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A CASE STUDY IN THE USE OF SATELLITE INFORMATION IN ASSESSING NUMERICAL WEATHER PROGNOSES NOVEMBER 7, 1980

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INTRODUCTION

On the morning of November 7, 1980, satellite imagery indicated that the CMC 500mb analysis at 1200Z was in error just west of the B.C. North Coast. A Pacific Weather Centre 500mb analysis using satellite thickness analysis confirmed the error. The 12 hour LFM prognoses valid at the same time verified quite well with the P.W.C. surface and 500mb analyses; consequently, they were used as primary guidance that morning. Subsequent forecasts based on those decisions proved to be quite good.

DISCUSSION

GOES imagery from 0000Z to 1500Z on November 7, 1980 (figure 1 and 2) showed a nearly stationary cloud circulation centre located northwest of the Charlottes in the northeastern Gulf of Alaska. The CMC 500mb chart at 1200Z (figure 3(a)) analysed an open low in approximately the same position as the cloud circulation centre. However, the thickness pattern, with warm air over the low, did not agree with the imagery which indicated a cold stationary closed centre instead.

The P.W.C. 500mb analysis using satellite derived thickness data (figure 3(c)) confirmed the existence of a closed cold low approximately 7dm deeper than analysed by CMC. This suggested that the spectral prognoses based on the 1200Z data would be too fast in opening the low and too fast in moving it inland.

Figure 3 also indicates that the 12 hour LFM surface and 500mb prognoses valid at 1200Z verified fairly well with the P.W.C. analyses. The main discrepancy was the depth of the surface low; it was approximately 6mb too deep on the LFM prognoses. In examining the 500mb prognoses (figure 4 and 5), it is apparent that the CMC spectral and LFM models treated the low differently. The 24 hour spectral prognoses valid at 1200Z on November 8, 1980 moved a vorticity minimum to just west of the Charlottes while the LFM 36 hour also valid at 1200Z maintained a vorticity maximum along the coast.

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Since the LFM and CMC analyses for the 08/1200Z were somewhat different (figure 5(c) and 5(e)), other data was necessary to verify the better model. Satellite imagery (figure 6) indicated a vorticity centre on or near the coast until at least 1200Z on November 8, 1980. As well, figure 7 indicates that the LFM surface prognoses verified better than the spectral at both 0000Z and 1200Z on November 8, 1980. Pressures on the LFM were somewhat too low, but the pattern of maintaining a low or trough along the coast was correct. Persistent showery precipitation with locally moderate amounts along the central and north coast confirmed the LFM as the superior product.

Figure 8 shows that the P.W.C. 18 and 30 hour surface prognoses were based on the LFM guidance. Occasional light rainshowers with a few moderate showers were forecast to continue along the coast till at least 1800Z on November 8, 1980.

CONCLUSIONS

Satellite imagery and satellite thickness data proved to be very useful in assessing the numerical weather prognoses on November 7, 1980. The satellite information indicated that the LFM package based on 07/0000Z initial data was superior to the new CMC spectral package based on 07/1200Z data. Surface prognoses and forecasts issued by the Pacific Weather Centre for the central and north coast area of concern verified quite well.

