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A RECORD SNOWFALL AT COMOX

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Introduction

A record daily snowfall at Comox on Vancouver Island was established on January 4, 1978. On that day, 60.2 cm of snow fell, resulting in widespread damage due to heavy snow loads. The problem was compounded by heavy snowfalls on previous and subsequent days. Forecast snowfall amounts were far too low, and as much of the snow fell in the early part of the morning, many authorities were unaware of the heavy snowfall and resulting hazard until it was too late. This report will attempt to identify features associated with this record snowfall event, and try to explain why forecasters did not anticipate such heavy amounts.

The Synoptic Situation

A frontal system spread snow across Vancouver Island on the morning of the 3rd, although the Low itself remained well off the coast. Snowfall amounts ranged from 10 to 20 cm, and rain was occasionally mixed with the snow in the southern regions. As the frontal cloud moved northward in the late afternoon, the forecast was for snow to taper off in the evening with only a few cm additional accumulation. The enhanced IR satellite imagery for 4 Jan 78 0045Z showed this frontal band across Vancouver Island (Attachment I). A second storm was developing near 40N on this photo, and threatened to bring more snow on the 4th late in the day.

What Happened?

Light snow continued through the evening, although the frontal band had now moved north of the Comox area (Attachment II). From this photo at 0245Z on the 4th, it would appear at first glance that subsequent snowfalls would be light until the arrival of the second storm later on the following day. However, early in the morning, heavy bursts of snow began to occur at Comox, and continued through the morning. Between midnight and noon, 48 cm of new snow fell, with 11 cm being recorded in one hour. The forecasters were hard pressed to explain the heavy snowfall, and as well, to predict future amounts. Most confusing of all was the local nature of the heavy snow, with most stations reporting little or no precipitation during this period.

The Hindcast

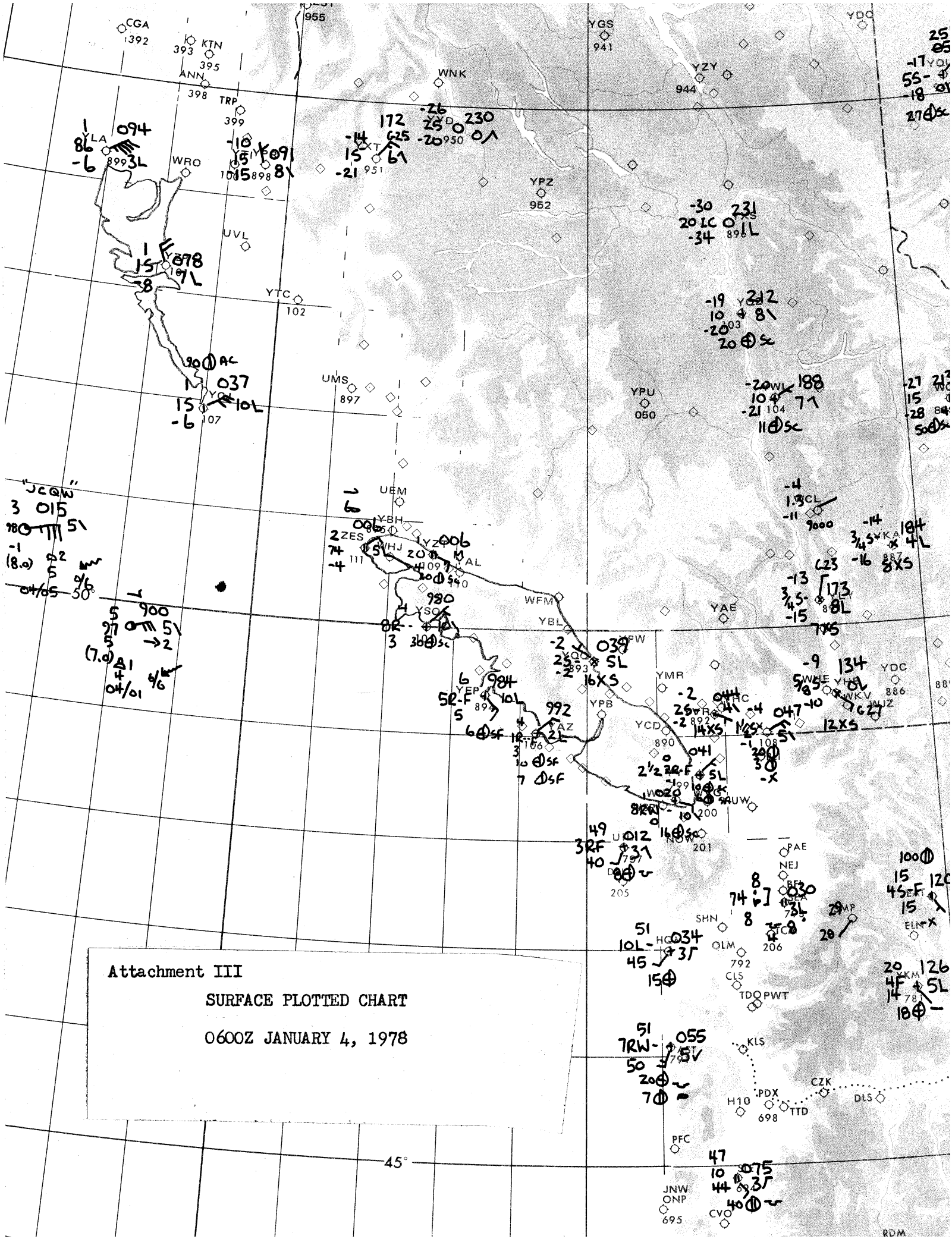
After a detailed examination of the available data, some light was shed on the cause of the heavy snowfall. If we refer to Attachment I again, a disorganized area of what appears to be convective cloud can be identified at points A. Two hours later, on Attachment II, this same patch of convective cloud seems to be organized better, and with colder cloud tops.

