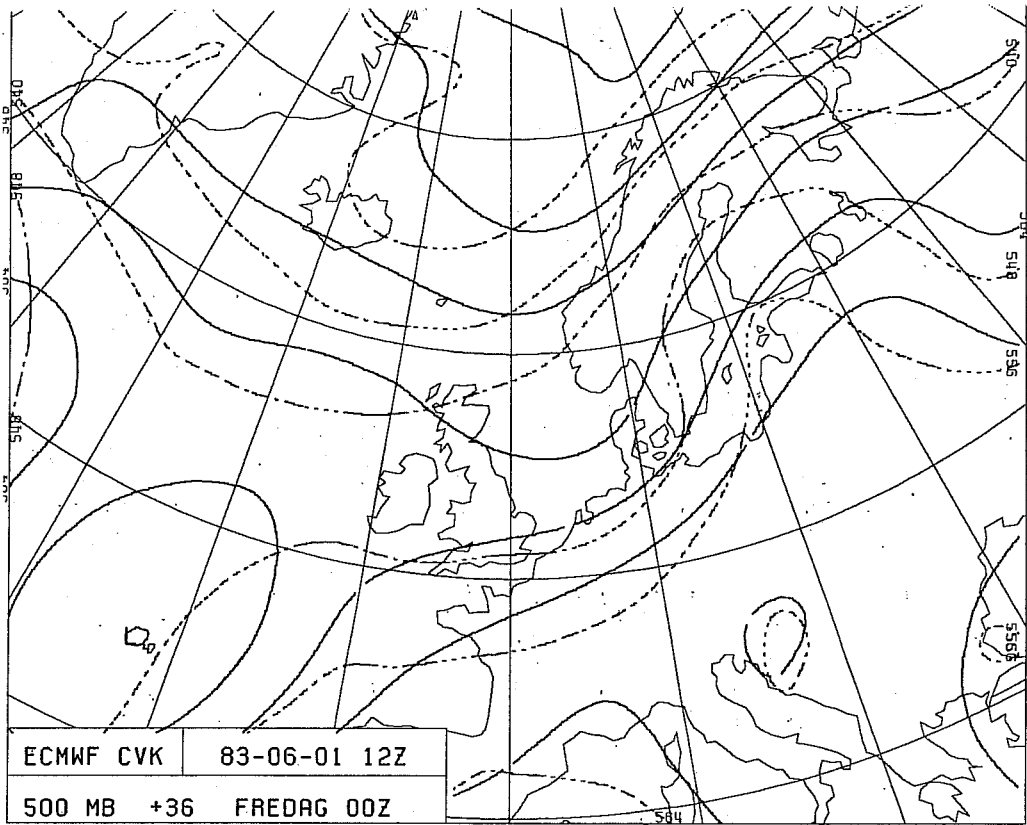


Fig. 2a ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in Sweden

TOP: 500 mb height and 500-1000 mb thickness
 BOTTOM: MSL pressure and vertical velocity at 700 mb

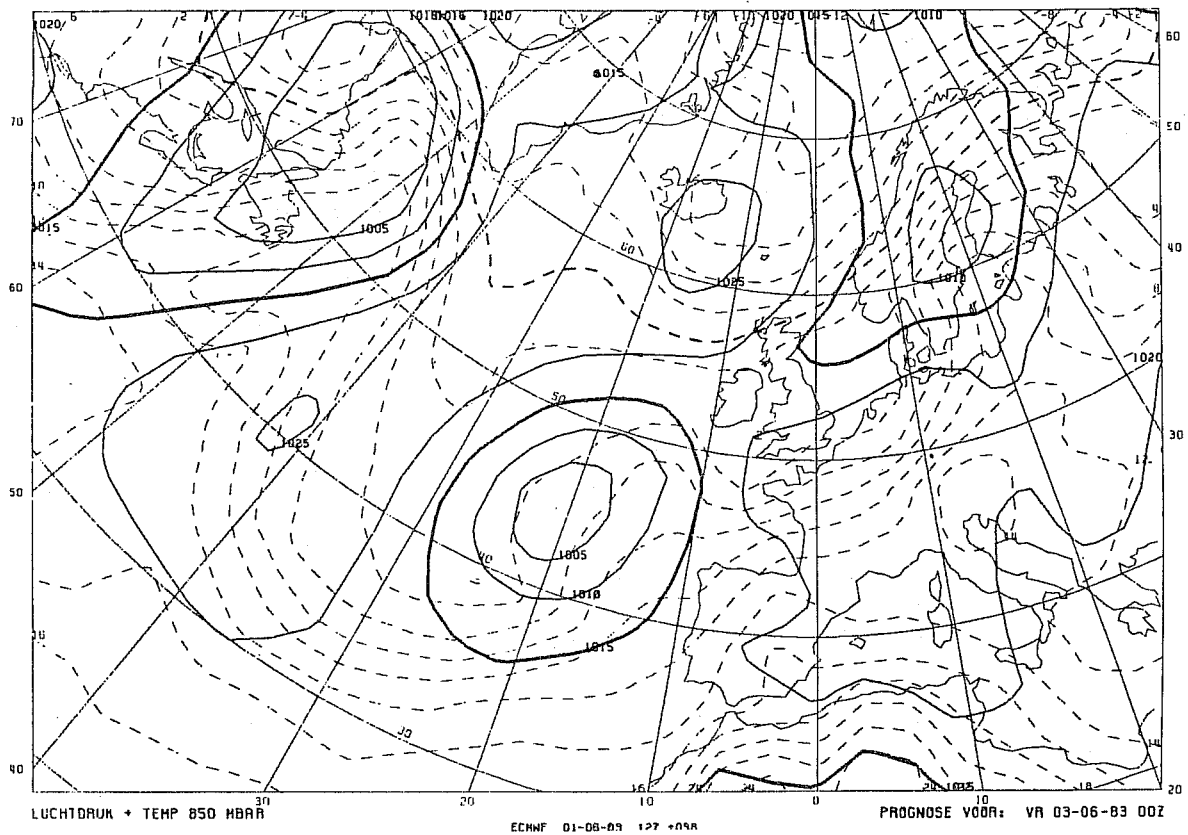
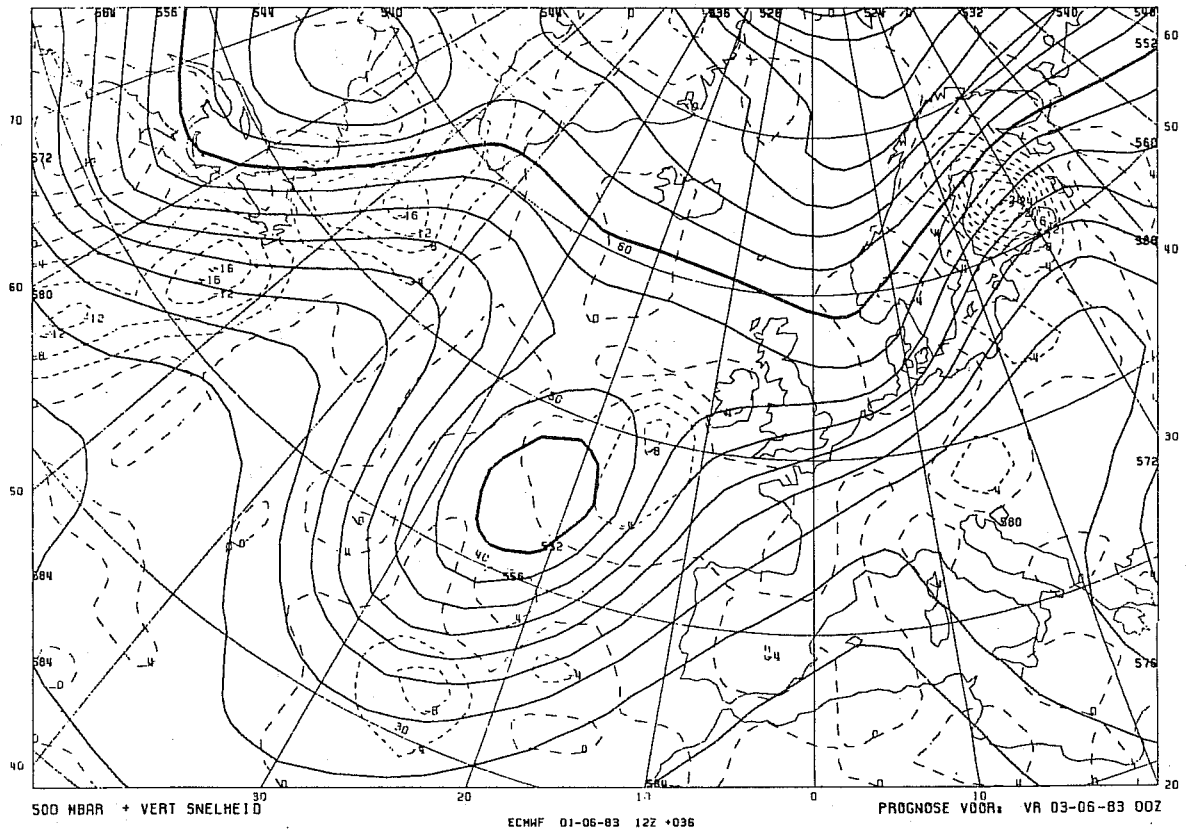


