



PACIFIC REGION TECHNICAL NOTES

79-028
October 31, 1979

"Unforecast" Thunderstorms in the Kamloops Area - August 2, 1979

Bob Bitcon, Meteorologist
Pacific Weather Centre, Vancouver

Preface

This note was initiated as a result of queries by B.C. Forest Service to Robert Duffy, A.E.S. Fire Weather Technician.

Introduction

Thunderstorms occur frequently in the summer time in the interior of British Columbia. Lines of thunderstorms occur along fronts and upper troughs while scattered airmass storms occur in the afternoons and evenings of very warm days.

The condition for hot days in the interior is a stationary ridge of high pressure aloft. The airmass becomes drier and more unstable each day because of the heating from below. A thermal trough forms at the surface, weakens at night but reforms the next day.

The element missing for development is moisture. When moisture is introduced thunderstorms are likely. This element can be fed into the system in two ways. The first way is a surge of moisture in the upper levels generally indicated by middle and high clouds at coastal stations heading eastward in the west to southwest flow of the ridge. The second method of moisture moving into interior is at the surface because of strong inflow conditions. Examples of inflow conditions are strong west winds at Hope and strong south winds at Lytton.

The Case of August 2, 1979

Events leading to the Thunderstorms of August 2 at Kamloops.

A frontal system from the west crossed the coast on the 31st of July but dissipated east of the coast mountains. This front was dropped from the map analysis August 1. No thunderstorms were reported along the front from any Forestry or A.E.S. weather station. Surface maps at 020000Z and 021200Z indicated a surface ridge of high pressure building over the province from the northwest with drying conditions and increasing stability. At 1800Z pressures were falling but no more than they would have fallen on a warm day. Winds were generally northwest 10 to 15 K.P.H. Little change had occurred in the upper air at Vernon, the sounding at 12Z was similar to the one taken 12 hours before except for the cooling at lower levels overnight. Some warming actually had taken place at higher levels.

From 12Z on the second, many changes occurred as can be seen on Fig. 1. Increasing moisture and a little cooling at upper levels.

The moisture can be seen on the satellite picture Fig. 2(A) near Port Hardy. Its path can be followed across the interior in Figs. 2(B), 2(C) and 2(D).

By 3 o'clock in the afternoon, towering cumulus had developed in many areas with rain showers. Thunderstorms were reported along a narrow band roughly along a line from Pemberton, Kamloops, Revelstoke, Banff beginning in the west and ending over the Rockies after midnight.

Aftercast

A pocket of moisture evident in the 021200Z sounding at Port Hardy was advected by the upper winds over Kamloops arriving at the time of maximum daytime heating. This timing plus the 2 to 3 degrees cooling aloft produced the thunderstorms. As the moisture moved eastward over the Rockies the activity ceased.

Conclusions

Although thunderstorms were not forecast specifically for Kamloops district zones 20 and 21, they were forecast for zones 22 and 18 adjacent to the Kamloops area. Zone 22 covers most of the Shuswap area where many of the thunderstorms were reported. Thunderstorms were also forecast for Zone 17 the zone just to the north of Kamloops.

Ideas

1. More contact by the technician with the fire weather forecaster in Vancouver, no mention is made of a phone call either in the morning or in the afternoon. The rain shower at "Shil" fire even at 3 o'clock would have been enough to issue an amended forecast.

TERMOGRAMME

STATION

115

YVK

DATE AUGUST

03/1979

STATION

PLUT 15 DRY-BULB AND DEW-PT.

DATE

00

DATE

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Diagramme de l'enthalpie potentielle en fonction de la
pression et d'autres conditions atmosphériques dans le
thermogramme sont conformes au Doc. 7483-2 Manuel
de l'atmosphère Type D-501 (2^e édit., 1964)



