PACIFIC REGION TECHNICAL NOTES

79-019

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Explanatory Note on Small Wavelength Comma Structures and Cirrus Streak Observed May 5-9, 1979

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Introduction

Interesting small wavelength comma cloud features and cirrus streaks were observed over the Eastern Pacific during the period May 5 through May 9, 1979. Further consideration of these features was made by W.L. Ranahan, Officer in Charge, Canadian Forces Base Meteorological Office in Comox. Upon Mr. Ranahan's request the Pacific Weather Centre has examined these features and produced this short explanatory technical note.

Description of the synoptic situation May 5-9, 1979

The 500 mb analysis for 00Z May 6 identified a low over the Aleutian Islands and a trof extending eastward to a secondary low off Vancouver Island. The major stream was placed along approximately 42 deg. lat. across the Eastern Pacific to California. Long wave ridging began taking place in the stream along 150 deg. long. This ridge built rapidly north and eastward during the period 00Z May 8 to 00Z May 9. With the building ridge, the cold low off Vancouver Island quickly drops into Nevada and a stream breaks through across the Queen Charlotte Islands. Figure 1 presents 500 mb charts depicting this sequence of events.

Small wavelength comma cloud features

The satellite image of 2045Z May 6 (figure 2) shows a series of very short wavelength comma features being generated in the jet stream in the vicinity of the low over the Aleutians Islands. A series of these small wavelength commas were observed over a 2 day period beginning approximately 2045Z May 5 and ending 2045Z May 7. The 2045Z May 7 image (figure 2) shows the last series of these comma features between 135-160 deg. long. Computer 500 mb height and vorticity analyses (figure 1) were unable to pick these features up due to their small wavelengths. Generation of these features are likely due to the presence of weak shortwaves rotating about the low over the Aleutians. Additional impetus to their creation is likely due to the availability of cyclonic shear to the north of the jet stream. Once formed, the

commas propagate rapidly downstream without potential for development since the inducing short wave continues about the low and the cyclonic shear weakens with motion into the diffluent area east of the low and north of the jet stream.

Cirrus streak

The 1045Z May 8, SB6 sector, satellite image (figure 3) received by Comox shows a cirrus streak located at 140 long. 50 lat. southeastward to 128 long. 40 lat. Since the SB6 sector received by Comox covers a relatively small area and the computer 250 mb analysis for May 8, 12Z (figure 4) indicated a broad jet stream a little further south, consistent with the historic position of the jet, some question was raised as to the significance of the cirrus streak and its relationship with the jetstream. Based on the Aireps and the larger geographic coverage of the UC2 sectors (figure 5) available at the Pacific Weather Centre, a clearer analysis of the situation was possible. The rapid building of the Pacific ridge during the 12 hour period between 00Z and 12Z May 8 forces the jet to realign further north and east and thus the formation of the cirrus streak in question.

Summary

Features such as the very short wavelength comma clouds and the rapid re-alignment of jet streams as indicated by cirrus streaks can often elude the numerical analysis over data sparse areas such as the Pacific. With the use of satellite images these features can be discovered and an assessment of the nature of the atmosphere can be made. The example of the cirrus streak and its indication of the rapid building of the ridge north and eastward, was found to be very useful in assessing the numerical analyses and the resultant numerical prognoses.