Fig. 2b ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in the Netherlands

TOP: 500 mb height and vertical velocity
 BOTTOM: MSL pressure and 850 mb temperature

CHART TYPE: 1

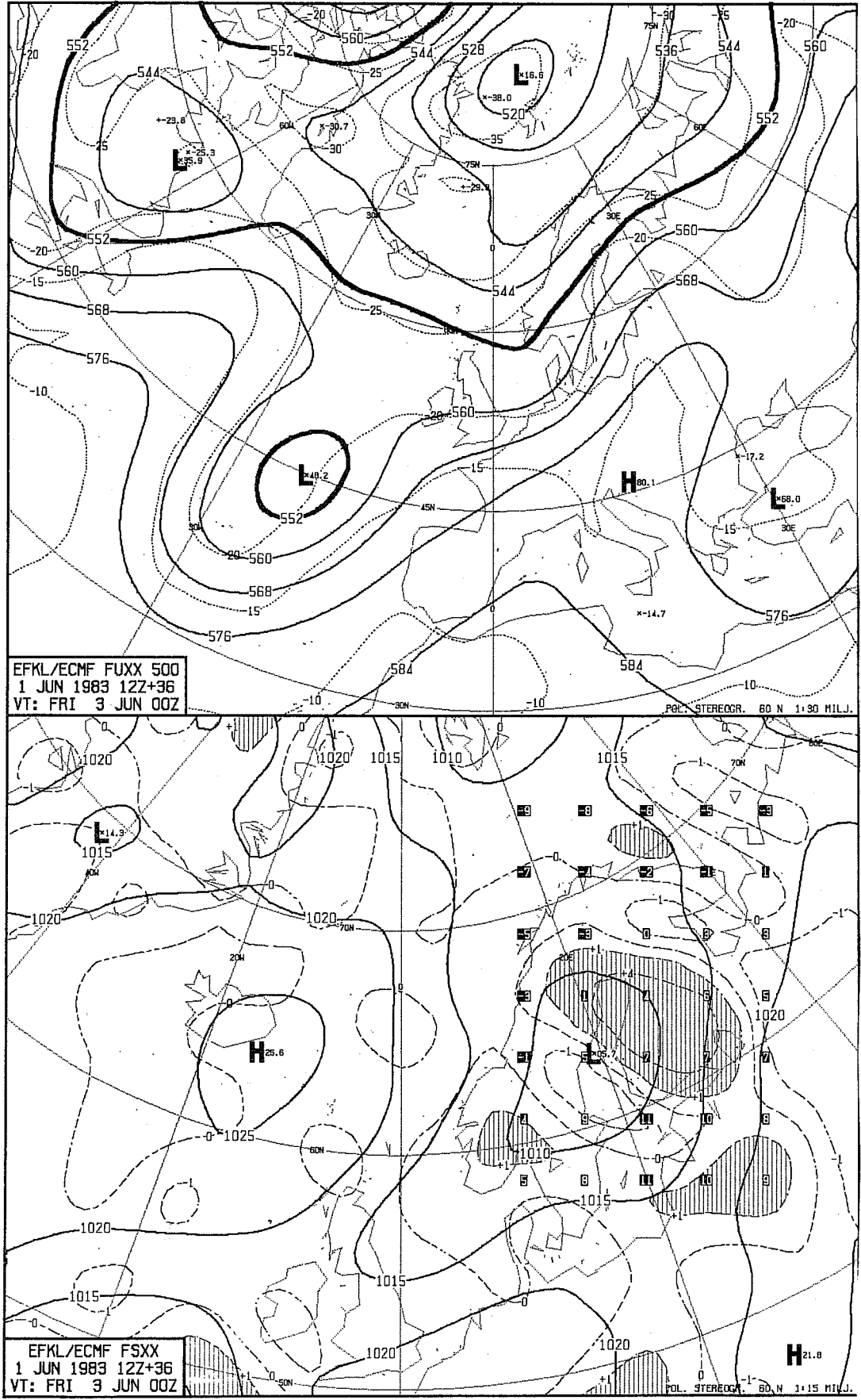
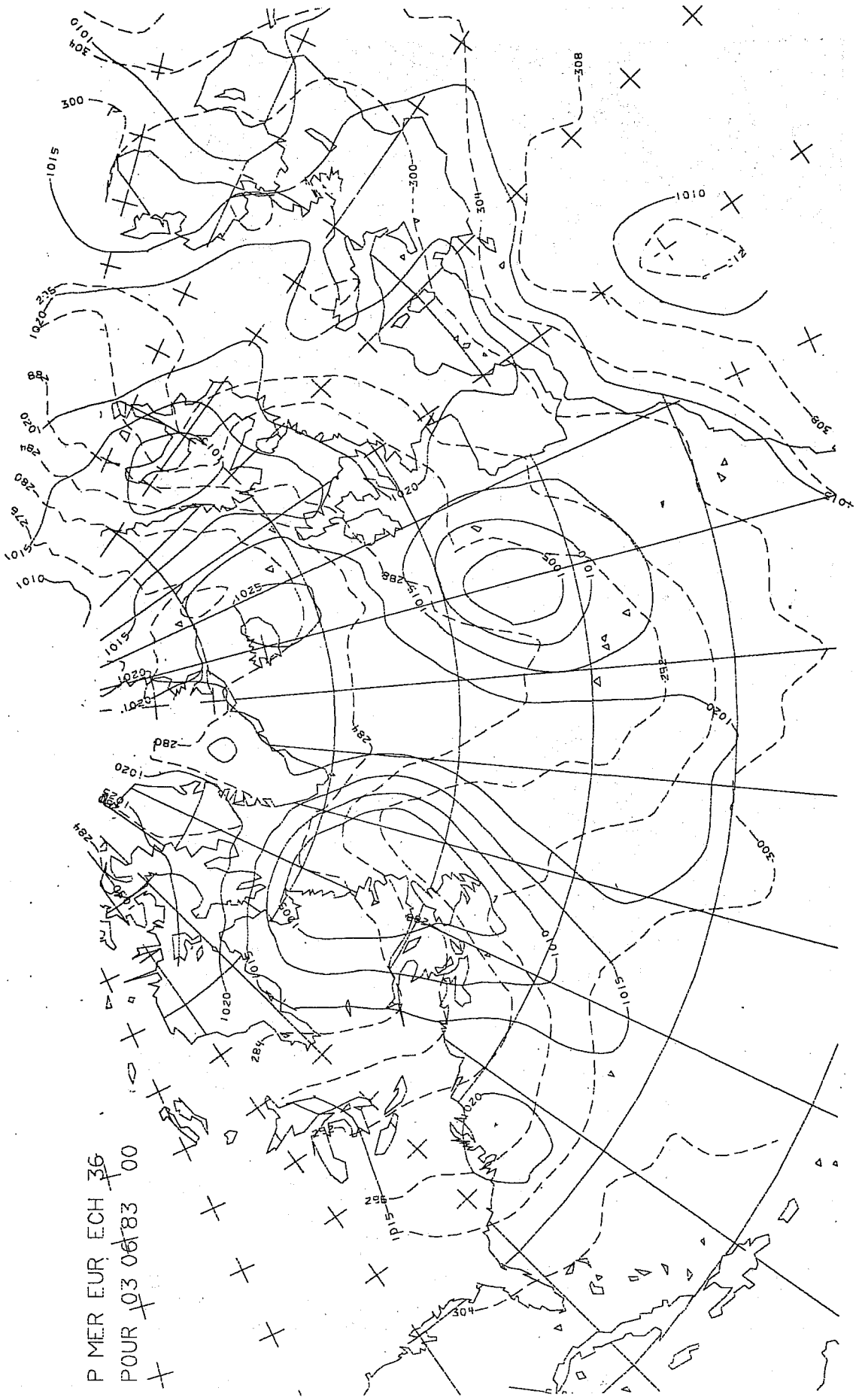


