



# **PACIFIC REGION TECHNICAL NOTES**

79-036  
December 11, 1979

## Under-Forecast of Snowfall in the Southern Interior on December 1, 1979

(FORECAST INVESTIGATION #1)

John Thomas, Meteorologist  
Pacific Weather Centre, Vancouver

---

### INTRODUCTION

The public forecasts for the southern interior regions of B.C. issued at 5:00 AM PST Saturday, December 1, 1979, were for "flurries today" with "periods of snow" on Sunday. Snow began falling in Kelowna, Penticton, Kamloops, and Castlegar between 5:00 AM and 7:00 AM and in Cranbrook at 10:00 AM and fell almost continuously for 24 hours with accumulations in excess of 30 cm. A revised forecast for "periods of snow" was issued at 11:30 AM but no snowfall advisory (significant accumulation) was issued until 4:00 PM after a considerable accumulation had already occurred (fig. 4a + 4b).

### SYNOPTIC SITUATION

On Saturday morning the main baroclinic (frontal) zone affecting B.C. stretched from northwest of Hawaii to southern Vancouver Island originating in the Intertropical Convergence Zone. Wind reports, figure 1, showed a jet in excess of 100 knots along most of the stream. The satellite image of figure 2 shows a series of low amplitude waves in the cirriform clouds with a lower level comma-cloud extending to the north of the jet-stream cirrus along 135W. This lower cloud band was associated with the surface wave indicated on figure 1. The upper flow over B.C. at 1215Z was anticyclonic with the axis of diffluence downstream from the ridge located along 120W, at A on fig. 1.

The prognosis on Saturday morning was to move the offshore wave inland across Washington State on Sunday resulting in snow over southern B.C.

By 01/1645Z, however, when snow had started at all the previously mentioned stations (except Cranbrook), the axis of diffluence had shifted to 115W, figure 2, and the cirriform cloud shield had spread across all of southern B.C. As figure 2 clearly shows, the high level trough and ridge over southern B.C. were very well defined and the cloud pattern is that of a classical warmfront with the wave offshore. This is exactly what the PWC 18Z surface analysis indicated and it was then that the public forecast was amended to "periods of snow" until noon Sunday.

The wave off the coast continued to deepen until it reached the coast at 02/0600Z and then filled as it moved eastwards along the B.C.-Washington border. Lying over the interior on Sunday, the system had the appearance, figure 3, of a frontal system which has occluded over the interior. This was only about 6 hours faster than the PWC surface prognosis for this time.

#### HINDCASTING FOR DECEMBER 1

During the two days prior to Saturday the numerical progs were of no assistance in forecasting the time and amount of snow. Of all the prog charts valid at 02/00Z, for example, only the 12h LFM forecast any precipitation at all in the southern interior (figure 5). The majority of the snow that fell was associated with the upper level ridge, i.e., overrunning, and not with the surface wave and trowal as originally forecast. This means that the continuous snowfall began 24 hours early and that the extended duration resulted in greater accumulations than anticipated. The result, a missed forecast for the first major snowfall of the winter.

#### CONCLUSION

There is no evidence to indicate that the time of snowfall and the total accumulation could have been forecast before the morning of Saturday, December 1. Even with the aid of satellite imagery, there was no indication that precipitation would propagate across the coast mountains with the upper ridge. The earlier images did show that the upper ridge and the axis of diffluence were moving in the stream at about 25 knots and the morning forecast for flurries indicated that clouds and at least some snow was expected as the system moved inland. The key to propagation of precipitation across the barrier of the coast mountains appears to be the presence of moisture at very high levels with sufficient vertical motion ahead of the upper trough to negate the orographically induced subsidence areas over the southern interior.

Once the snowfall had commenced, however, the origin of the air (sub-tropical) and the fact that the snow was forecast for a 24 hour period (11:30 AM amendment), consideration should have been given to forecasting a measurable accumulation.