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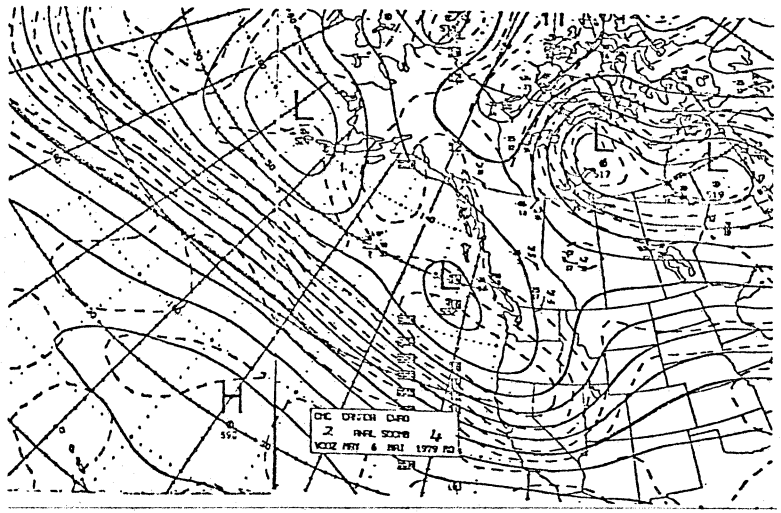
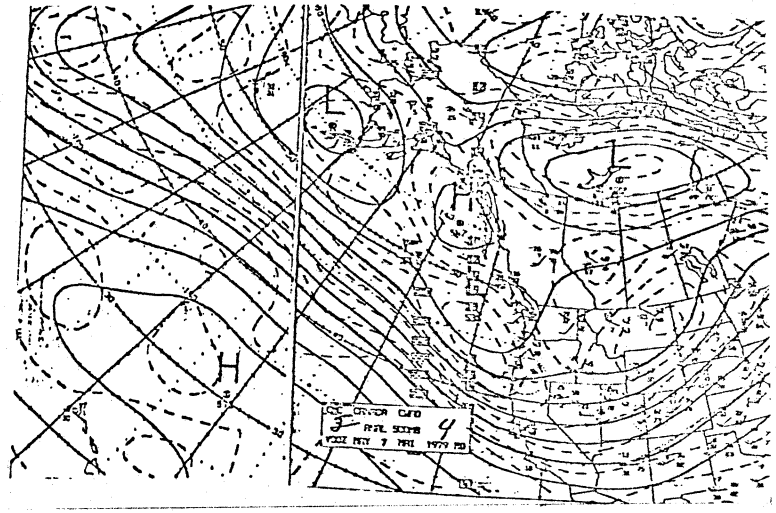
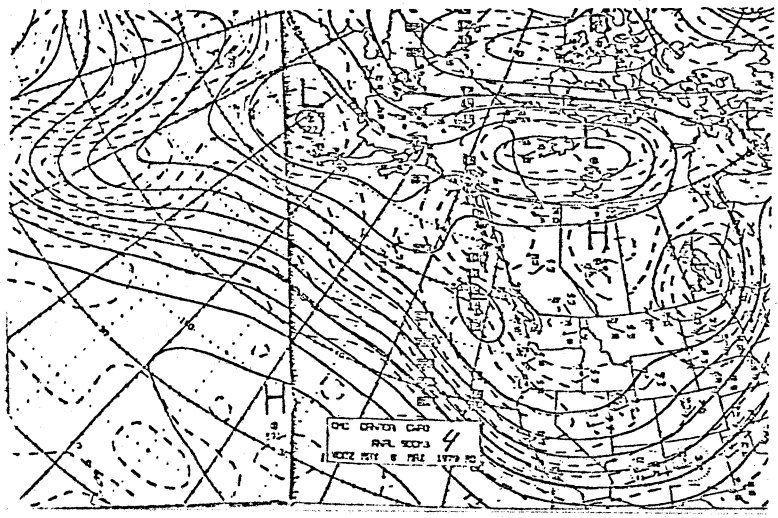
FIGURE 1.
CMC - 500 MB ANALYSIS
00Z MAY 6,7,8,9