Environnement
Canada

Environnement
Canada

Atmosphère
Environnement

Environnement
atmosphérique

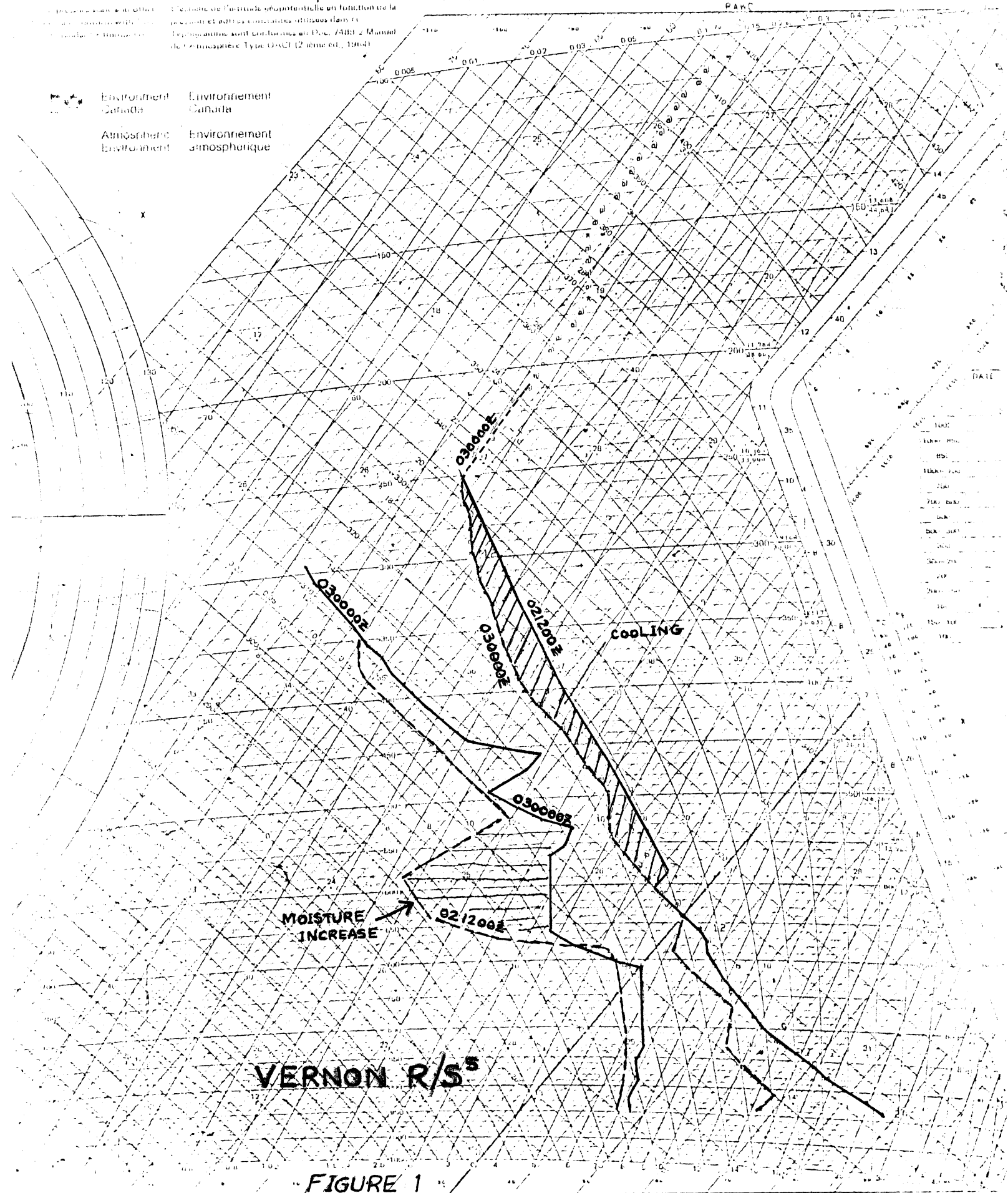


FIGURE 1

1245 02AU79 35E-2ZA 00634 22071 SB6

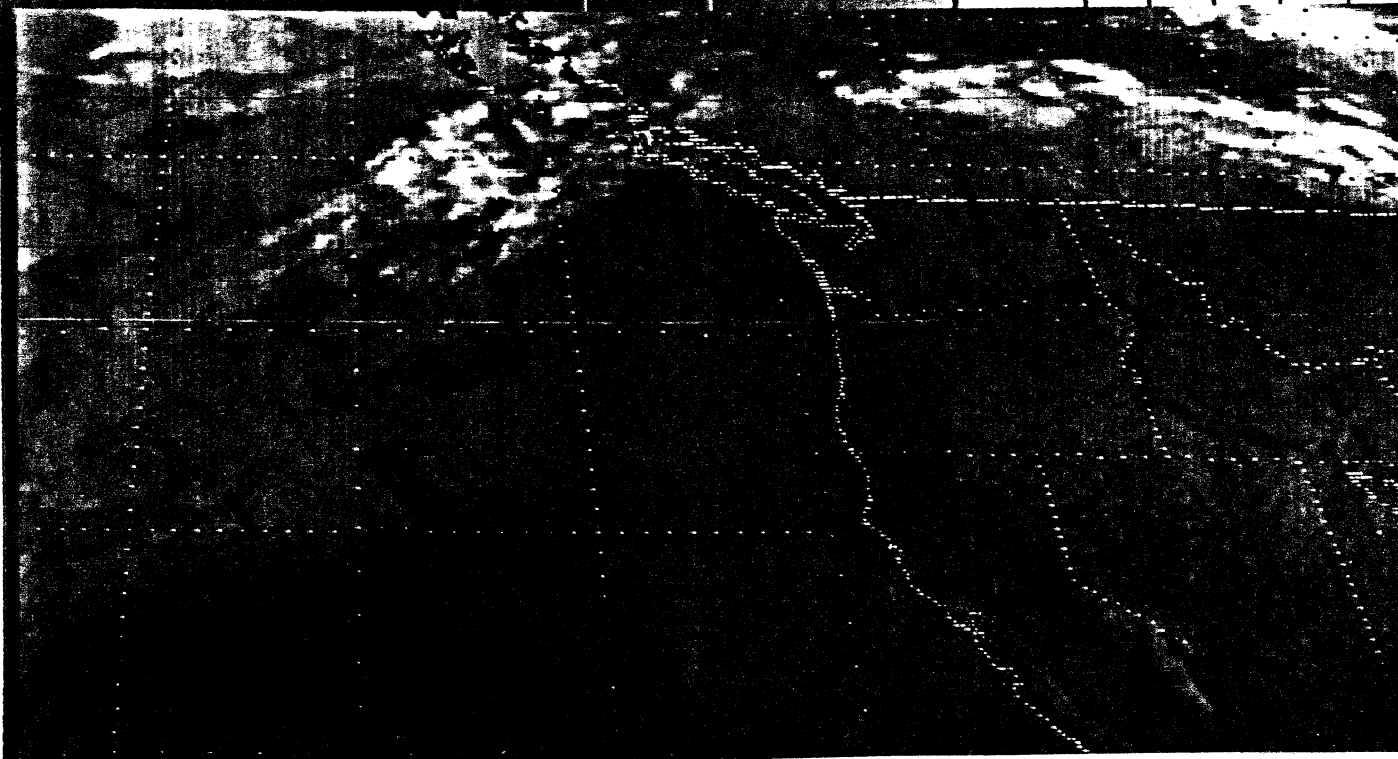