Fig. 2c ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in Finland

TOP: 500 mb height and temperature
BOTTOM: MSL pressure, 700 mb vertical velocity and 850 mb temperature



P MER EUR ECH 36
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Fig. 2d ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in France
 MSL pressure and 1000 to 700 mb thickness.

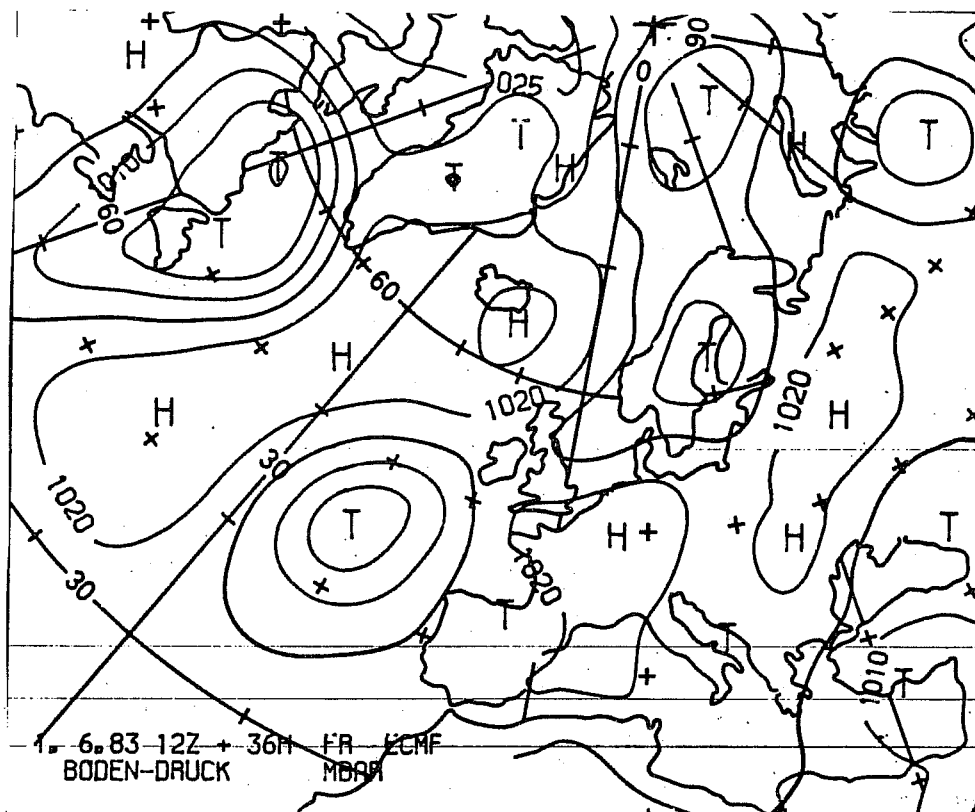
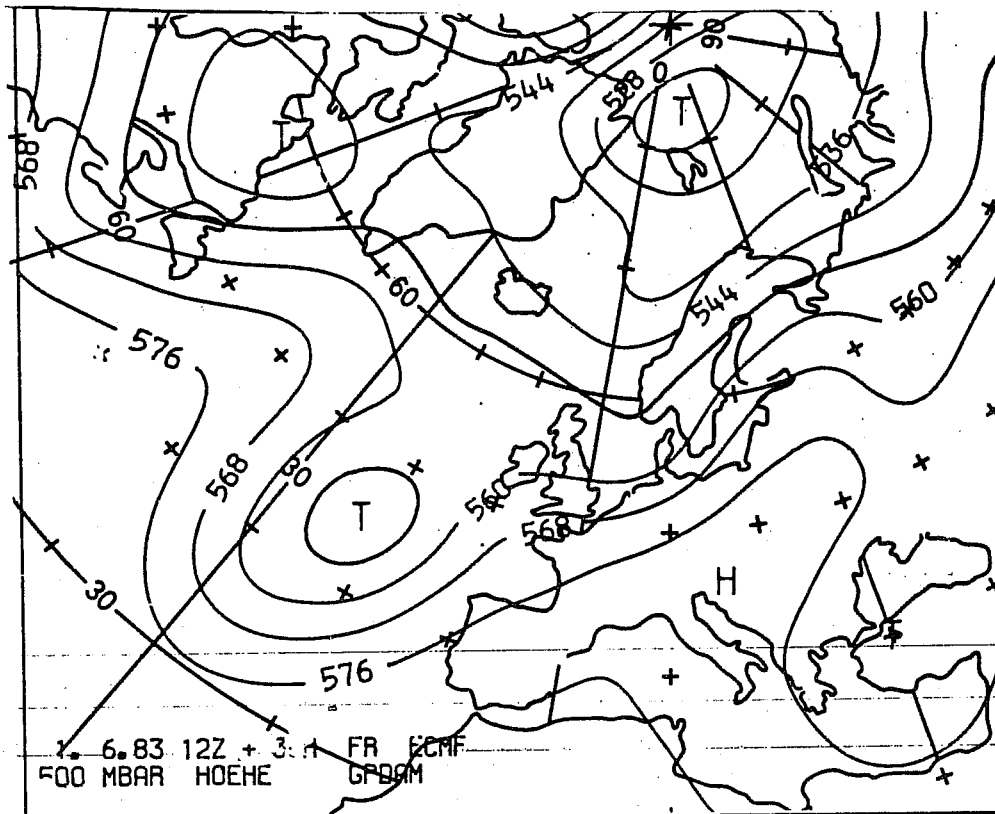