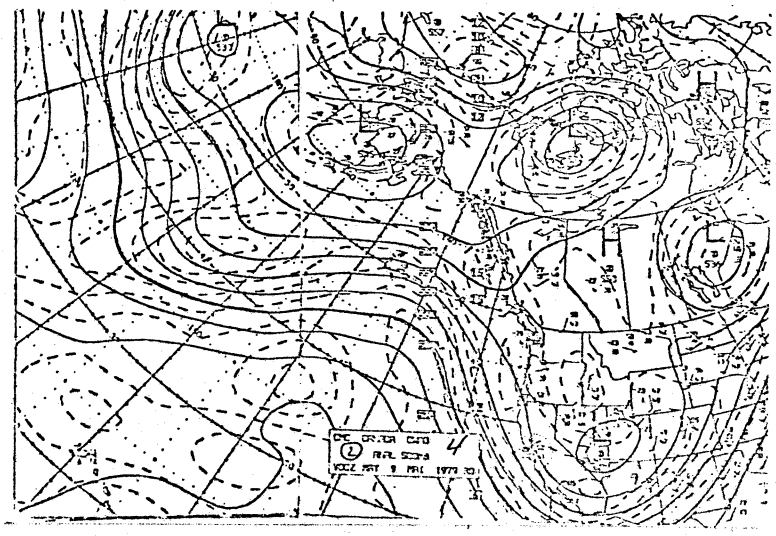
00Z MAY 6



00Z MAY 7

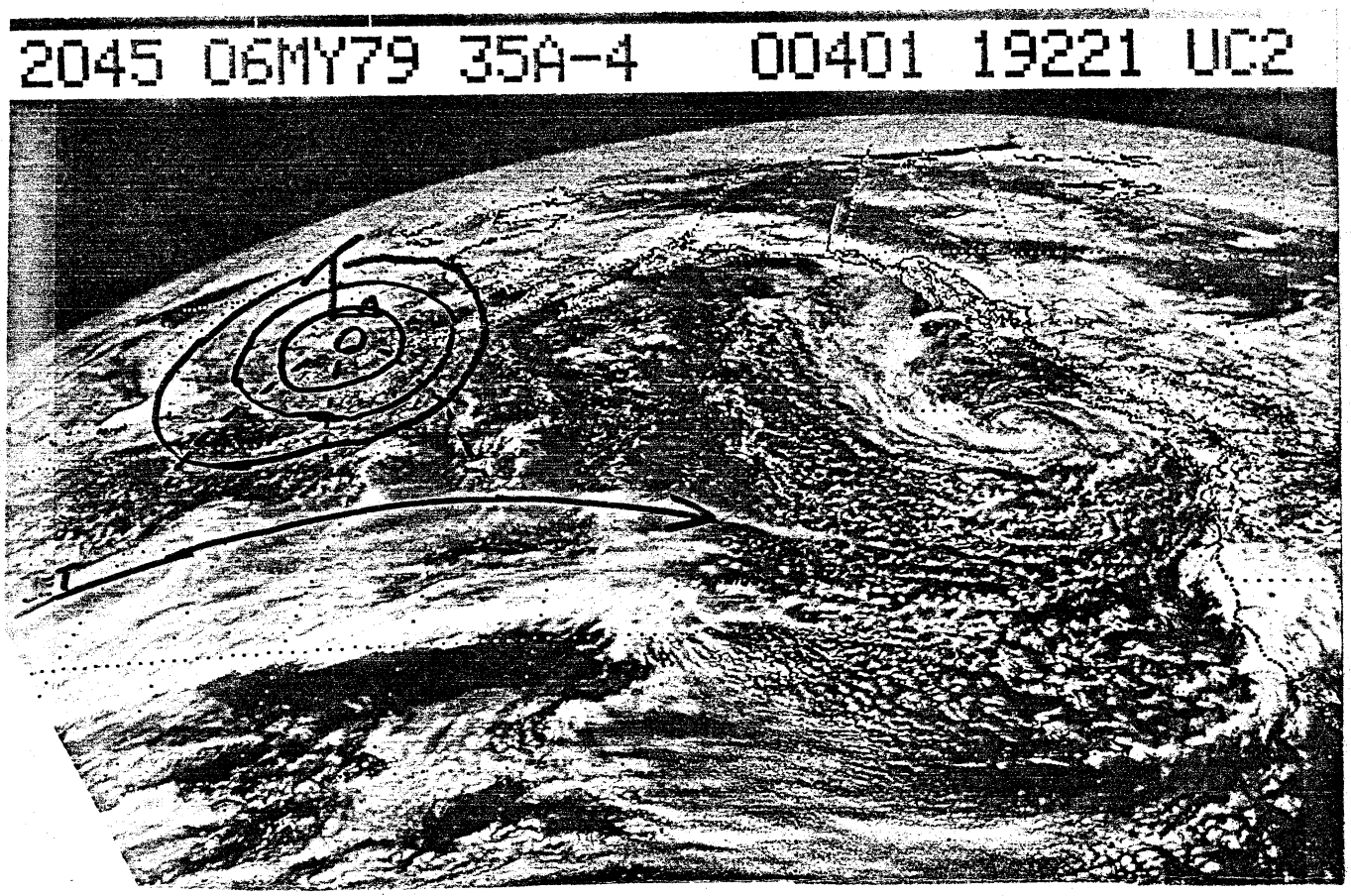