FIGURE 2A

1845 02AU79 35E-2ZA 00614 22072 SB6

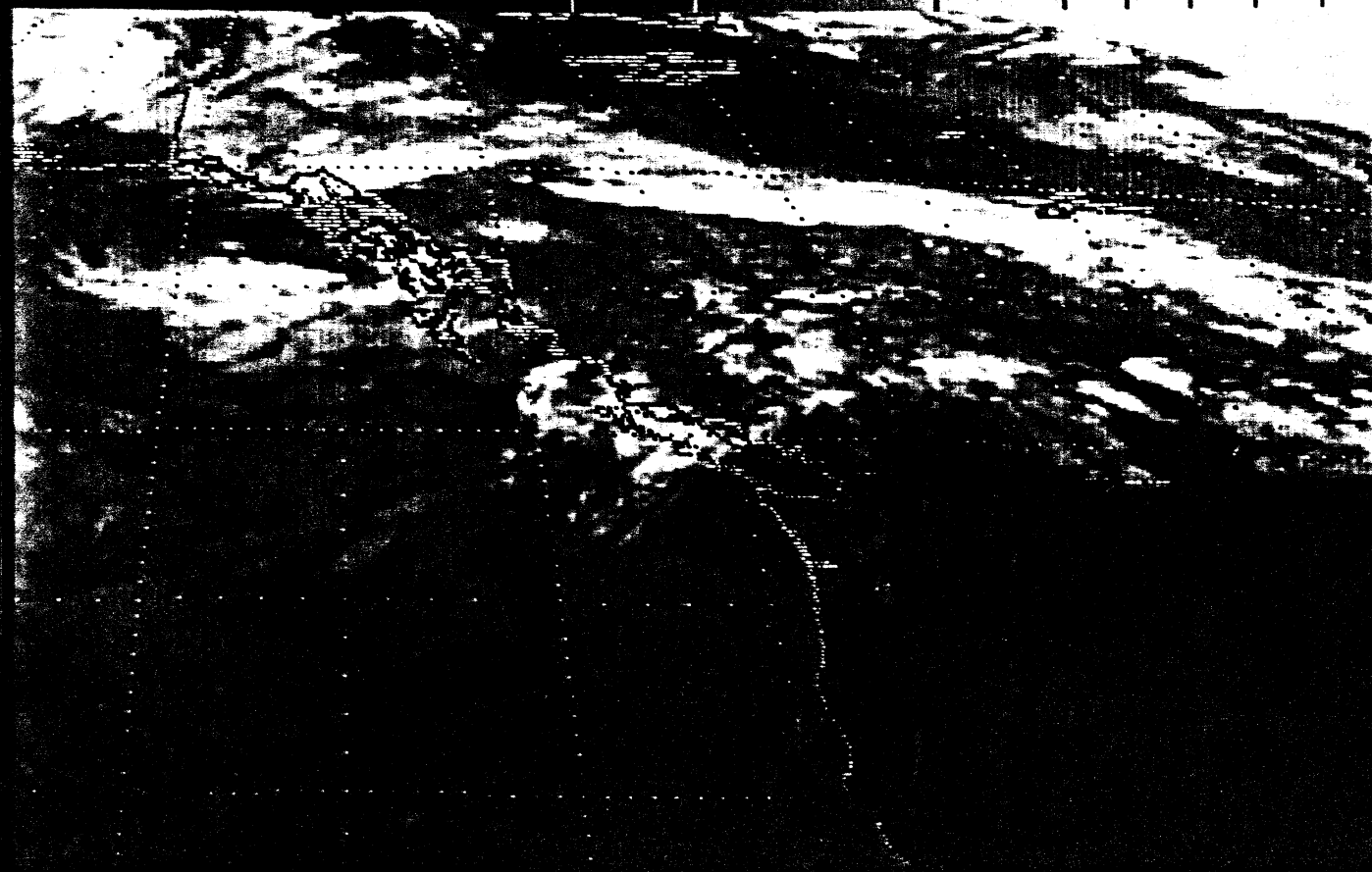