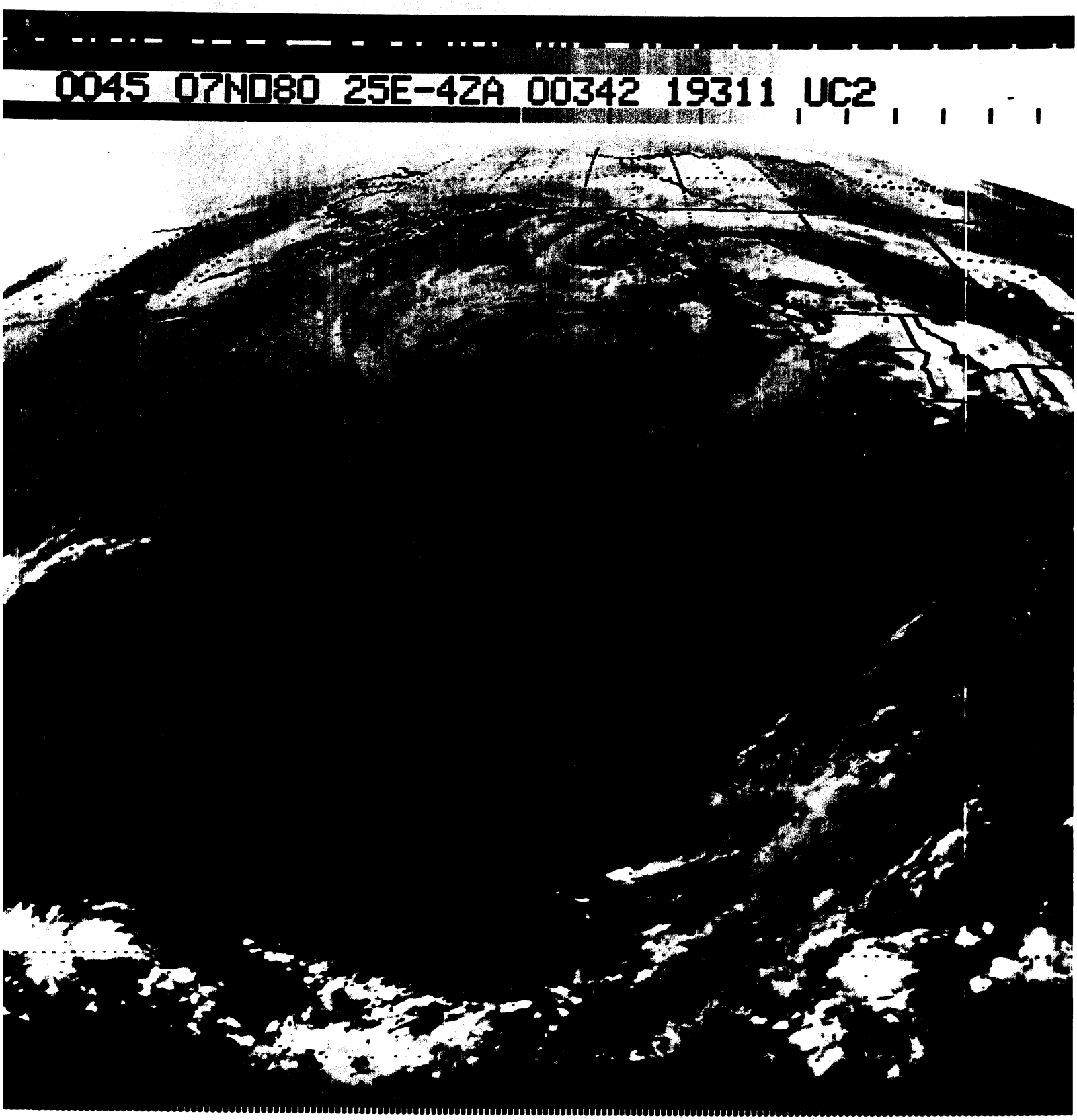

FIGURE 1

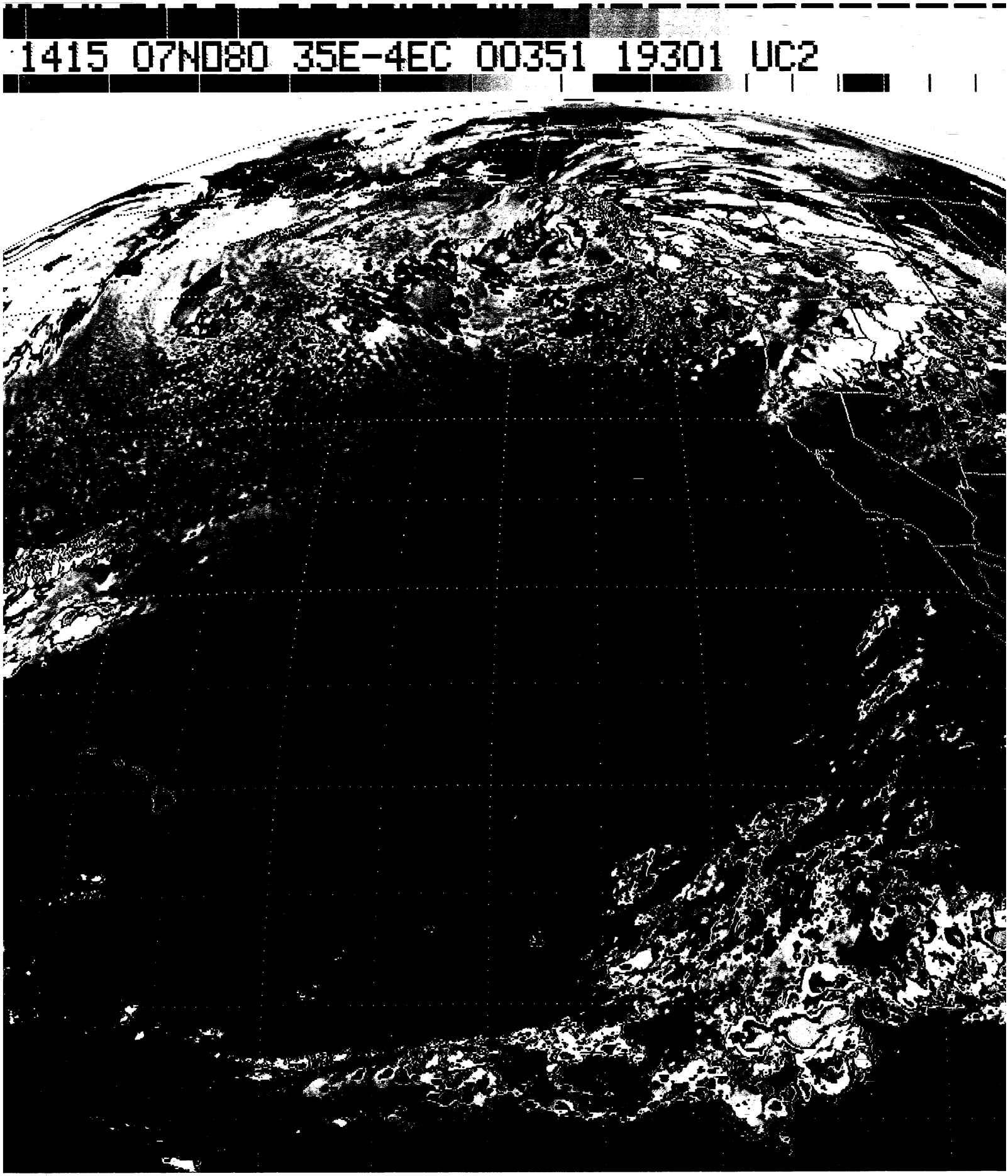

FIGURE 2

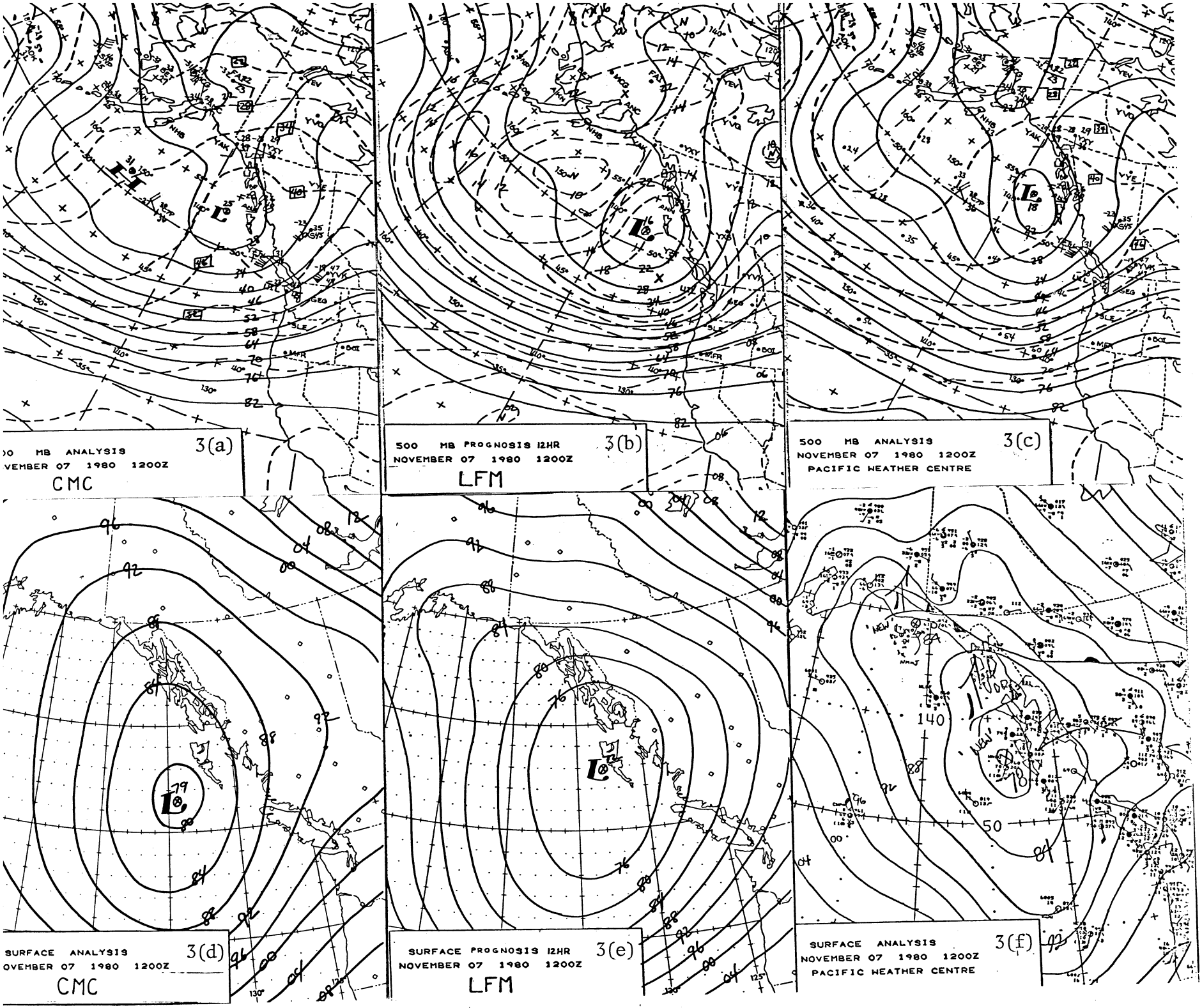
MB ANALYSIS
VEMBER 07 1980 1200Z
CMC
3(a)
500 MB PROGNOSIS 12HR
NOVEMBER 07 1980 1200Z
LFM
3(b)
500 MB ANALYSIS
NOVEMBER 07 1980 1200Z
PACIFIC WEATHER CENTRE
3(c)
SURFACE ANALYSIS
OVEMBER 07 1980 1200Z
CMC
3(d)
SURFACE PROGNOSIS 12HR
NOVEMBER 07 1980 1200Z
LFM
3(e)
SURFACE ANALYSIS
NOVEMBER 07 1980 1200Z
PACIFIC WEATHER CENTRE
3(f)