The massive storm to the south near 40N overshadows the significance of these smaller bands which would have a tendency to be ignored. Subsequent photos would lead us to believe that these bands of cloud moved directly across Vancouver Island between 12 and 18Z, and werelargely responsible for the record snowfall during this period. This feature does not show up on the 500 mb analysis, but can be detected as a pulse on the surface charts. Attachments III, IV, and V are plotted surface charts for 06Z, 12Z, and 18Z. Notice the changes in pressures and surface winds as a pulse moves across Vancouver Island between 06Z and 18Z. During this period, moderate rain is reported at Tofino and moderate snow at Port Alberni. A temperature drop to -11.9 ^{o}C was reported at Port Hardy at 12Z, which no doubt contributed to the enhancement of the instability precipitation at Comox during the period.

Conclusions

Since the occurrence of this record snowfall long after the passage of the frontal weather system, other similiar cases have been noted. The latest to affect Comox was on April 22, 1978, when a group of convective cloud cells readily identifiable on the satellite imagery, moved across Vancouver Island after the front, and dumped over 30mm of rain in a few hours. It is obvious that forecasters must cautiously watch for developments of this nature in the future when one would normally be predicting a fade-out of precipitation after the passage of the primary weather system. These secondary developments will be most noticeable on satellite imagery, and have the potential of dumping significant amounts of precipitation when it is least expected.