00Z MAY 8



00Z MAY 9

FIGURE 2.
SATELLITE IMAGES
2045Z MAY 6 AND MAY 7, 1979



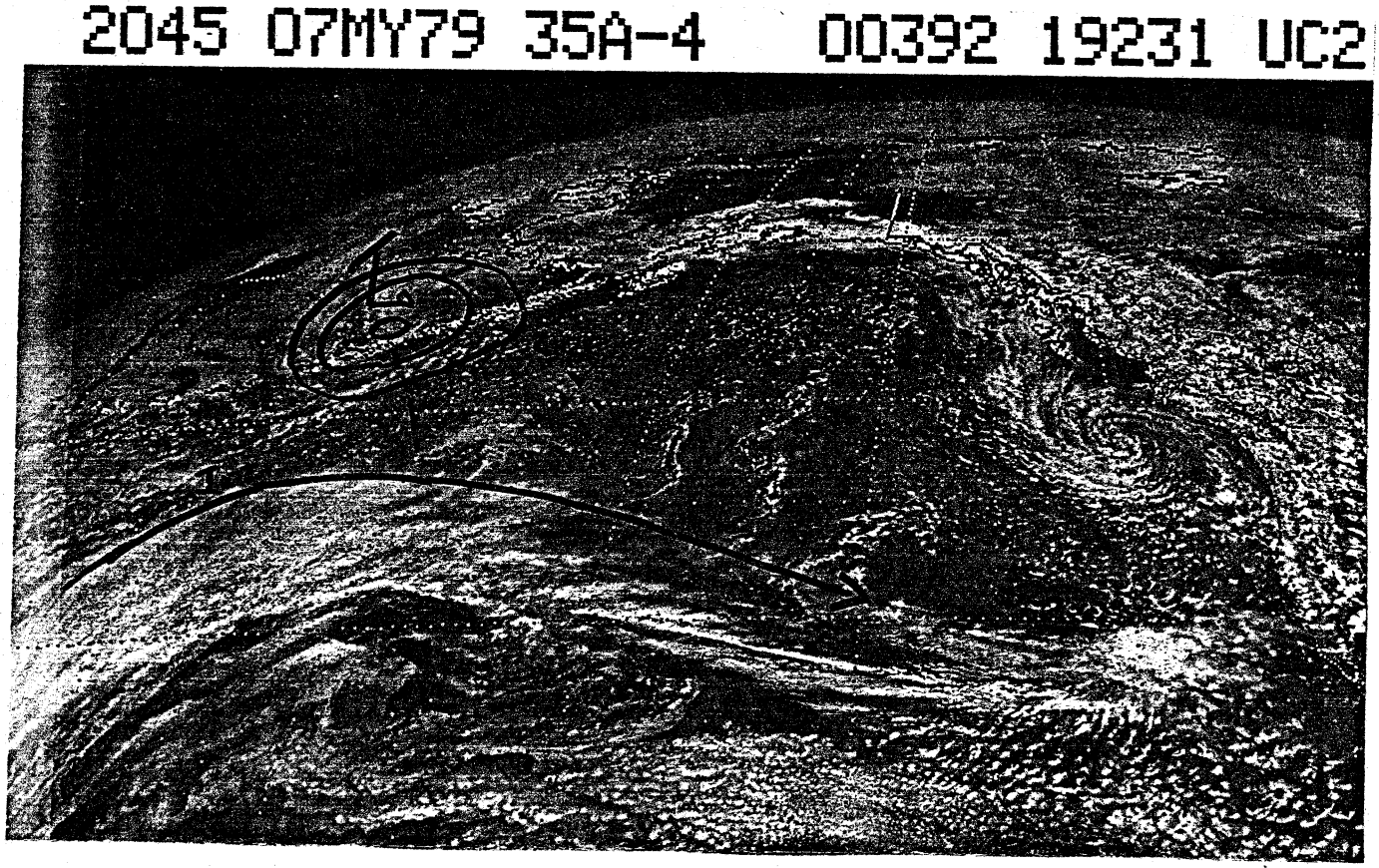


FIGURE 3.
SATELLITE IMAGES
1045Z MAY 8
(SB6 SECTOR) RECEIVED AT COMOX