Editor's Note: This investigation was initiated at the request of Dale H. Richier, O.I.C. Penticton Weather Office.

01DE79 35E-42A 00351 19231 402

12152

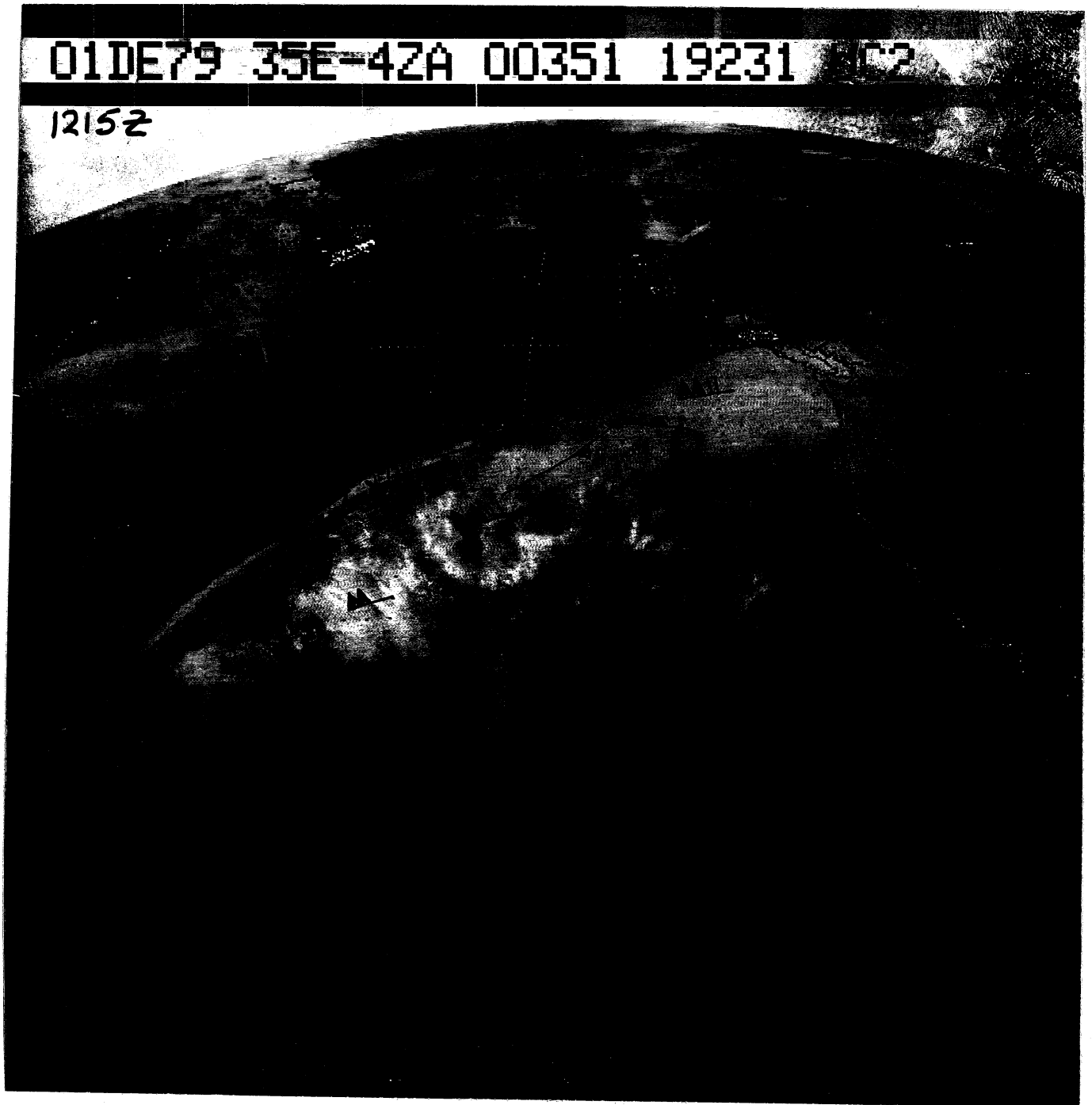


FIGURE 1

01DE79 35E-22A 00623 22091 SB6

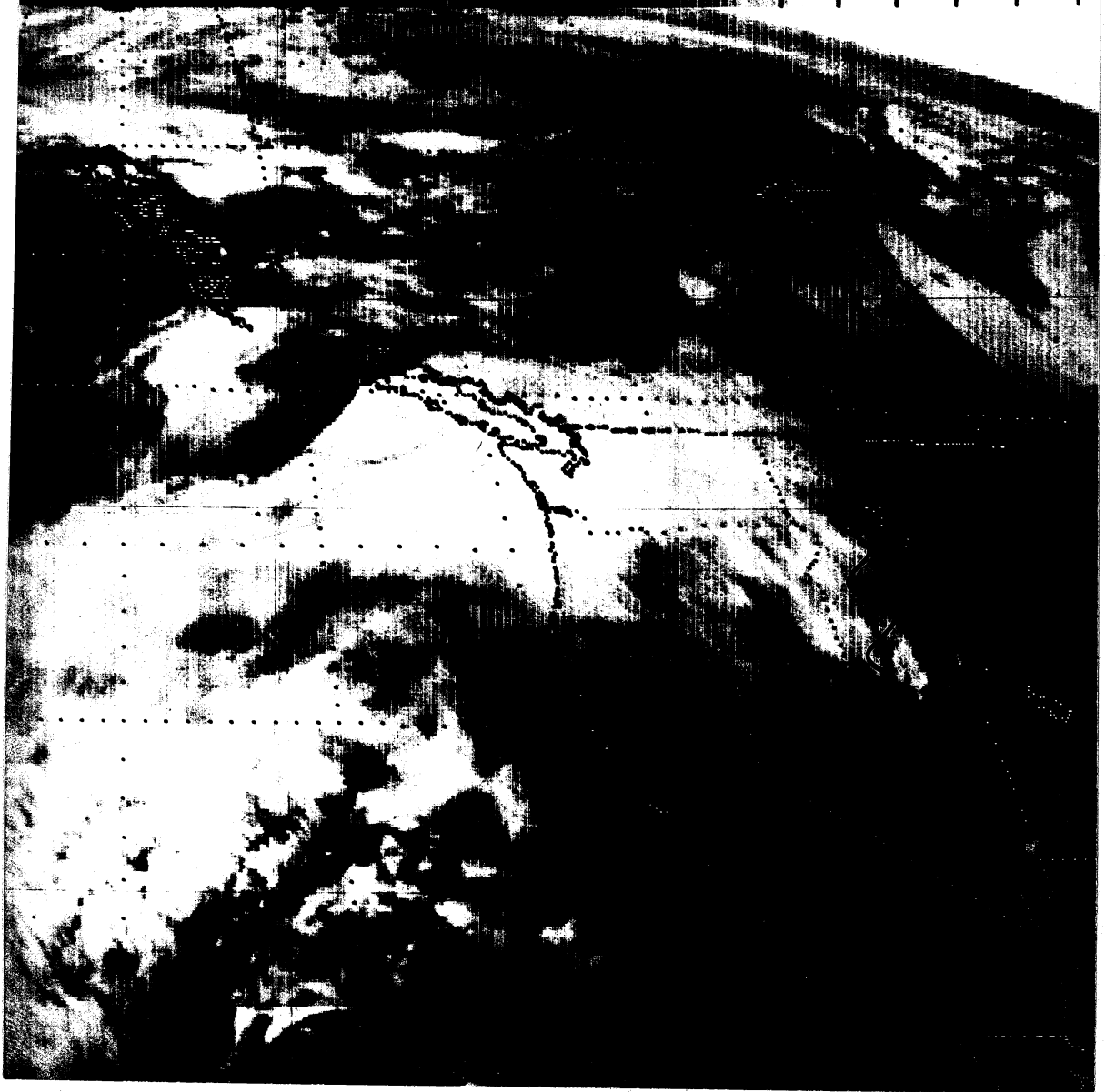


FIGURE 2

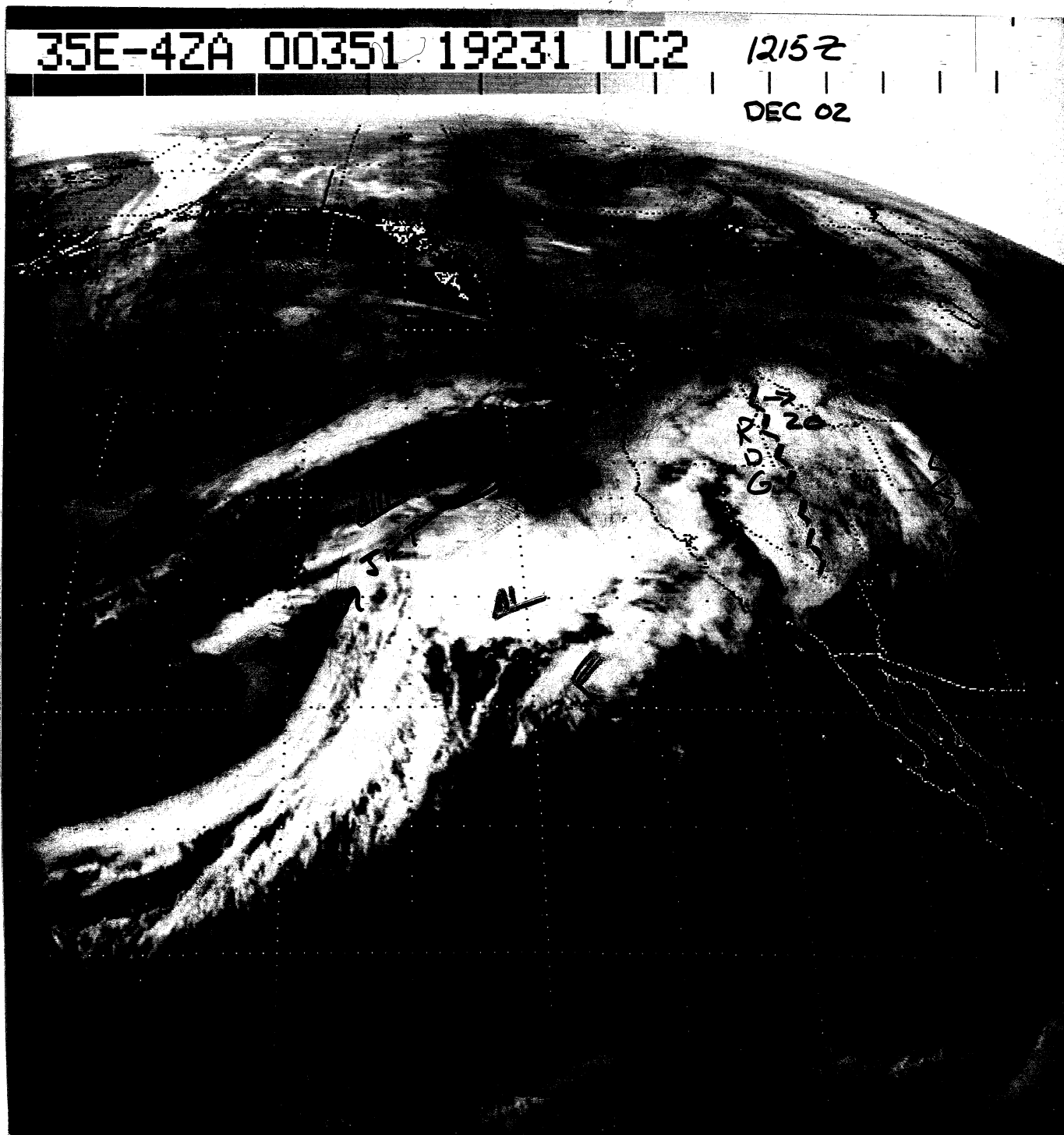


FIGURE 3

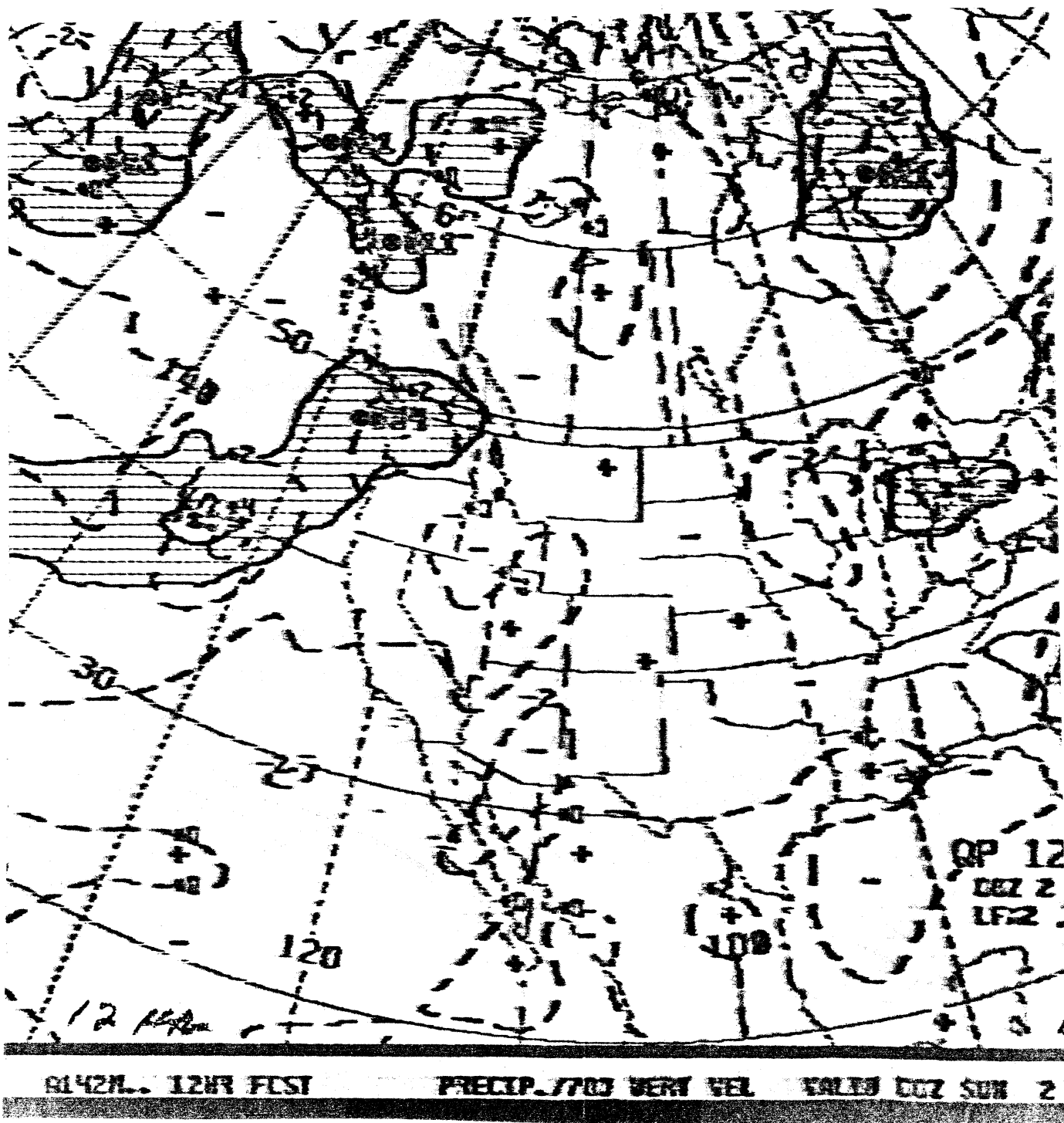


FIGURE 5

FPCN11CWVR 011300

FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA  
AT 5.00 AM PST SATURDAY 01 DECEMBER 1979 FOR TODAY AND SUNDAY.  
THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT  
4 PM TODAY 01 DECEMBER 1979.

THOMPSON OKANAGAN.

CLOUDY TODAY WITH A FEW FLURRIES.

SUNDAY CLOUDY WITH PERIODS OF SNOW OR RAIN AND SNOW MIXED EASING TO  
A FEW FLURRIES BY NOON. HIGHS BOTH DAYS NEAR 4.

LOWS TONIGHT NEAR OR JUST BELOW FREEZING.

COLUMBIA KOOTENAY.

TODAY AND SUNDAY CLOUDY WITH ISOLATED FLURRIES.

PERIODS OF SNOW STARTING NOON SUNDAY.

HIGHS BOTH DAYS MINUS 6 TO MINUS 3. LOWS TONIGHT AROUND MINUS 10.

SYNOPSIS FOR BRITISH COLUMBIA.

THE PATTERN OF A BROAD WESTERLY FLOW OF MOIST MILD PACIFIC

AIR OVER THE PROVINCE WILL PERSIST THROUGH THE WEEKEND.

IN GENERAL THIS WILL SPELL CLOUD FOR ALL OF BC WITH SHOWERS ON THE  
COAST. HOWEVER A LOW CENTRE OFF SHORE WILL DEEPEN TODAY

AND MOVE ONTO THE SOUTH COAST THIS EVENING ACCOMPANIED BY

WIDESPREAD RAIN. PERIODS OF SNOW WILL ACCOMPANY THE SYSTEM ACROSS  
THE INTERIOR SUNDAY. UNSETTLED CONDITIONS WILL RETURN TO THE COAST

SUNDAY AS THE SYSTEM MOVES INLAND.

END

FPCN11CWVR 011800

FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA

AT 10 AM PST SATURDAY 01 DECEMBER 1979 FOR TODAY AND SUNDAY.

THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT

4 PM TODAY 01 DECEMBER 1979.

GREATER VANCOUVER

LOWER FRASER VALLEY

HOWE SOUND-WHISTLER

SUNSHINE COAST

EAST VANCOUVER ISLAND.

TODAY CLOUDY WITH SHOWERS INCREASING TO STEADY RAIN IN THE EVENING.

SUNDAY CLOUDY WITH SHOWERS. HIGHS BOTH DAYS NEAR 8.

LOWS TONIGHT AROUND 4.

REMAINDER OF 5 AM FORECASTS UNCHANGED.

END

FPCN11CWVR 011930AMD

REVISED FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA

AT 1130 PST SATURDAY 01 DECEMBER 1979 FOR TODAY AND SUNDAY.

THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT

4 PM TODAY 01 DECEMBER 1979.

THOMPSON OKANAGAN.

CLOUDY TODAY WITH PERIODS OF SNOW. SUNDAY CLOUDY WITH PERIODS OF  
SNOW OR RAIN AND SNOW MIXED EASING TO A FEW FLURRIES BY NOON.

HIGHS BOTH DAYS NEAR 2. LOWS TONIGHT AROUND MINUS 2.

COLUMBIA.

TODAY CLOUDY WITH ISOLATED FLURRIES. PERIODS OF SNOW SUNDAY MORNING  
EASING TO FLURRIES IN THE AFTERNOON. HIGHS BOTH DAYS MINUS 4 TO

MINUS 1. LOWS TONIGHT AROUND MINUS 7.