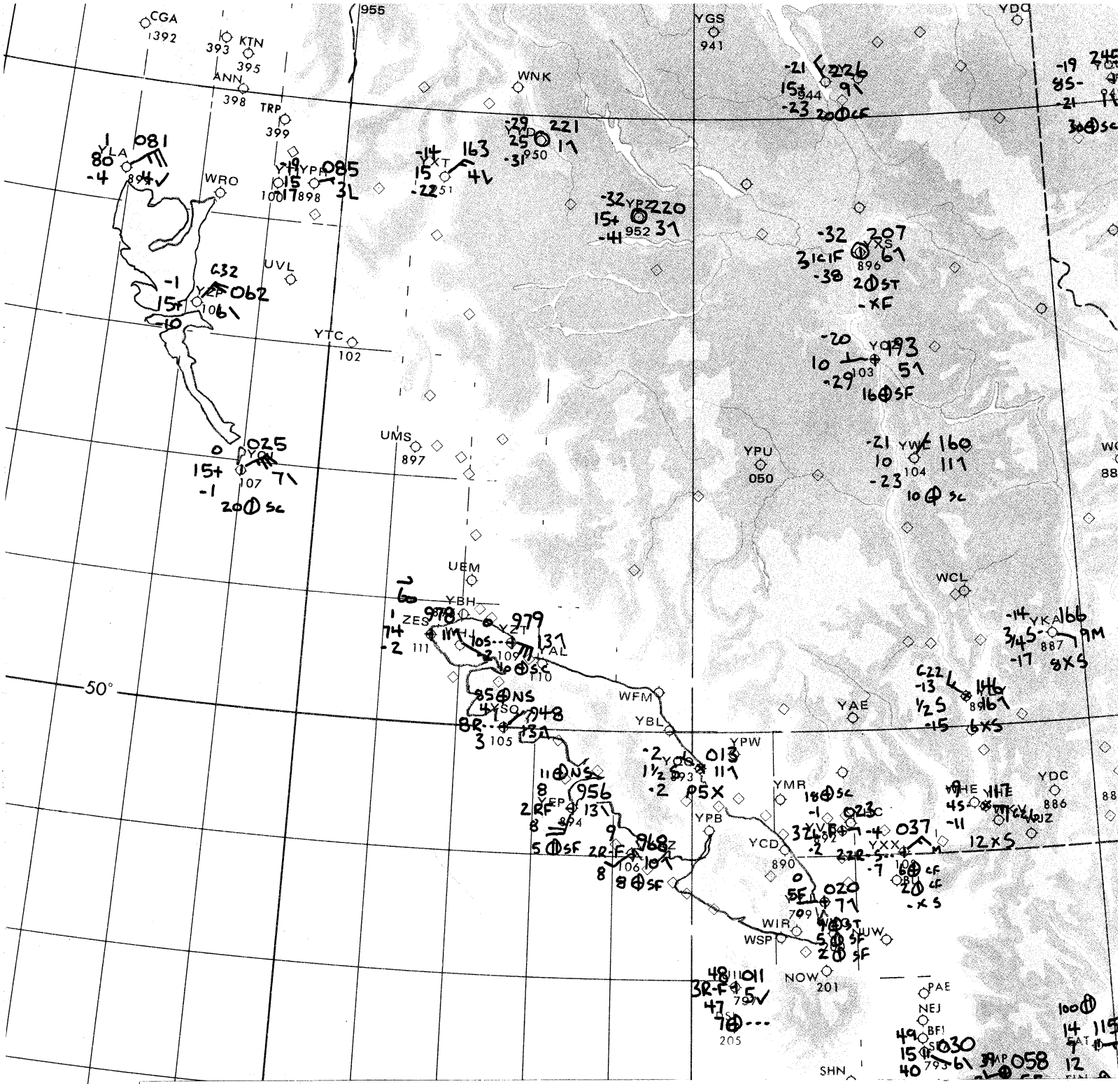

Attachment I



Attachment III

SURFACE PLOTTED CHART

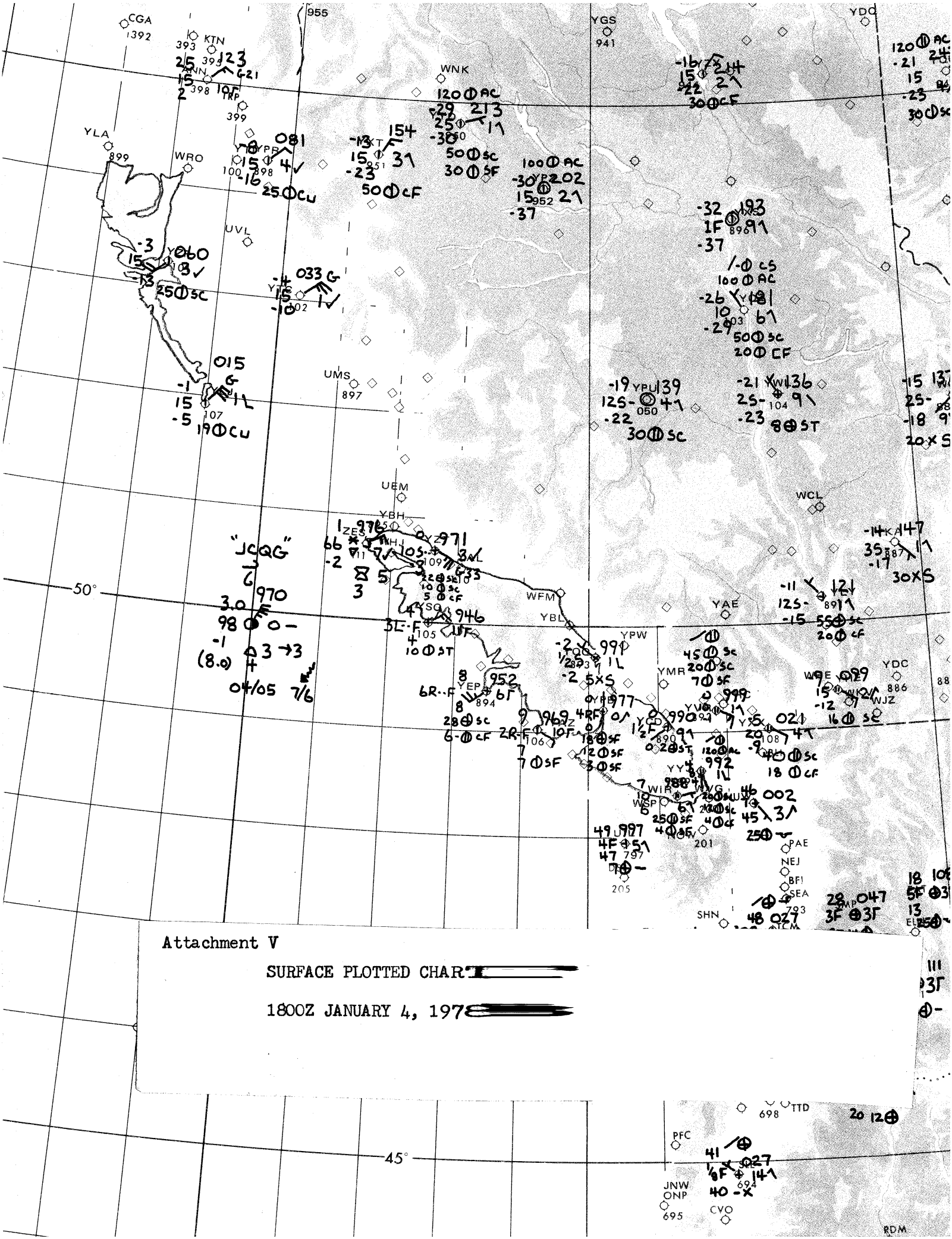
0600Z JANUARY 4, 1978



Attachment IV

SURFACE PLOTTED CHART

1200Z JANUARY 4, 1978



Attachment V

SURFACE PLOTTED CHART

1800Z JANUARY 4, 197