FIGURE 2B

0245 03AU79 35E-22A 00613 22132 SB6



FIGURE 2C

0745 03AU79 35E-22A 00624 22111 SB6

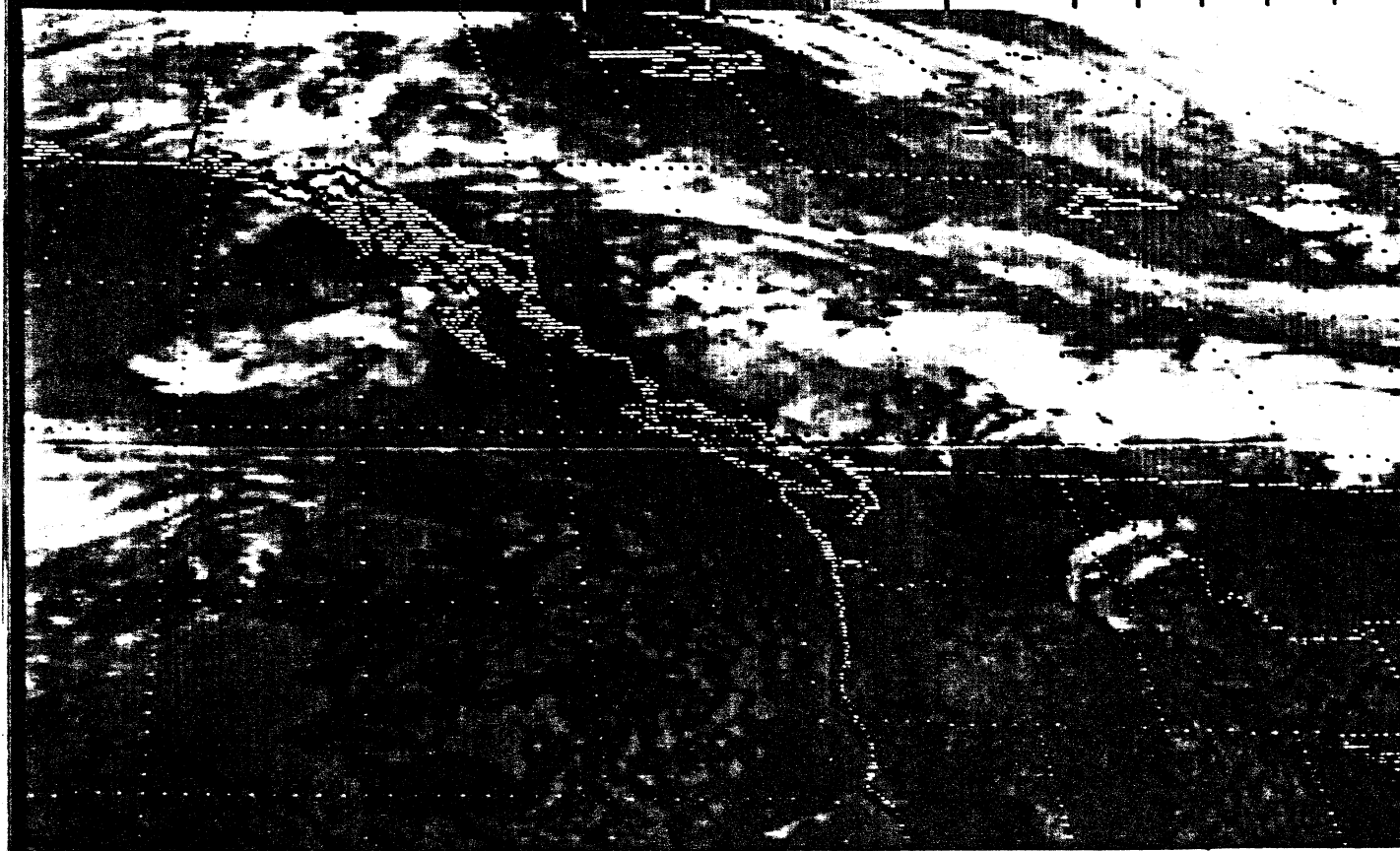
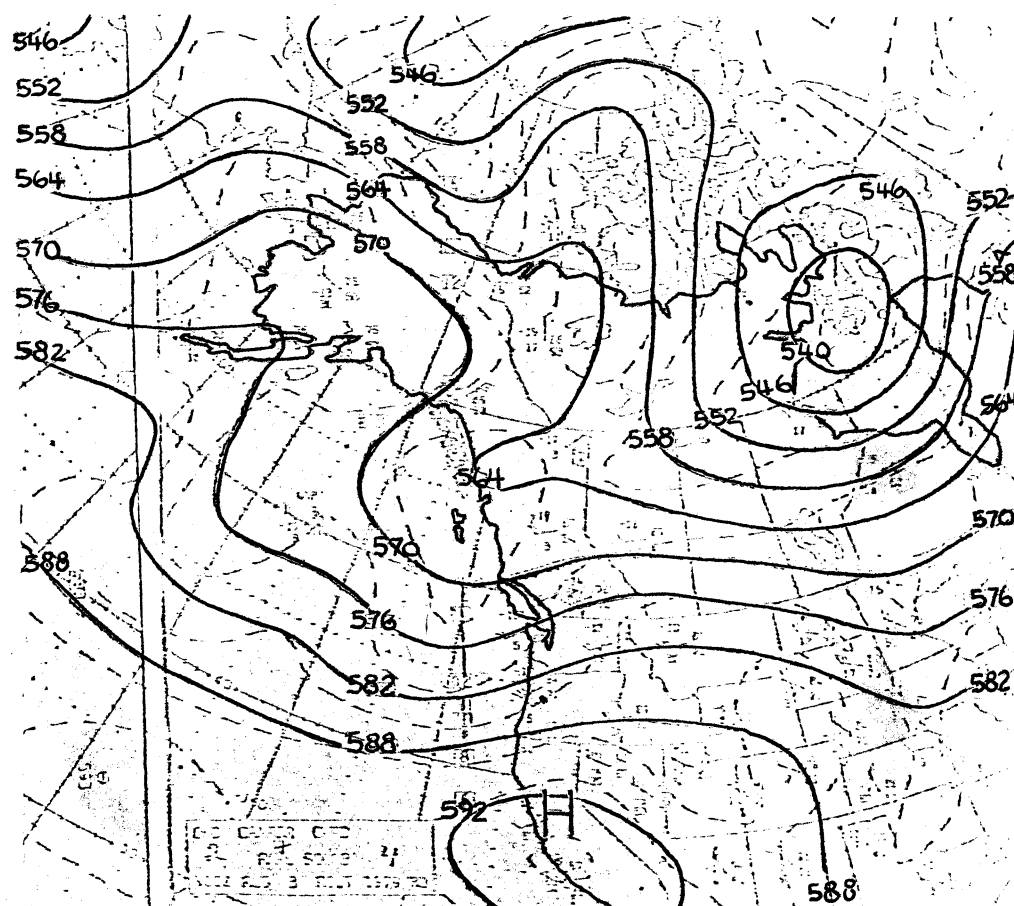
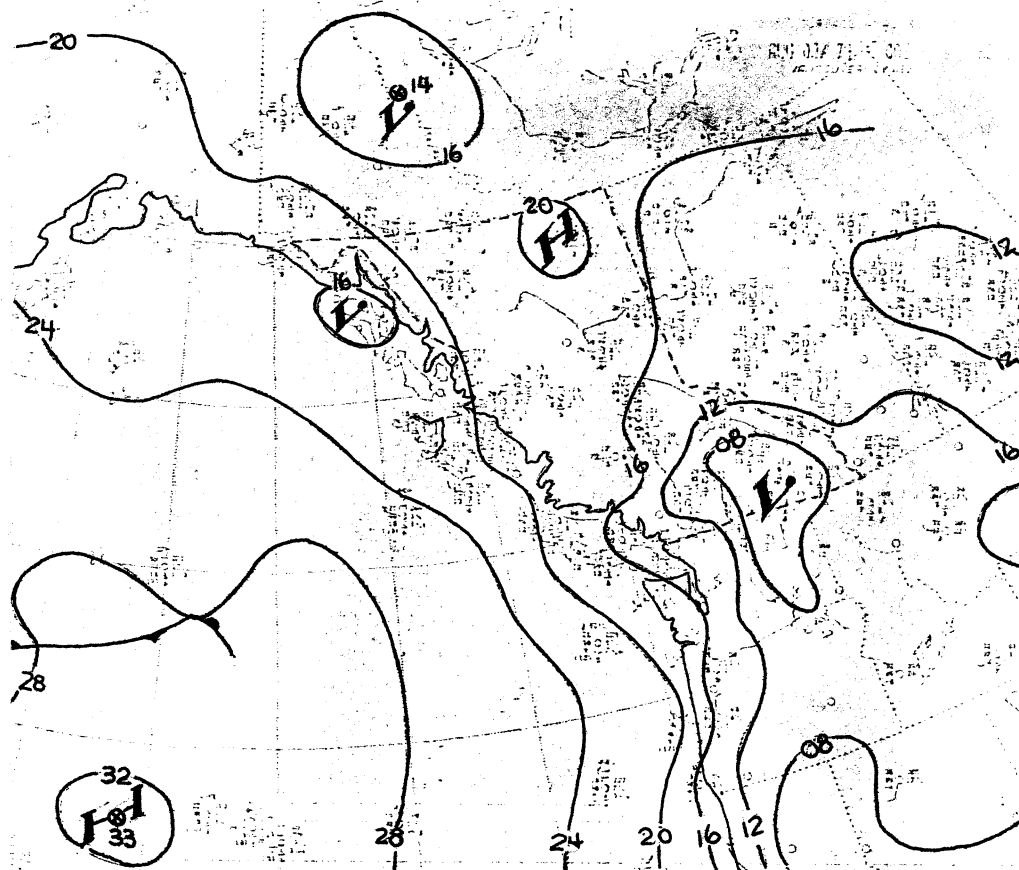