KOOTENAY.

TODAY CLOUDY WITH PERIODS OF SNOW. SUNDAY SNOW EASING TO FLURRIES  
IN THE AFTERNOON. HIGHS TODAY MINUS 5 TO MINUS 2. LOWS TONIGHT

AROUND MINUS 6. HIGHS SUNDAY NEAR FREEZING.

END

FPCN11CWVR 02000

FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA  
AT 4.00 PM PST SATURDAY 01 DECEMBER 1979 FOR TONIGHT AND SUNDAY  
WITH AN OUTLOOK FOR MONDAY.

THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT  
5 AM SUNDAY 02 DECEMBER 1979.

THOMPSON OKANAGAN.

SNOW TONIGHT. LOWS AROUND MINUS 2. SUNDAY CLOUDY WITH PERIODS OF  
SNOW OR RAIN AND SNOW MIXED EASING TO A FEW FLURRIES BY NOON.  
HIGHS NEAR 3.

OUTLOOK FOR MONDAY...A FEW FLURRIES.

COLUMBIA.

TONIGHT CLOUDY WITH ISOLATED SNOWFLURRIES. LOWS NEAR MINUS 7.  
SUNDAY PERIODS OF SNOW EASING TO FLURRIES IN THE AFTERNOON.  
HIGHS MINUS 4 TO MINUS 1.

OUTLOOK FOR MONDAY...A FEW FLURRIES.

KOOTENAY.

TONIGHT SNOW EASING TO SNOWFLURRIES SUNDAY AFTERNOON. LOWS TONIGHT  
AROUND MINUS 6. HIGHS SUNDAY NEAR FREEZING.

OUTLOOK FOR MONDAY...A FEW FLURRIES.

SYNOPSIS FOR BRITISH COLUMBIA.

A MOIST WESTERLY FLOW OF PACIFIC AIR OVER THE PROVINCE WILL MEAN  
GENERALLY CLOUDY SKIES FOR THE NEXT FEW DAYS WITH MOST OF THE  
PRECIPITATION FALLING IN SOUTHERN BC. A DISTURBANCE CURRENTLY OFF  
VANCOUVER ISLAND HAS SPREAD RAIN ALONG THE COAST AND SNOW INTO  
THE SOUTHERN INTERIOR. THE SYSTEM WILL PUSH EASTWARD THROUGH  
THE INTERIOR ON SUNDAY. ON MONDAY HOWEVER ANOTHER PACIFIC SYSTEM  
WILL WORK ITS WAY TOWARDS THE COAST SPREADING CLOUD AND  
PRECIPITATION AHEAD OF IT.

END

FPCN11CWVR 020000AMD

REVISED FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA  
AT 4 PM PST SATURDAY 01 DECEMBER 1979 FOR TONIGHT AND SUNDAY.

THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT  
5 AM SUNDAY 02 DECEMBER 1979.

THOMPSON OKANAGAN.

SNOW ADVISORY ISSUED FOR THE OKANAGAN DISTRICT.

SNOW TONIGHT. FURTHER ACCUMULATIONS OF 5 TO 10 CENTIMETERS IN THE  
OKANAGAN. LOWS AROUND MINUS 2. SUNDAY CLOUDY WITH PERIODS OF SNOW  
EASING TO FLURRIES BY NOON. HIGHS NEAR 3.

OUTLOOK FOR MONDAY...A FEW FLURRIES.

KOOTENAY.

SNOW ADVISORY ISSUED.

TONIGHT SNOW EASING TO SNOWFLURRIES SUNDAY AFTERNOON. FURTHER  
ACCUMULATIONS OF 5 TO 10 CENTIMETERS. LOWS TONIGHT AROUND MINUS 6.  
HIGHS SUNDAY NEAR FREEZING.

OUTLOOK FOR MONDAY...A FEW FLURRIES.

REMAINDER OF 4 PM FORECASTS UNCHANGED.

END