FIGURE 3

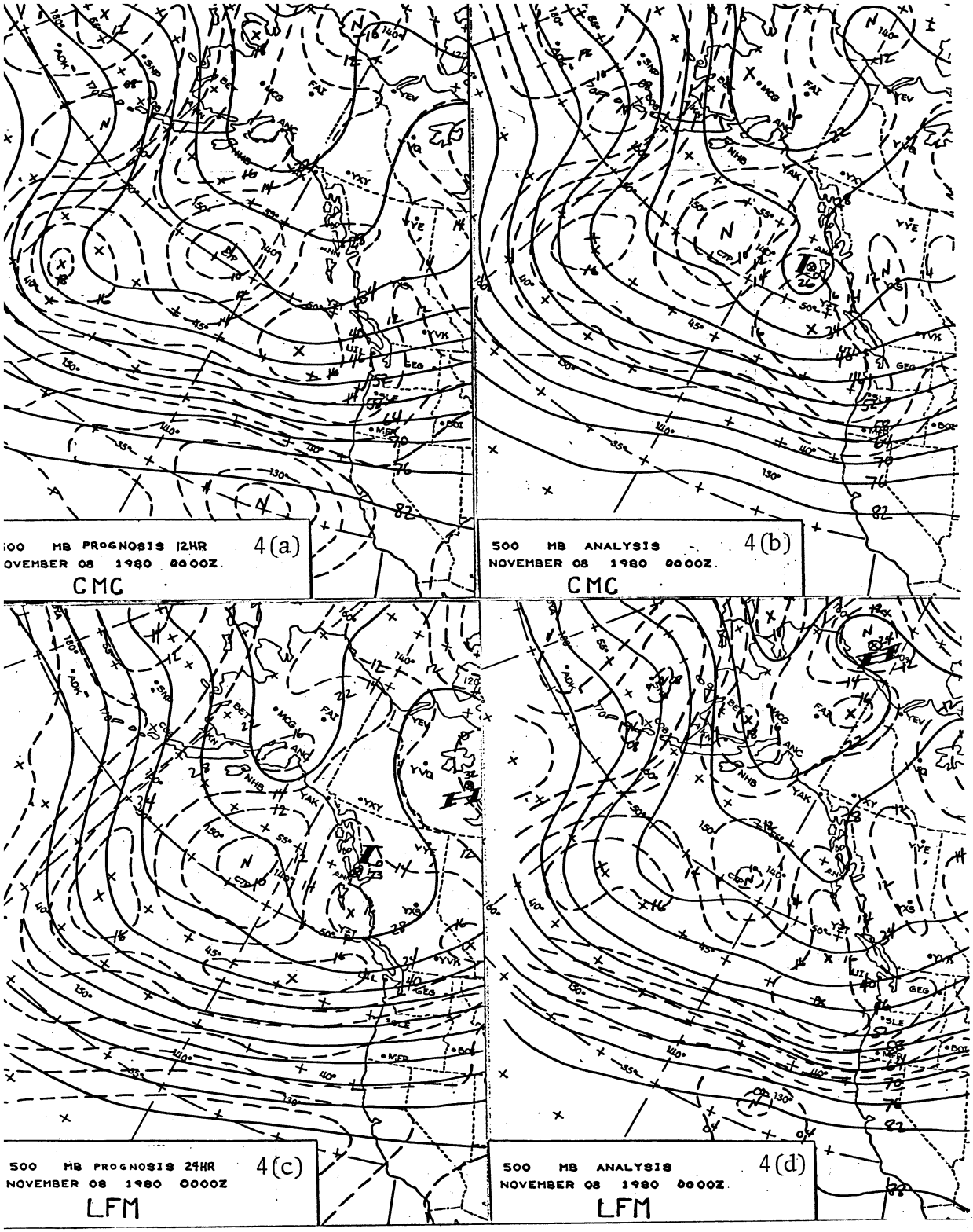
00 MB PROGNOSIS 12HR
OVEMBER 08 1980 0000Z
CMC
4(a)
500 MB ANALYSIS
NOVEMBER 08 1980 0000Z
CMC
4(b)
500 MB PROGNOSIS 24HR
NOVEMBER 08 1980 0000Z
LFM
4(c)
500 MB ANALYSIS
NOVEMBER 08 1980 0000Z
LFM
4(d)