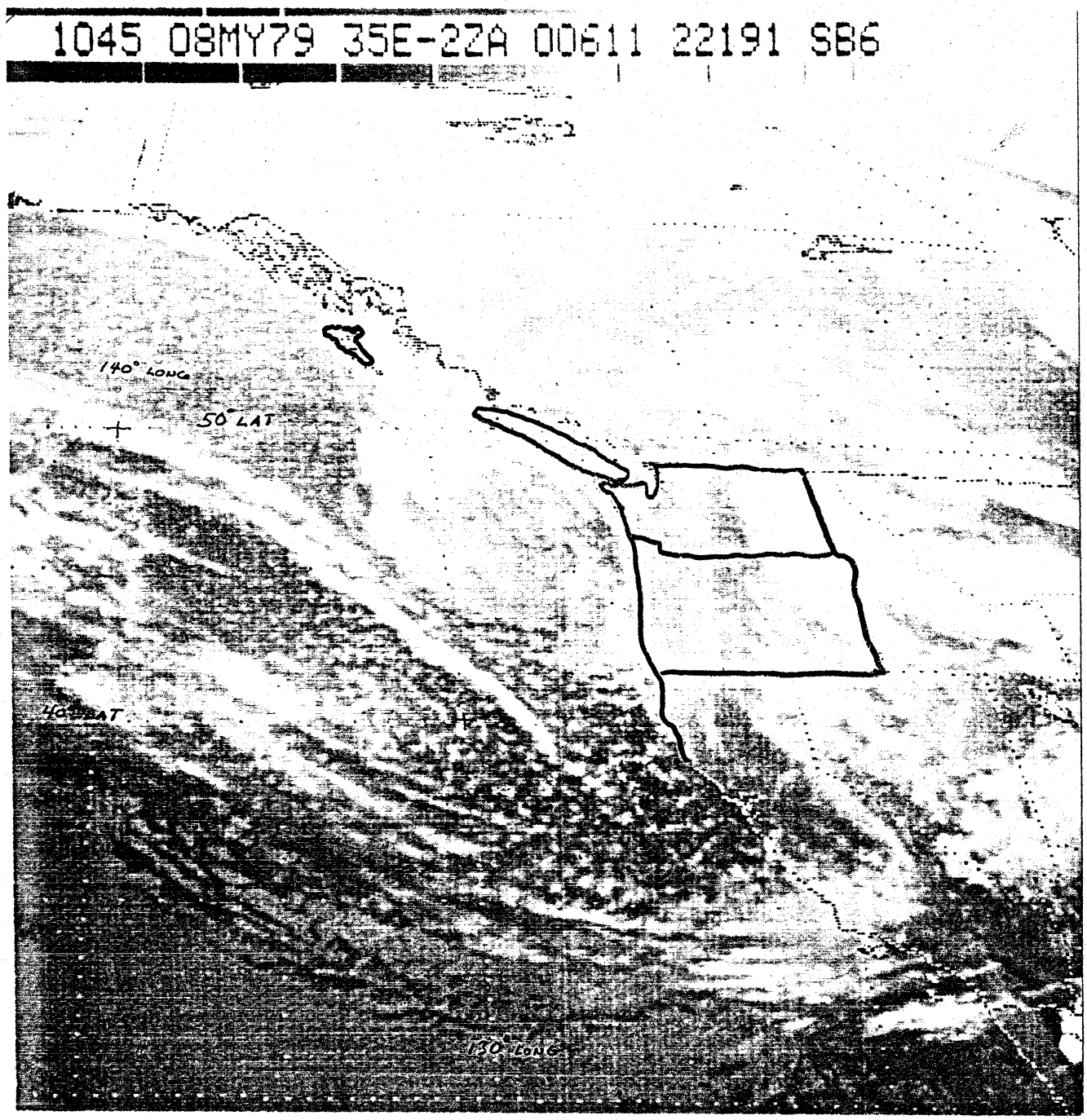
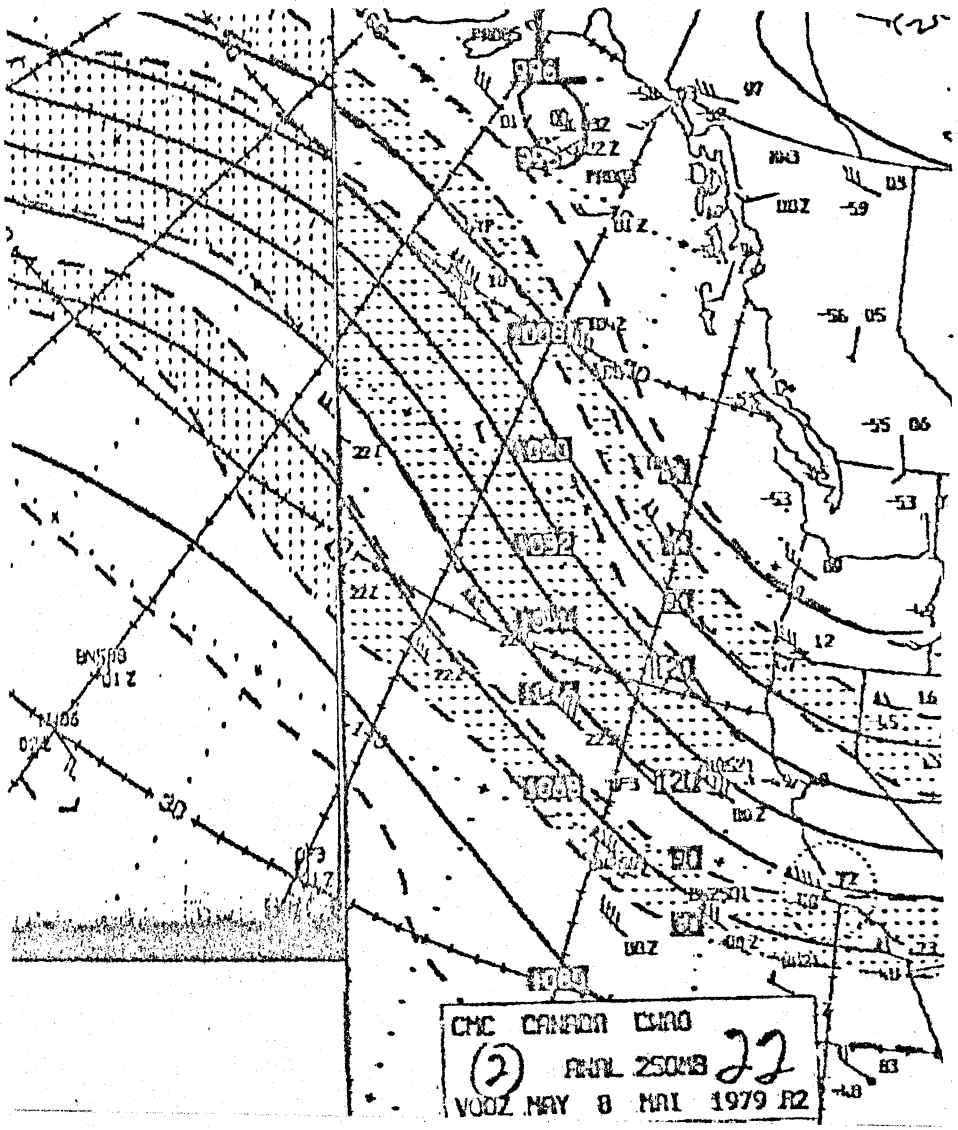