FIGURE 2D



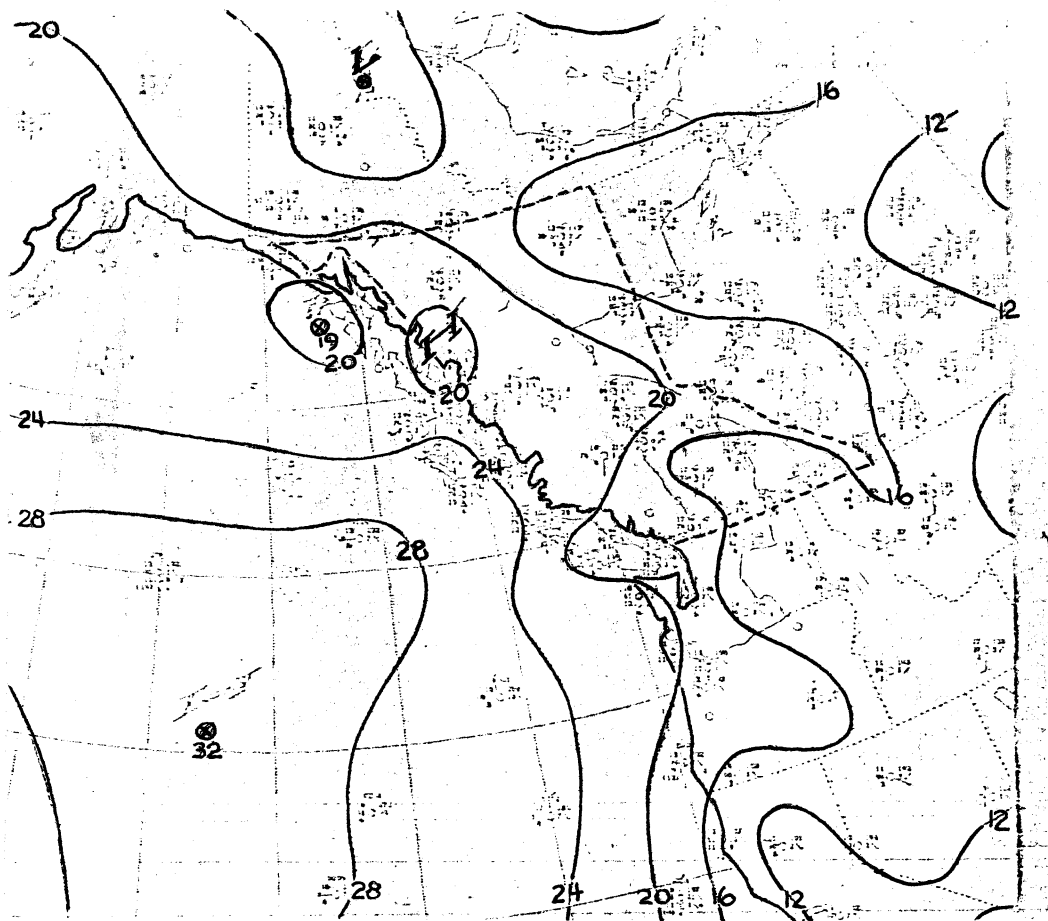


FIGURE 4A. 021200Z SURFACE ANALYSIS

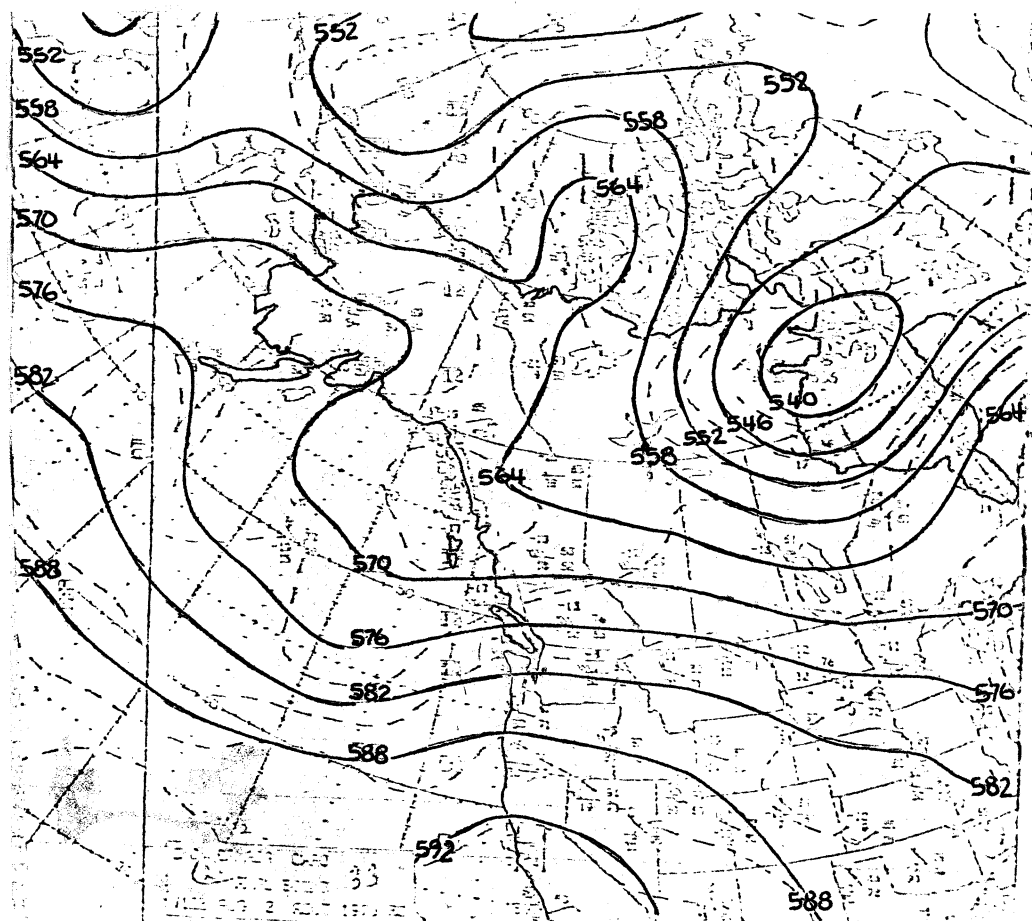


FIGURE 4B. 021200Z 500MB ANALYSIS

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Atmospheric Environnement
Environment atmosphérique

Weather Office
Atmospheric Environment Service
3035 Airport Drive
Kamloops, B.C.
V2B 7X1

August 24, 1979

Mr. J. D. Bailey
i/c Protection
B.C. Forest Service
515 Columbia St.
Kamloops, B.C.

Re: Unforecast Lightning, August 2, 1979

Dear Sir:

For your information, I am passing along a few notes on the unforecast lightning that developed over many areas of the Southern Interior on the afternoon and evening of August 2, 1979.

1. The Vernon upper air sounding for 1200Z, August 2 indicated a "border line" instability situation, with very warm dry air. This had been a common situation through the preceeding four days, during which afternoon thunderstorms had been forecast. On these previous days, there had been little actual CB development.
2. On the morning fire weather forecast, no thunderstorm activity was forecast for the Southern Interior. However, I did change the forecast to read "risk of thunderstorms in the afternoon and evening".
3. Variable cloudiness was being reported over the B.C. Interior, mostly high Cirrus cloud, with a few scattered Cumulous.
4. The first solid indication that any organized cloud might be showing up was at 2000Z, when Williams Lake Airport reported broken Altocumulous at 16, 000 feet.
5. This broken cloud persisted through the afternoon at Williams Lake, with no indication of it spreading southward.
6. The afternoon fire weather forecast mentioned that there was no sign of a surge of moisture reaching the Southern Interior, and considering the lack of moisture, and very little reported Cumulous development, I felt that there was no longer a risk of thunderstorms.
7. After about 3 p.m., there was a sudden increase in Cumulous cloud, which began to build very rapidly, and this, along with a report from the "Shil" fire, situated north of Lillooet, of Towering Cumulous and light rain showers, and after much hesitation on my part, convinced me that I should again add "risk of thunderstorms in the afternoon and evening" to