FIGURE 4

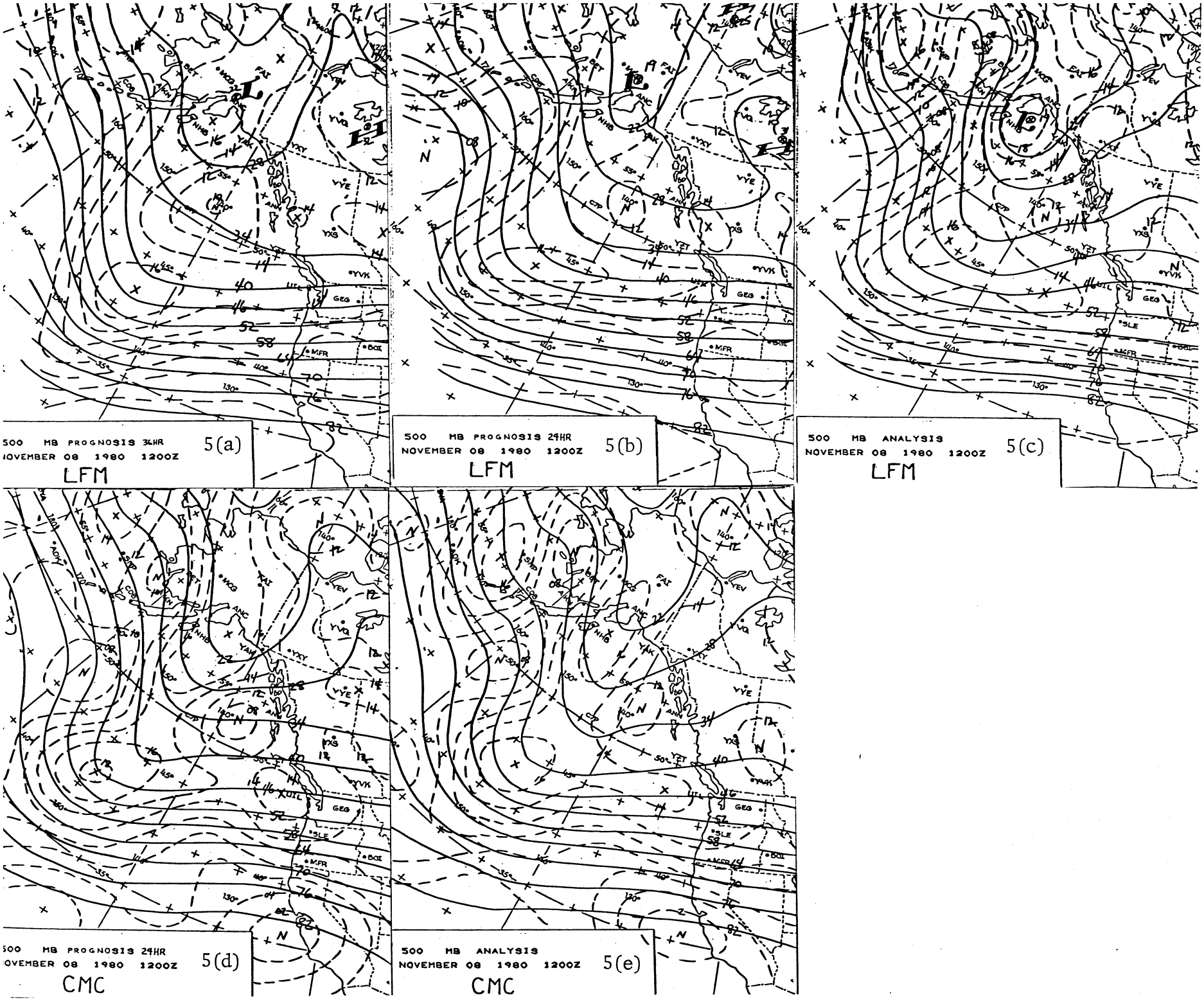
500 MB PROGNOSIS 36HR
NOVEMBER 08 1980 1200Z
LFM
5(a)
500 MB PROGNOSIS 24HR
NOVEMBER 08 1980 1200Z
LFM
5(b)
500 MB ANALYSIS
NOVEMBER 08 1980 1200Z
LFM
5(c)
500 MB PROGNOSIS 24HR
NOVEMBER 08 1980 1200Z
CMC
5(d)
500 MB ANALYSIS
NOVEMBER 08 1980 1200Z
CMC
5(e)