Fig. 2e ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in Germany

TOP: 500 mb height
BOTTOM: MSL pressure

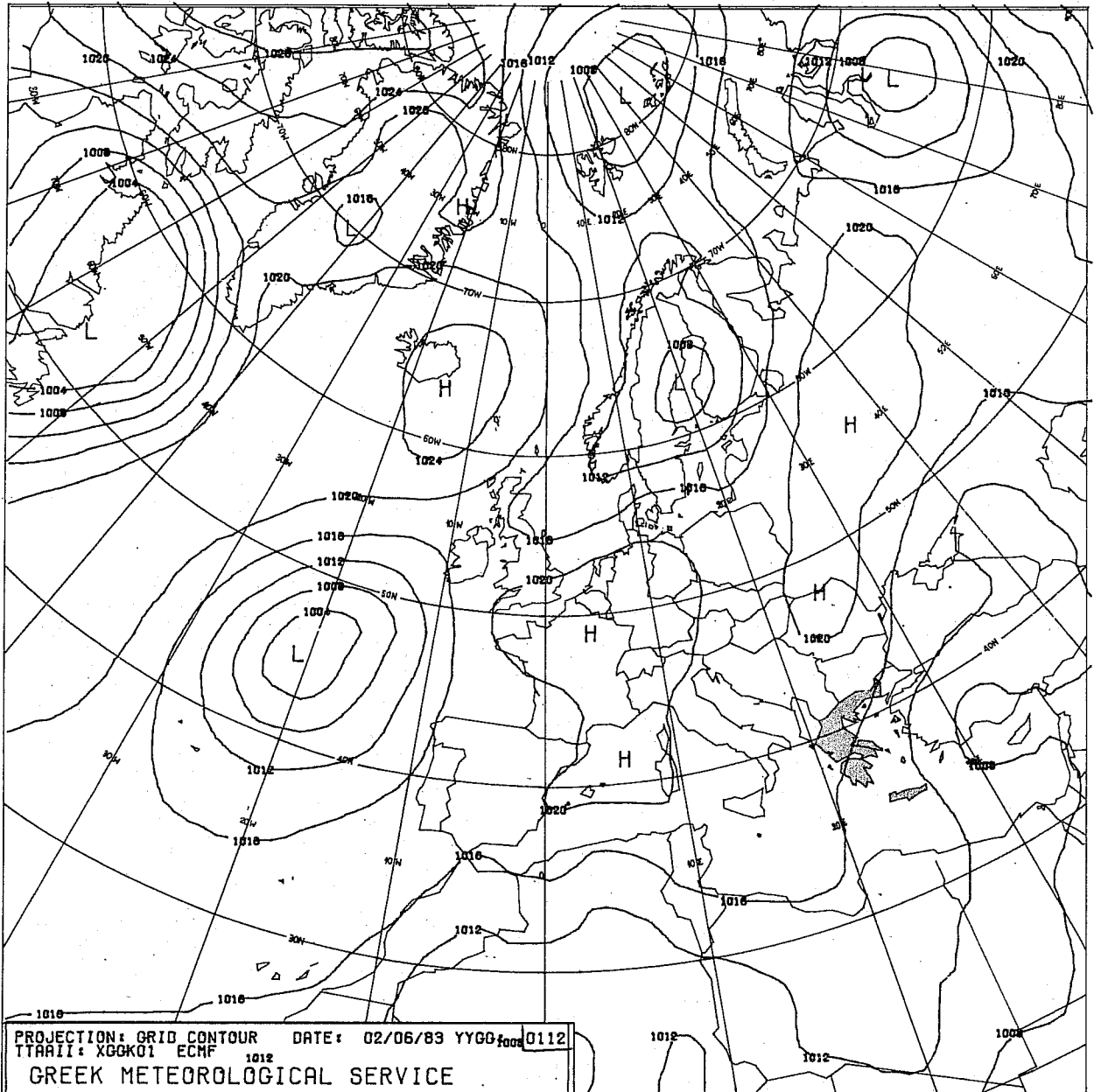


Fig. 2f ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in Greece MSL pressure

