



# PACIFIC REGION TECHNICAL NOTES

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Pacific Storm of October 11-12, 1984

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## Introduction

Friday October 12, 1984 proved a fateful day for numerous West Coast fishermen. A rapidly intensifying low pressure area sped towards the coast packing Storm Force winds. This resulted in the loss of several fishing boats and more importantly, the loss of five lives.

This report will attempt to examine the sequence of events leading up to the disaster and attempt to examine some of the meteorological factors influencing the development.

## The Sequence of Events (Wednesday Oct. 10 - Friday Oct. 12)

### Wednesday Morning (October 10):

Early Wednesday morning at 10/1200 GMT the system was near the dateline (180°W).

The 48 hour numerical model prognoses based on 10/1200Z data were at odds. The U.S. spectral and the CMC spectral progs both tracked the system towards the B.C. Coast and deepened it to 976 mbs (Figure 1). The 48 hour LFM prog showed a ridge over the coast.

### Wednesday Evening (October 10):

The cirrus shield ahead of the system was evident on the western edge of the satellite picture. The cloud mass was the remnants of typhoon OGDEN, which had now become extratropical and was caught up in the Westerlies.

### Wednesday Night (October 10/11):

The satellite imagery still showed an amorphous "blob" of cloud approaching, however, the water vapour image showed clearly the presence of two streams. This confirmed the presence of warm subtropical air in the system and was a clue that this system might be different from the usual, having the potential for significant development.

The 36 hour CMC prog for Friday morning (12/1200Z) showed a 977 mb centre near Cape St. James (Figure 2). At 11/0000Z a bogus point was entered on the CMC model at 43 N 155 W.

The U.S. spectral backed off on development showing a 984 mb centre farther

to the northwest. The LFM run fell in line with the U.S. spectral. The PWC prog for 12/1200Z based on this model run showed a 970 mb centre near 50 N 140 W (Figure 3).

Thursday Morning (October 11):

At 5:00 a.m., Gale Warnings were issued for all northern B.C. coastal areas and the off-shore areas calling for southeast 20 to 40 knots developing overnight.

On the 11/1800Z surface analysis (Figure 4) there were 5 ships within a 300 nmi. radius of the low centre. These ships reported strong falling pressures as follows: KLHZ falling 50 (i.e. 5 mbs/3 hrs) and UZUA falling 70.

On the satellite imagery the cirrus with the system had pushed northward indicating building of the ridge ahead of the system. The dry "slot" was now evident.

The model run based on 11/1200Z data proved very interesting. The CMC spectral 24 hour prog for 12/1200Z backed off on development showing a 987 mb low at 53 N 141 W (Figure 5).

The U.S. Spectral continued to back off on development showing a 995 mb low at 50 N 140 W.

The LFM was similar to the previous run showing a 982 mb low near 54 N 141 W. The PWC prog for 12/1200Z, based on this model run, showed a 988 mb centre near 53 N 141 W (Figure 6). The forecasters had also backed-off.

Thursday Afternoon (October 11):

Gale Warnings were extended to southern coastal areas at 7 p.m. (12/0200Z). The 7:15 p.m. forecast for West Coast Vancouver Island called for winds increasing to southeast 30 to 40 knots Friday afternoon.

Thursday Evening (October 11):

The low was now into the developing stages. The 12/0000Z surface analysis showed a 980 mb centre at 47 N 142 W (Figure 7).

On the satellite imagery, the cirrus edge was now within 100 nmi. of the coast, a speed of about 35 knots in the past 6 hours. The following cold trough was more evident now. The structure of the system was not classical.

Another factor leading to strong pressure gradients over the coast was the rising pressures over British Columbia. These were due to cold air moving in over the province as the cold trough ahead of the system was forced inland.

The buoy reports for 12/0300Z (8 p.m. PDT) were as follows: 6004 falling 55, 6005 falling 59, 6002 falling 35.

By this time it was apparent that rapid intensification was taking place.

The 12/0600Z surface analysis showed a 964 mb centre at 49 N 137 W (Figure 9). The buoys reported as follows: 6004 falling 84, 6005 falling 83, 6002 falling 32.

The CMC 12 hr prog valid 12/1200Z was similar to the previous 24 hr prog showing a 986 mb low centre near 52 N 139 W (Figure 9). The U.S. spectral 12 hr prog showed a 985 mb low centre near 52 N 137 W, 10 mb deeper and closer to the coast than the previous 24 hr prog.

The LFM had a 992 mb centre at 50 N 135 W.

Gale Warnings were upgraded to Storm Warnings at 11 p.m. Thursday (12/0600Z) for all marine areas except Georgia Strait and Juan de Fuca Strait.

A Gale Warning was in effect for Georgia Strait. The forecast for West Coast Vancouver Island called for winds increasing to southeast 40 to 50 knots with higher gusts Friday morning.

At 11:30 p.m. Thursday a Gale Warning was issued for Juan de Fuca Strait.

Thursday Night/Friday Morning (October 12):

Overnight the storm continued to intensify. At 3 a.m. Friday, Storm Force winds were first reported on the coast. By 12/1200Z (5 a.m. Friday) the surface analysis showed a 958 mb centre near 50° N 135° W (Figure 10).

The satellite imagery now indicated a more classical structure with the storm in the fully developed stage.

Storm Warnings were continued on the 5 a.m. Friday forecast (12/1200Z).

#### Extraneous Factors Affecting the Forecast Production

The GOES satellite imagery was of less value than in the past due to the satellite position over 98° W. Features on the satellite picture become of marginal use west of 150 W and of no significant value west of 160 W.

It should also be noted that GOES 1, situated over 128 W was no longer producing visual imagery. The sensor malfunctioned on the previous weekend (October 7-8).

#### Summary

The situation leading to the development of this storm appeared to be unusual in several respects.

The storm contained the remnants of Typhoon OGDEN. Very warm moist air was present in the system. This likely resulted in dramatic latent heat release and strong baroclinicity - both factors supporting strong development.

The satellite imagery reflected the warm temperatures. The signature of the storm appeared to be different from that of a classic Pacific low pressure area. It was not obvious from the imagery that major intensification was taking place until it was well underway.

Two of the three numerical models presented an intensifying storm in the long range but the analysis was questionable. The 5 a.m. Thursday Marine Forecast issued a Gale Warning for the offshore marine areas and all North Coastal marine areas.

On the later model runs the numerical models backed off on intensification of the storm. There was a reasonable data field although some of the ship and buoy reports conflicted. The Gale Warning was extended to South Coastal Waters at 7 p.m. The forecast called for southeast gales developing over West Coast Vancouver Island, Friday afternoon.

On Thursday evening the stationary buoy reports made it apparent that major storm development was underway. The satellite imagery confirmed major intensification. At 11 p.m. Thursday, Gale Warnings were upgraded to Storm Warnings for all coastal waters except Georgia Strait and Juan de Fuca Strait. A Gale Warning was issued for Juan de Fuca Strait at 11:30 p.m. The new numerical model runs based on 12/0000Z data (Thursday afternoon) continued to grossly underestimate the amount of intensification.

The storm continued to intensify overnight reaching its maximum depth estimated at 958 mb early Friday morning at 12/1200Z.

#### Points to Note

The models did not handle the explosive deepening well. Central pressure of the low was grossly underestimated. The models did not appear to handle well the latent heat release of tropical moisture entrained into the system.

Every piece of data must be weighed carefully - especially in data sparse regions. The data from the stationary buoys positioned about 275 miles off the coast were absolutely-crucial in the determination of explosive deepening.