FIGURE 5

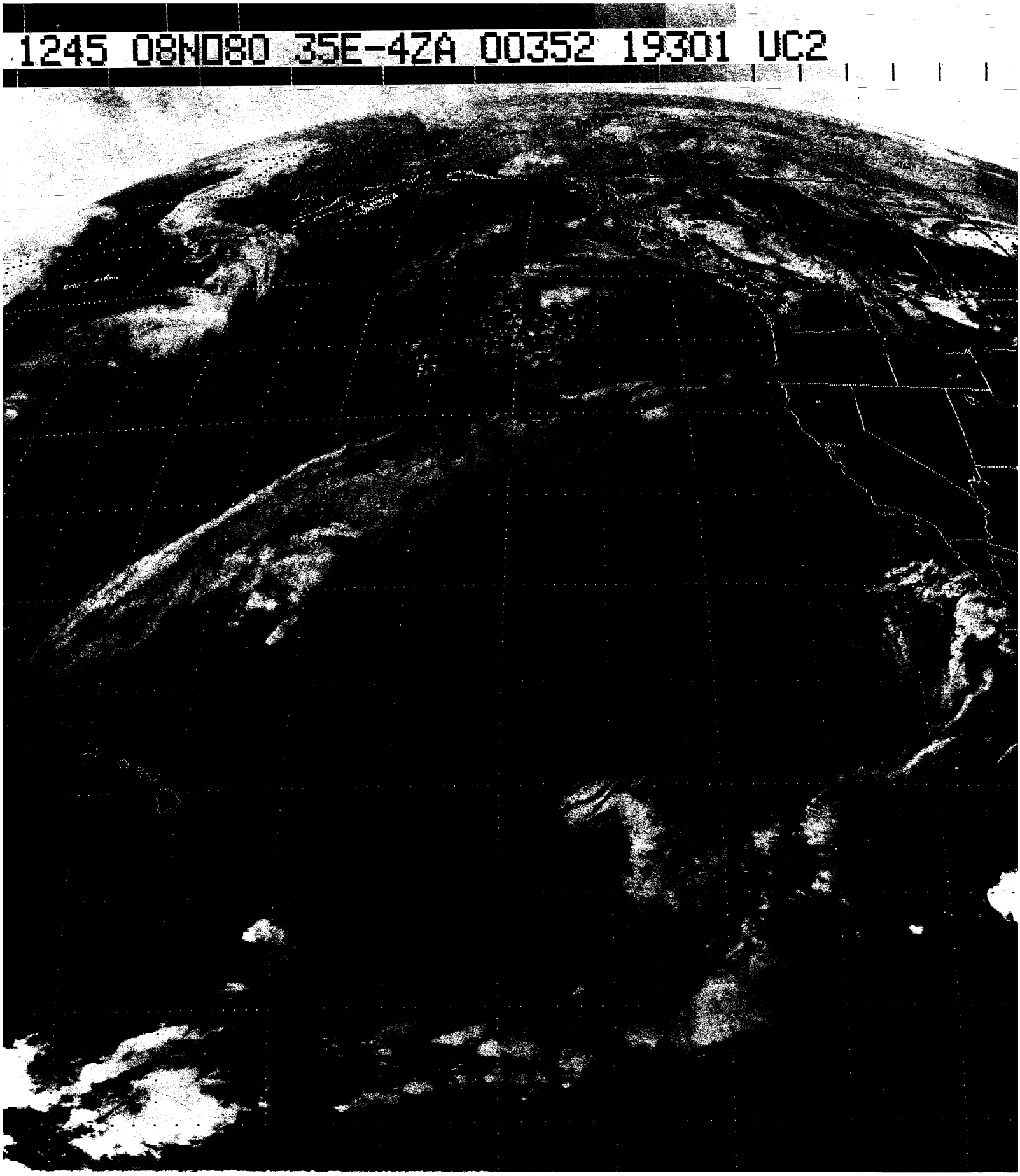

FIGURE 6

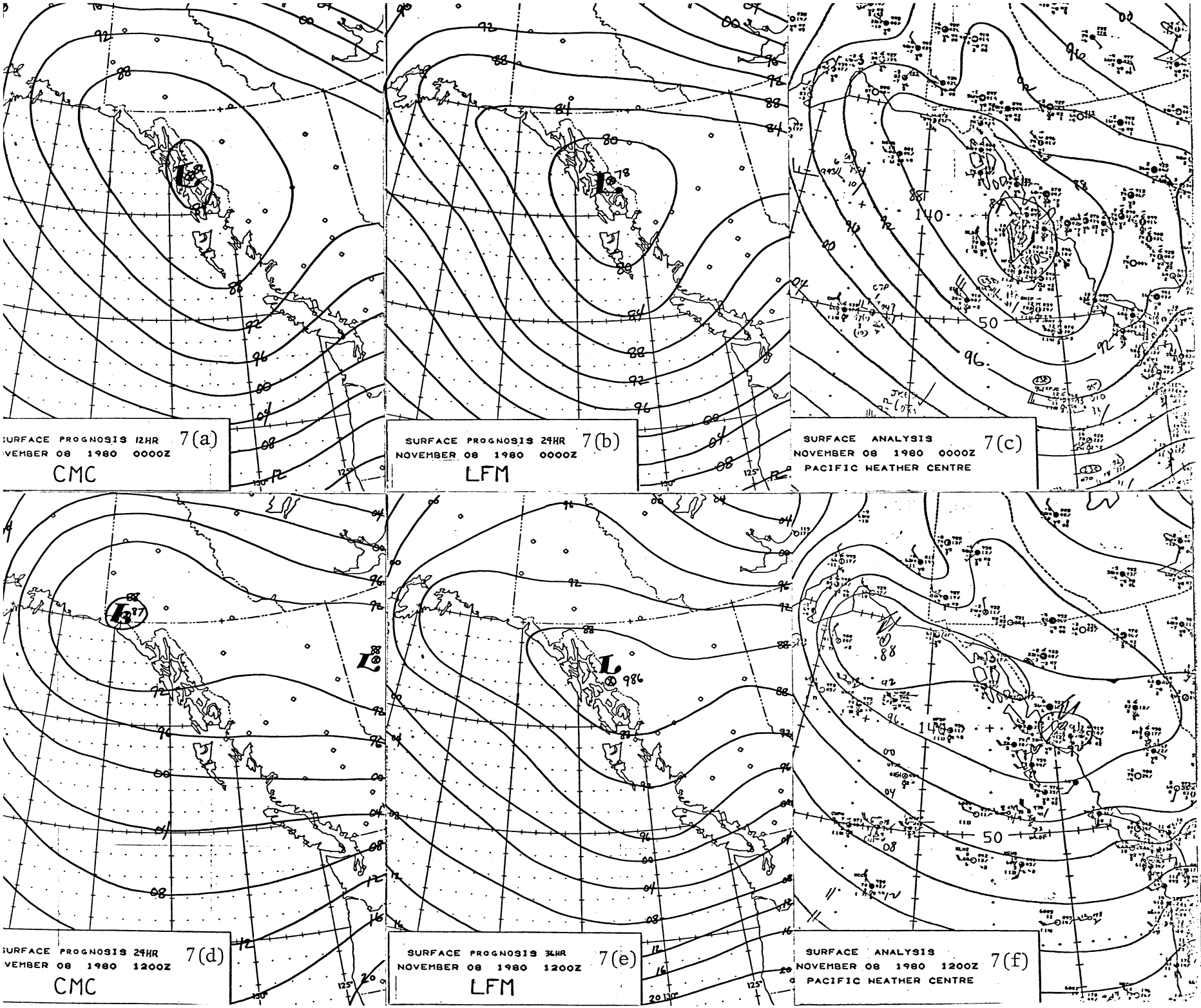
SURFACE PROGNOSIS 12HR
VEMBER 08 1980 0000Z
CMC
7(a)
SURFACE PROGNOSIS 24HR
NOVEMBER 08 1980 0000Z
LFM
7(b)
SURFACE ANALYSIS
NOVEMBER 08 1980 0000Z
PACIFIC WEATHER CENTRE
7(c)
SURFACE PROGNOSIS 24HR
VEMBER 08 1980 1200Z
CMC
7(d)
SURFACE PROGNOSIS 36HR
NOVEMBER 08 1980 1200Z
LFM
7(e)
SURFACE ANALYSIS
NOVEMBER 08 1980 1200Z
PACIFIC WEATHER CENTRE
7(f)