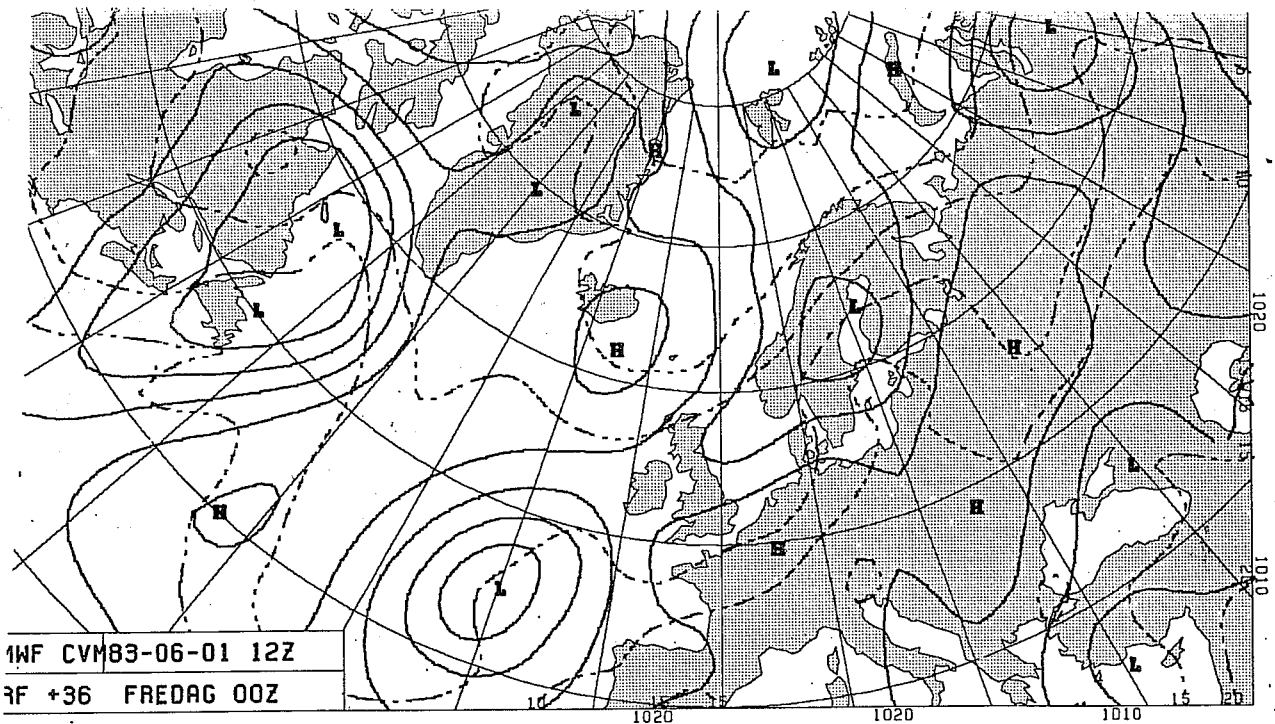
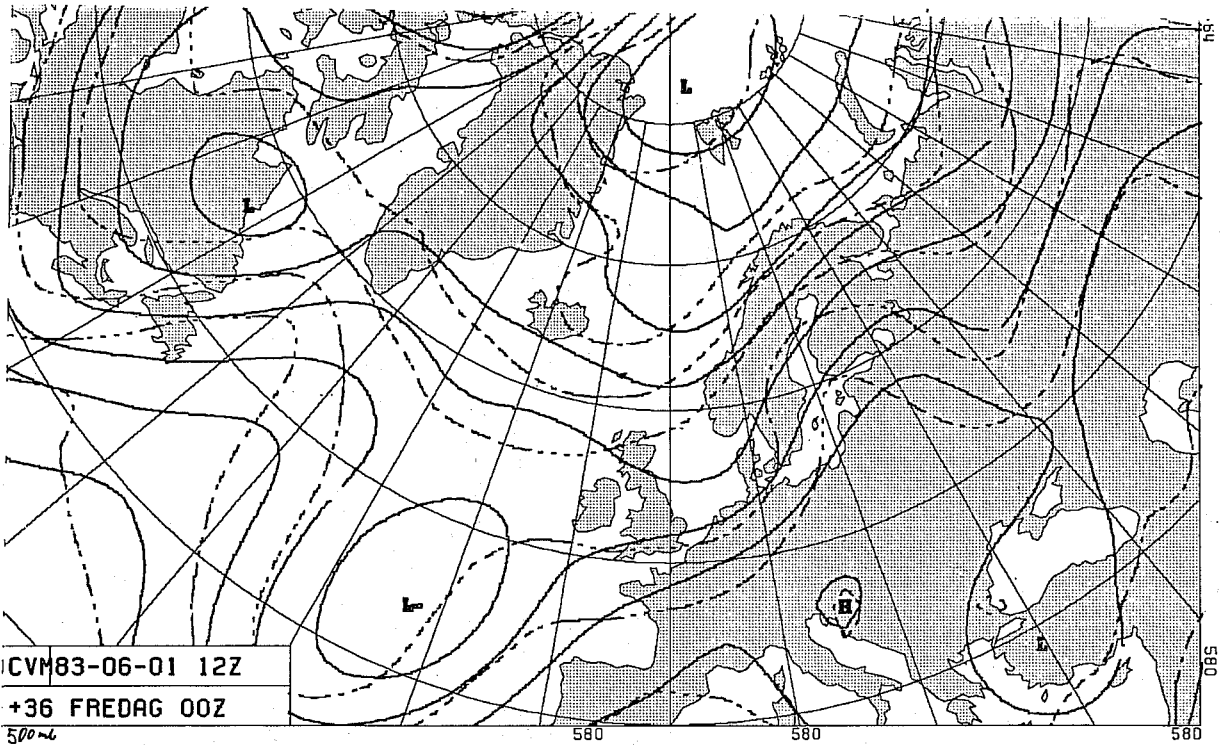


Fig. 2g ECMWF 36 hr forecasts valid on 3 June 1983 at 00 GMT plotted in Sweden (Atlantic-European area, see also Fig. 2a)

TOP: 500 mb height and 500/1000 mb thickness
 BOTTOM: MSL pressure and 850 mb temperature



Fig. 3 ECMWF analyses and forecasts (D+1 to D+6) from 1 June 1983 at 12 GMT plotted in the Netherlands

Top to bottom: MSL pressure, 850 mb height and temperature, 500 mb height, vertical velocity at 500 mb level