FIGURE 4.
CMC 250MB ANALYSIS
00Z AND 12Z MAY 8



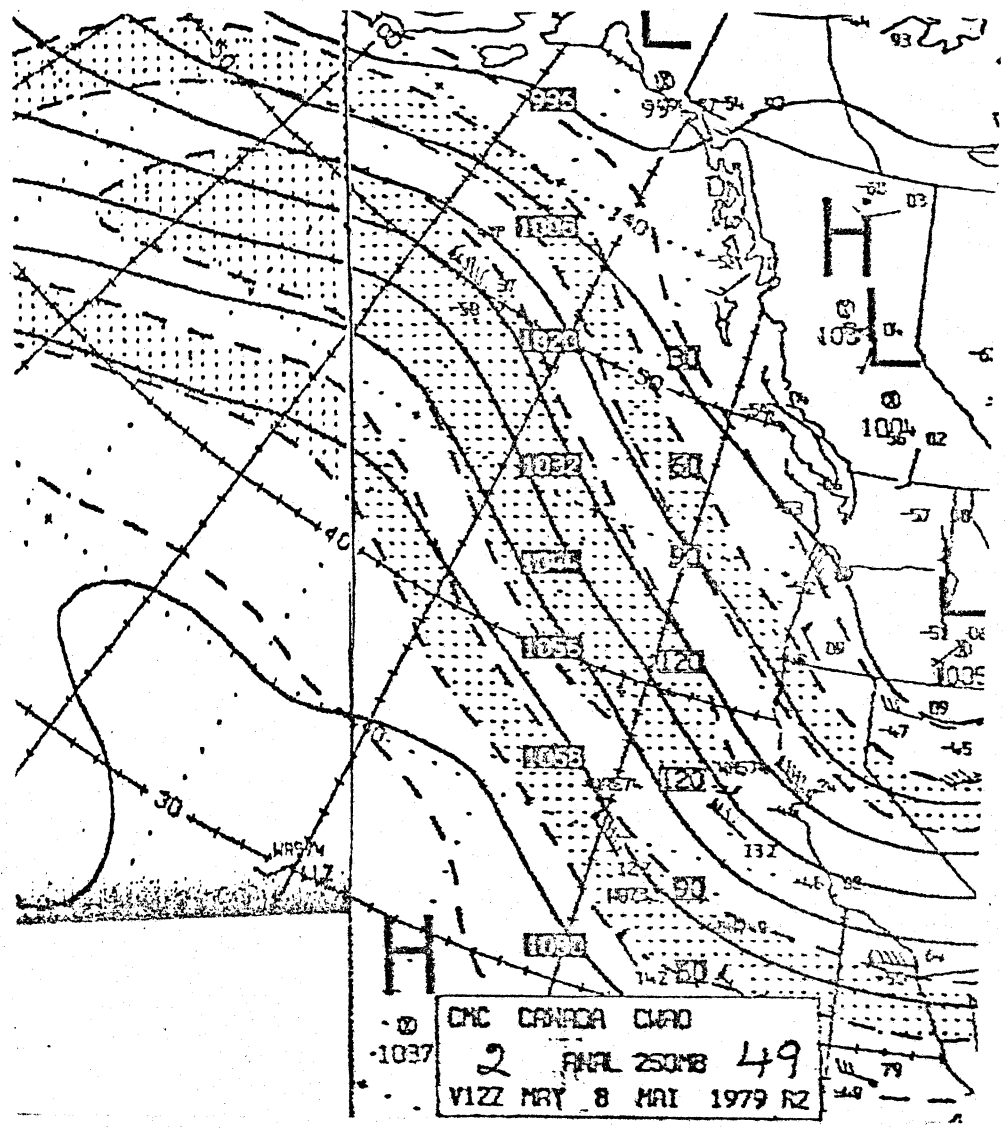


FIGURE 5.
SATELLITE IMAGES
(UC2 SECTOR)
2215Z MAY7 AND 1315Z MAY 8