FIGURE 7

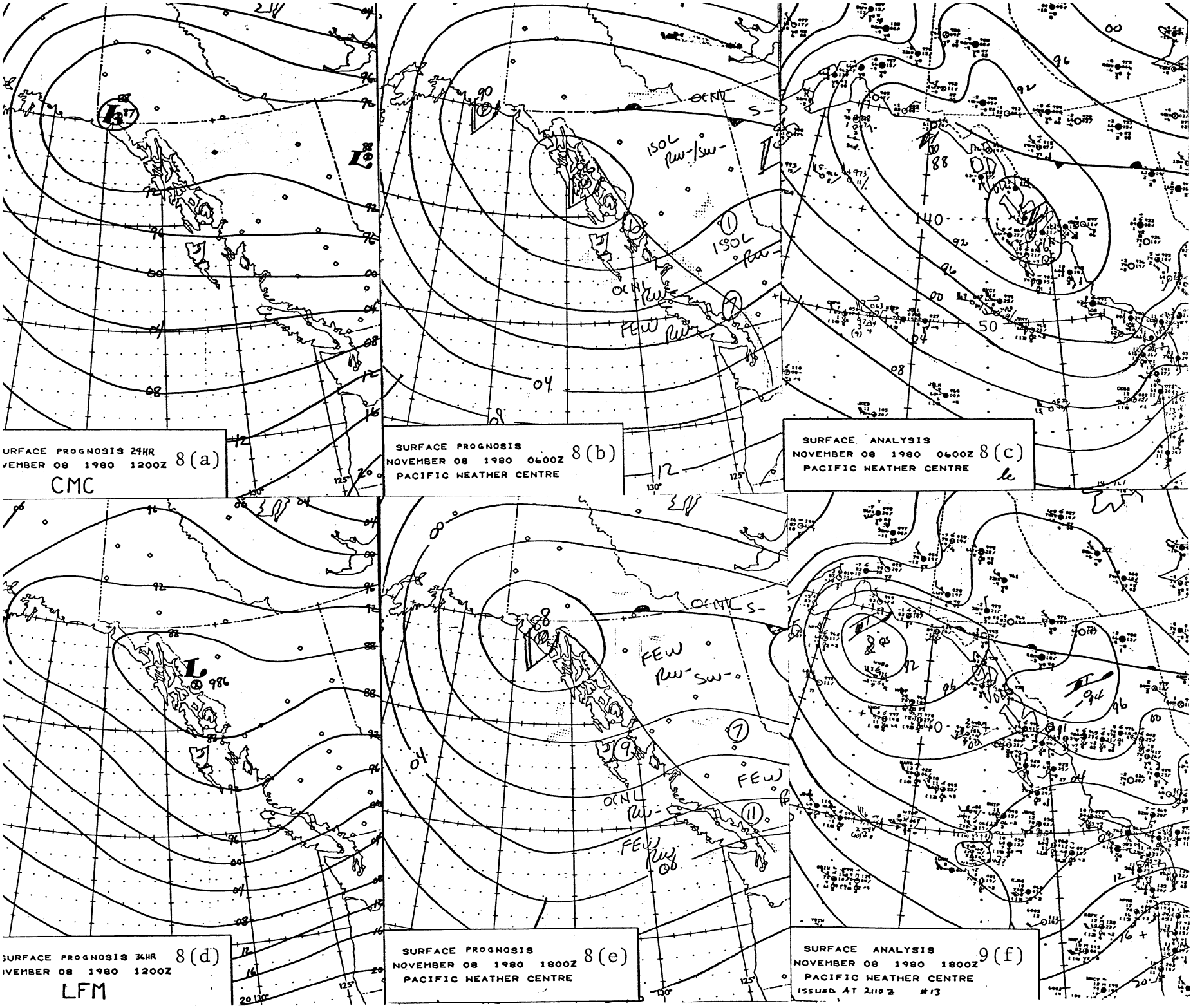
URFACE PROGNOSIS 24HR
VEMBER 08 1980 1200Z
8(a)
CMC
SURFACE PROGNOSIS
NOVEMBER 08 1980 0600Z
PACIFIC WEATHER CENTRE
8(b)
SURFACE ANALYSIS
NOVEMBER 08 1980 0600Z
PACIFIC WEATHER CENTRE
8(c)
URFACE PROGNOSIS 36HR
VEMBER 08 1980 1200Z
8(d)
LFM
SURFACE PROGNOSIS
NOVEMBER 08 1980 1800Z
PACIFIC WEATHER CENTRE
8(e)
SURFACE ANALYSIS
NOVEMBER 08 1980 1800Z
PACIFIC WEATHER CENTRE
ISSUED AT 2110Z #13
9(f)

FIGURE 8