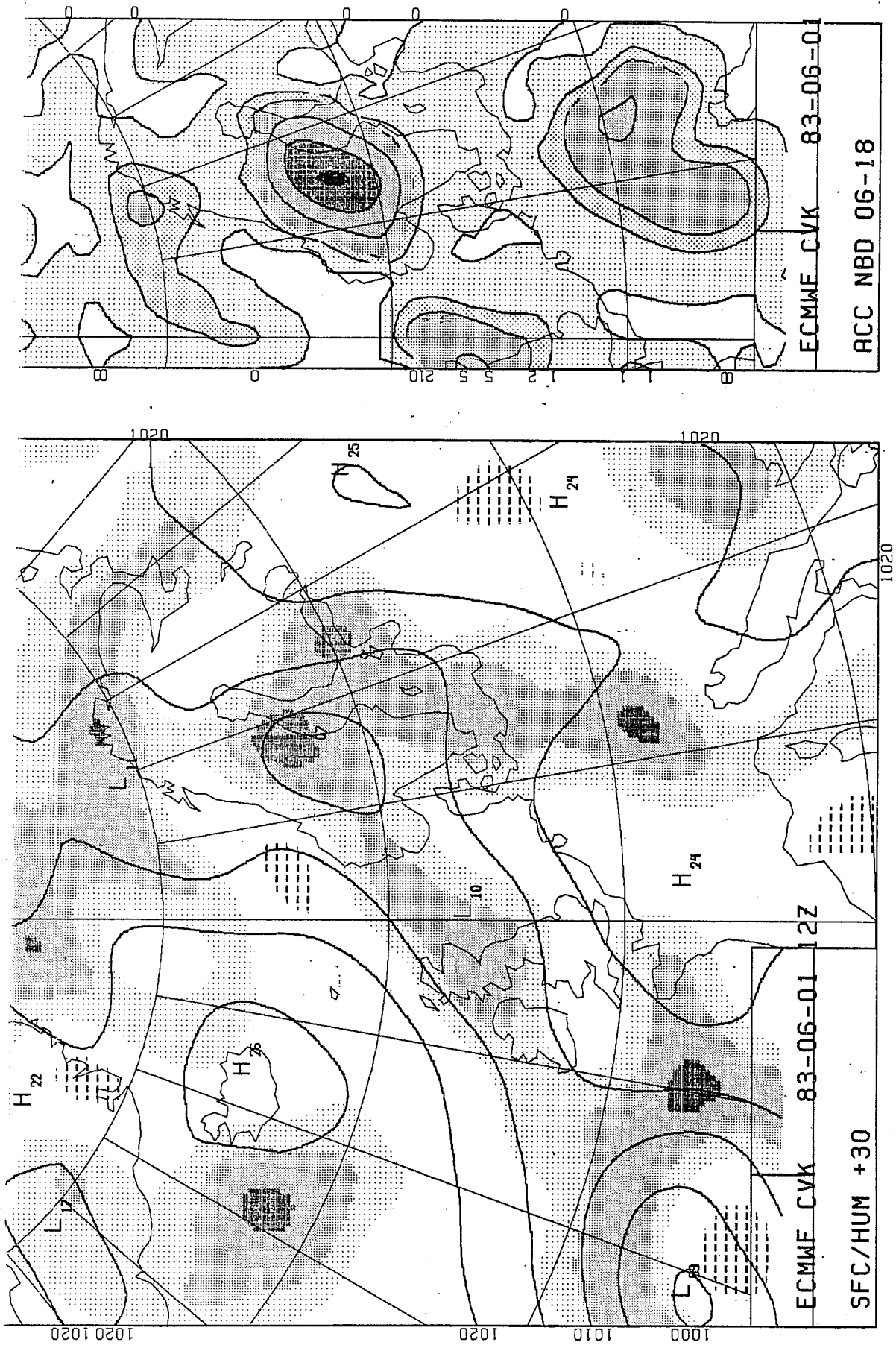


Fig. 4 ECMWF 30 hr forecasts from 1 June 1983 at 12 GMT plotted in Sweden

Left: MSL pressure and humidity Right: accumulated 12 hr precipitation

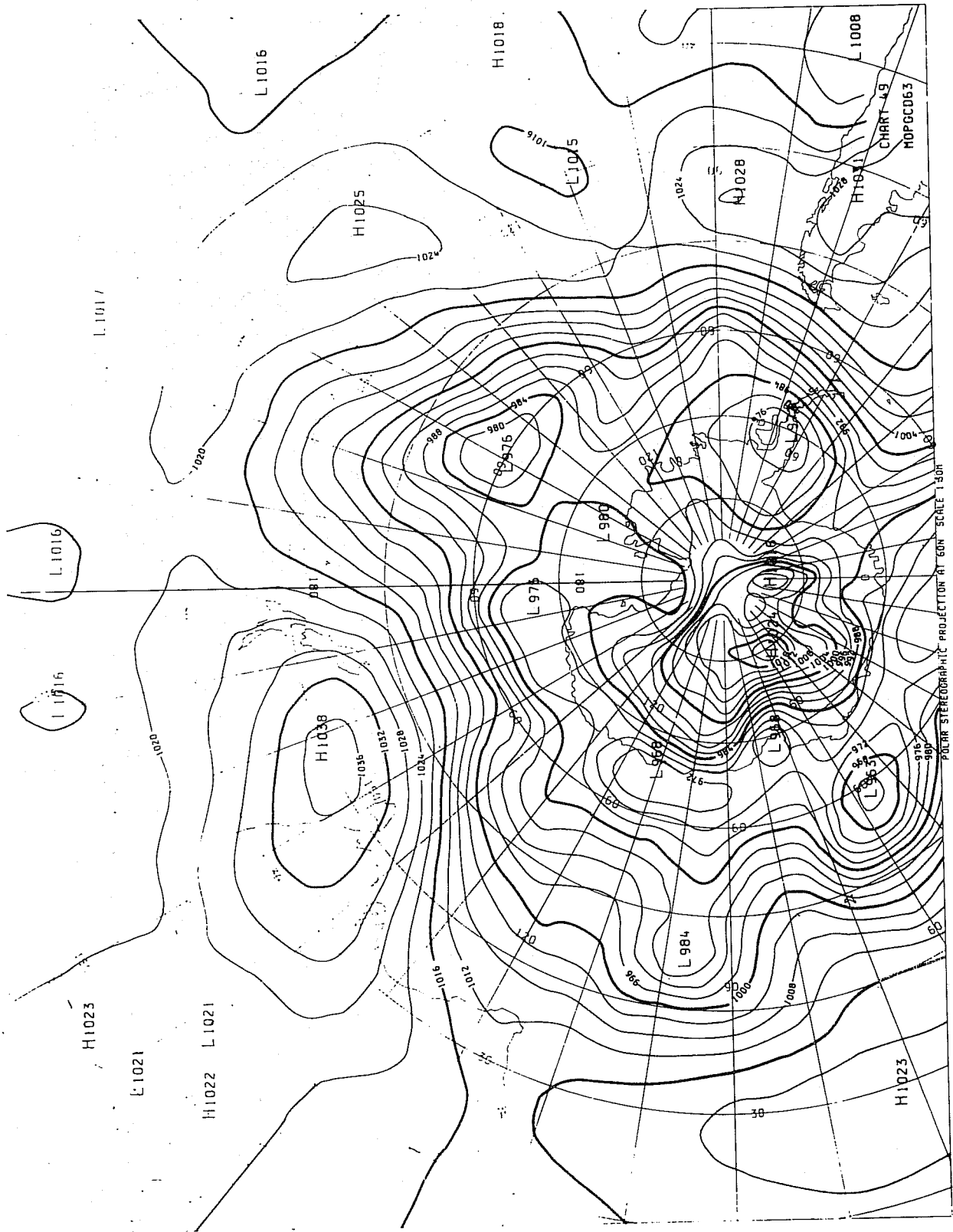


Fig. 5. ECMWF Southern Hemisphere 24 hr forecasts valid on 2 June 1983 at 12 GMT plotted in UKMO. MSL pressure