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*Might be worth investigation
by project Meteorologist
Vello, Rasmussen, Mackenzie, B. +*



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Mr. J. D. Bailey

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the afternoon fire weather forecast.

8. The first thunder was reported at Kamloops Airport at around 6 p.m.

9. From the attached computer print-out map, it can be seen that the thunderstorms were confined mainly to the Thompson & Shuswap areas, and tended to be rather spotty in nature. There was also some precipitation recorded with the thunder, but this again tended to be very spotty. Strong winds were also recorded in most areas.

Conclusions

1. In reviewing the reports and forecasts for that day, I doubt that I would have handled the situation any differently.
2. As the A.E.S. weather reporting network is so widely scattered, it seems that certain localized weather conditions are able to slip through large areas of the Province unseen.
3. There was an indication on an afternoon satellite photograph that a band of cloud was crossing the Southern Cariboo. This would have been the broken Altocumulus reported at Williams Lake. However, this photograph was not available to me.
4. There was also a personal bias involved here. Thunderstorms forecast, and not occurring during the preceeding few days tend to create the feeling that you are crying wolf to^o often.

Recommendations

1. At the Weather Office, we are already arranging for a little closer liason with the briefer on duty. For instance, if he should spot something on the satellite photograph, he will contact the briefer at B.C. Forest Service H.Q.
2. I recommend that consideration be given to including reports of TCU or CB development be included in the 1 p.m. fire weather reports. Because of the obvious appearance of these cloud forms, there would be little additional training of the observers involved. This would lessen the possibility of having these small-scale disturbances moving unnoticed into the area.

Yours truly,

Robert O. Duffy

A.E.S. Fire Weather Technician

cc: W. J. Frymire

OIC Kamloops W04

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