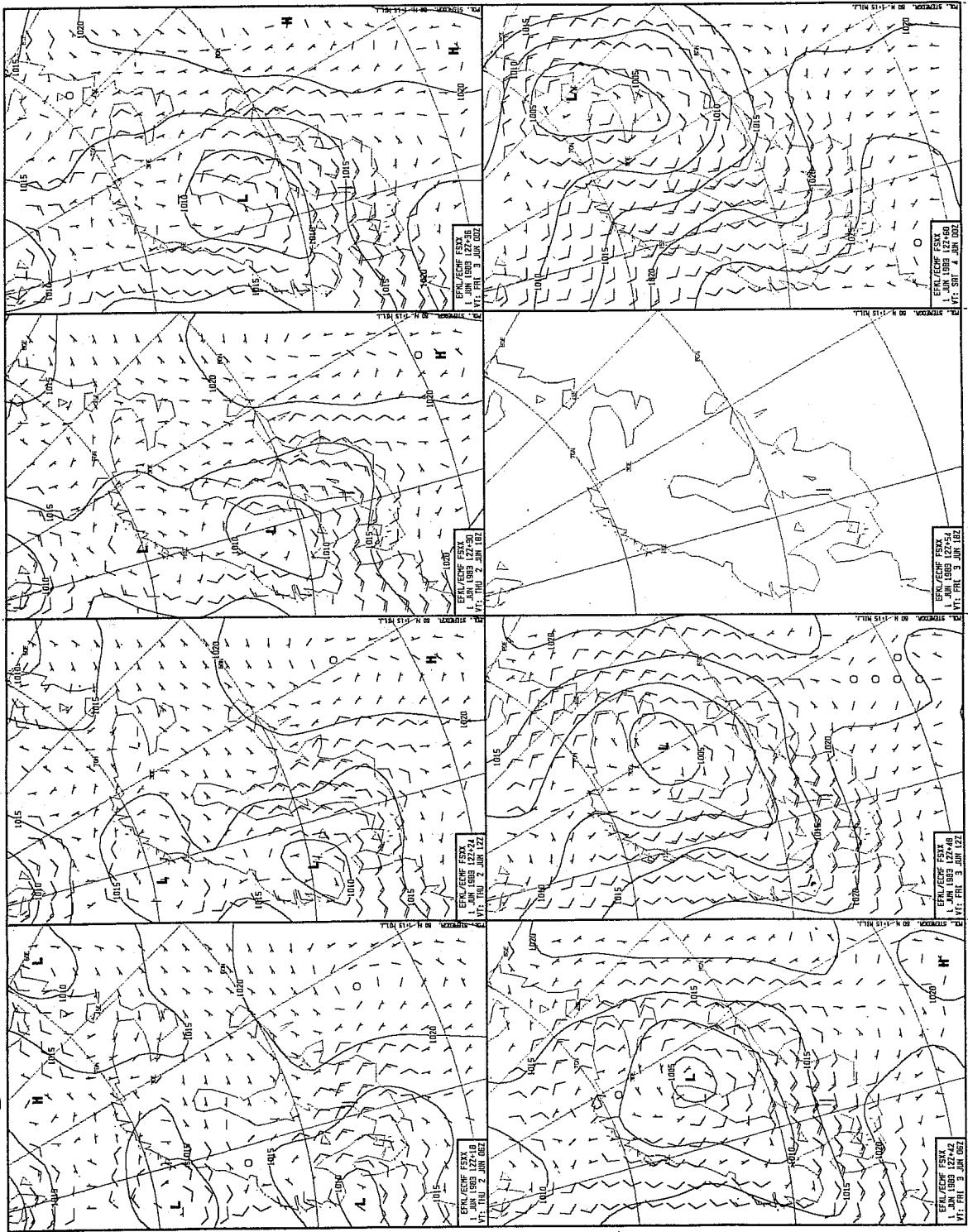


Fig. 7 ECMWF forecasts (1 June 1983 12 GMT + 18 hr to 1 June 1983 12 GMT + 60 hr) plotted in Finland. MSL pressure and 10 meters wind

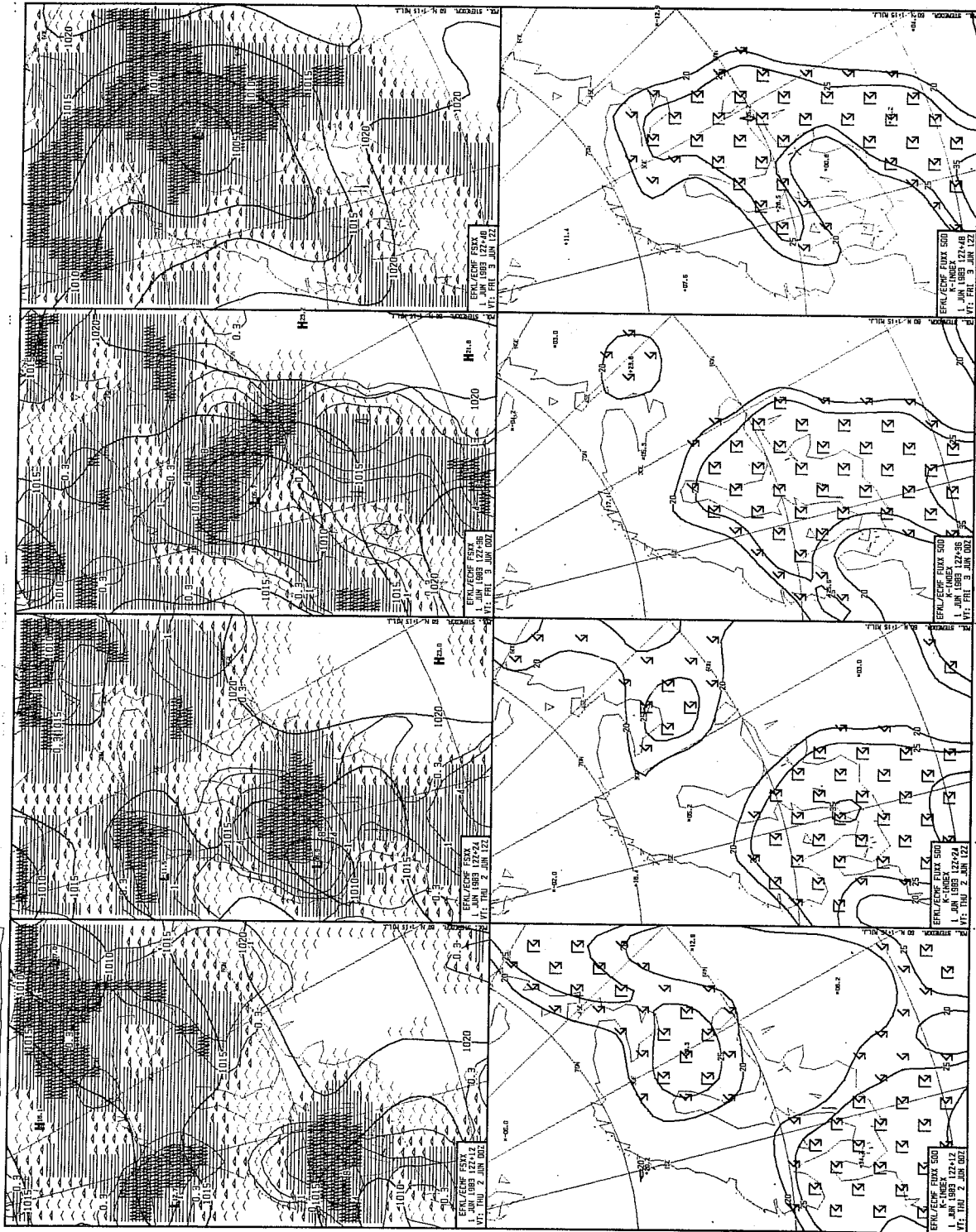


Fig. 8 ECMWF forecasts (up to 48 hrs) from 1 June 1983 at 12Z plotted in Finland

TOP: Cloudiness %, shading indicates cloud cover <10% (white),
 10-30%. 30-50%. 50-90%. >90% (dark)
 BOTTOM: Thunder index (K-T850-T500+Td850-(T700-Td700))

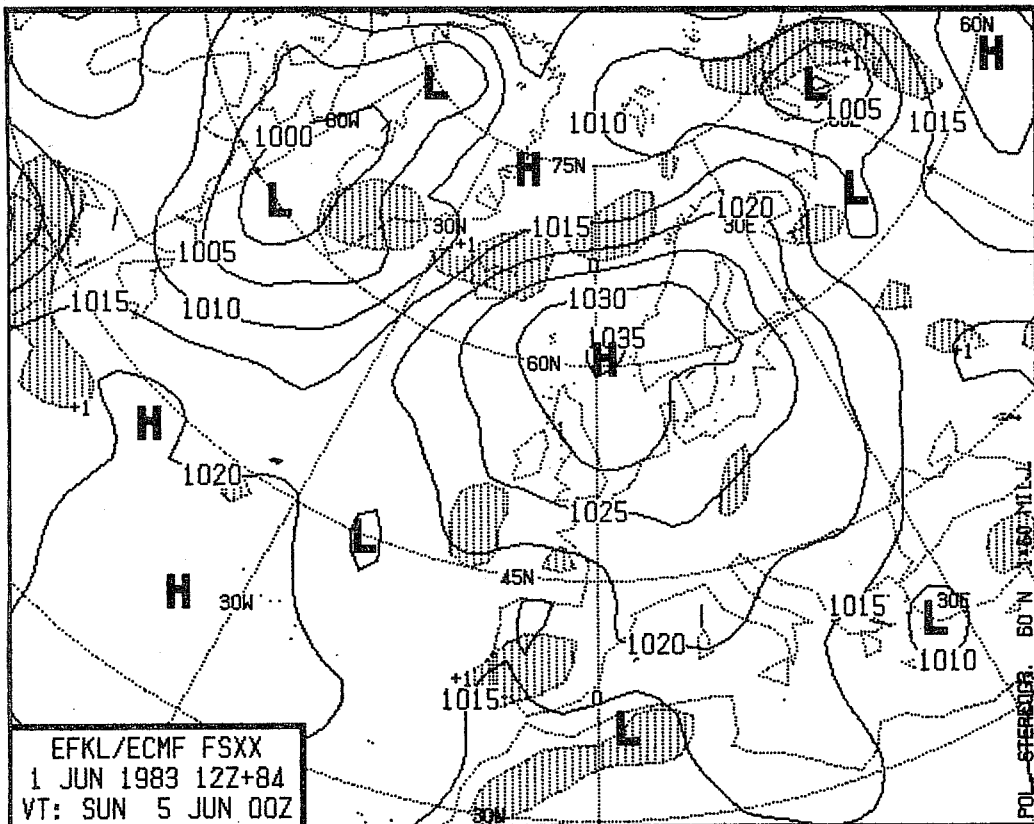
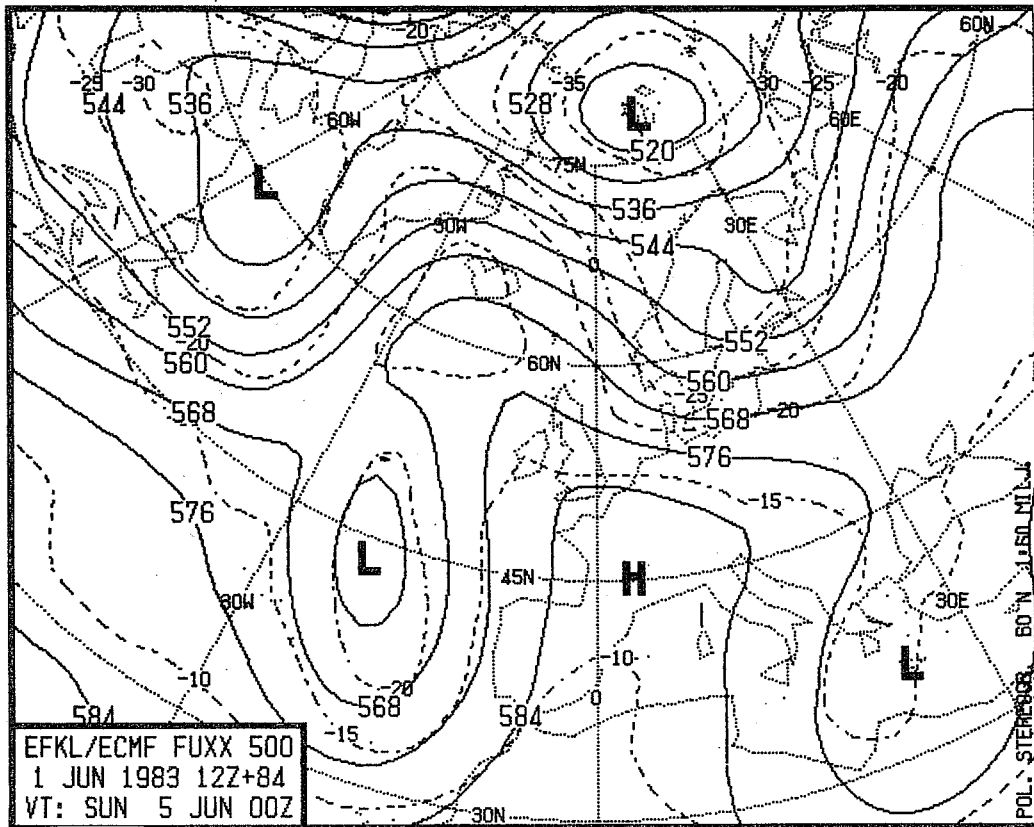


Fig. 9 ECMWF 84 hr forecasts valid on 5 June 1983 00 GMT plotted in Finland

TOP: 500 mb heights and temperature
 BOTTOM: MSL pressure and 700 mb vertical velocity