



PACIFIC REGION TECHNICAL NOTES

83-017

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Mountain Forecast Verification - Mountaintop Winds 1982/83

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INTRODUCTION

The difficulty in verifying upper air parameters was discussed in a previous paper in this series (PRTN 83-016). Basically this problem relates to the fact that radiosonde data is available at only 5 point sources. These points are frequently not representative of conditions over the forecast areas.

THE MOUNTAINTOP WINDS

Winds in the mountain forecast represent the free-air flow near mountaintop elevations. On the coast this is considered to be near 850 mb. In the interior it is closer to 700 mb. Winds reported at the radiosonde stations (see Figure 1) were extracted on a daily basis for the period December 1982 to March 1983. Speeds were converted to kilometres per hour and compared to the wind forecasts of the early morning mountain forecast guidance package transmitted under the forecast headers FPCN50 and FPCN51.

VERIFICATION

For ease of manipulation, wind speeds and directions were handled separately. Each wind forecast speed and direction for today (Day-1) and tomorrow (Day-2) was categorized as falling into one of three classes. These classes will be referred to as hits, near misses, and misses. The definitions are tabulated in Figure 2.

THE RESULTS

A summary of the results is presented in Figure 3. It is seen that for wind direction on Day-1 the percentage of hits varies from 31% at Port Hardy to 44% at Vernon. The mean for all 5 sites is 38.1%. By including the "near misses", the mean success rate is increased to 83%. On Day-2 the percentage of hits is lower at all sites except Prince George where an increase of just over 2% is seen. The mean success rate (hits plus near misses) for Day-2 is 79.2%.

Looking at wind speeds, the Day-1 percentage of hits varies from 40% at Vernon to 52% at Port Hardy. It is interesting to note that the site with the highest score for direction has the lowest for speed - and vice-versa.

The mean percentage of hits for wind speed on Day-1 is 45.2%. Including the "near misses", a mean success rate of 80% is achieved. The Day-2 figures show a success rate of 77.4%.

CONCLUSIONS

A caution must be repeated here about the representative quality of the specific point radiosonde data when used to verify wind flow over the mountain forecast areas. Frontal discontinuities and sharp troughs are a fact of life over the winter months.

The figures presented here indicate a satisfactory level of skill in forecasting upper winds. The Day-1 success rate of 80-83% lowers only marginally to 77-79% on Day-2. Anomalies where the Day-2 percentage of hits is fractionally higher than the Day-1, are hard to explain. These show up at Prince George (direction and speed), Vernon (speed only), and Quillayute (speed only). In fact, differences of one or two percentage points are not really meaningful and perhaps merely reflect the shortcomings of the verification system.

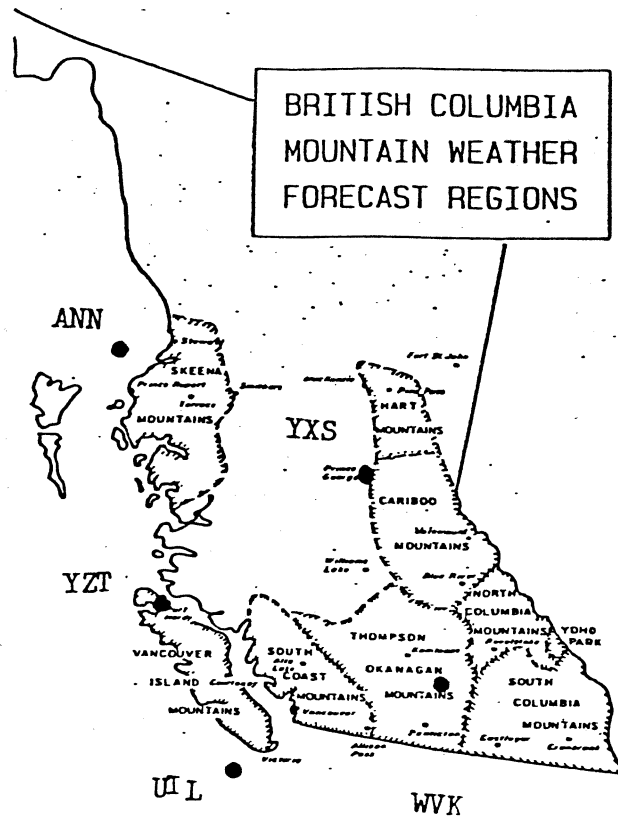
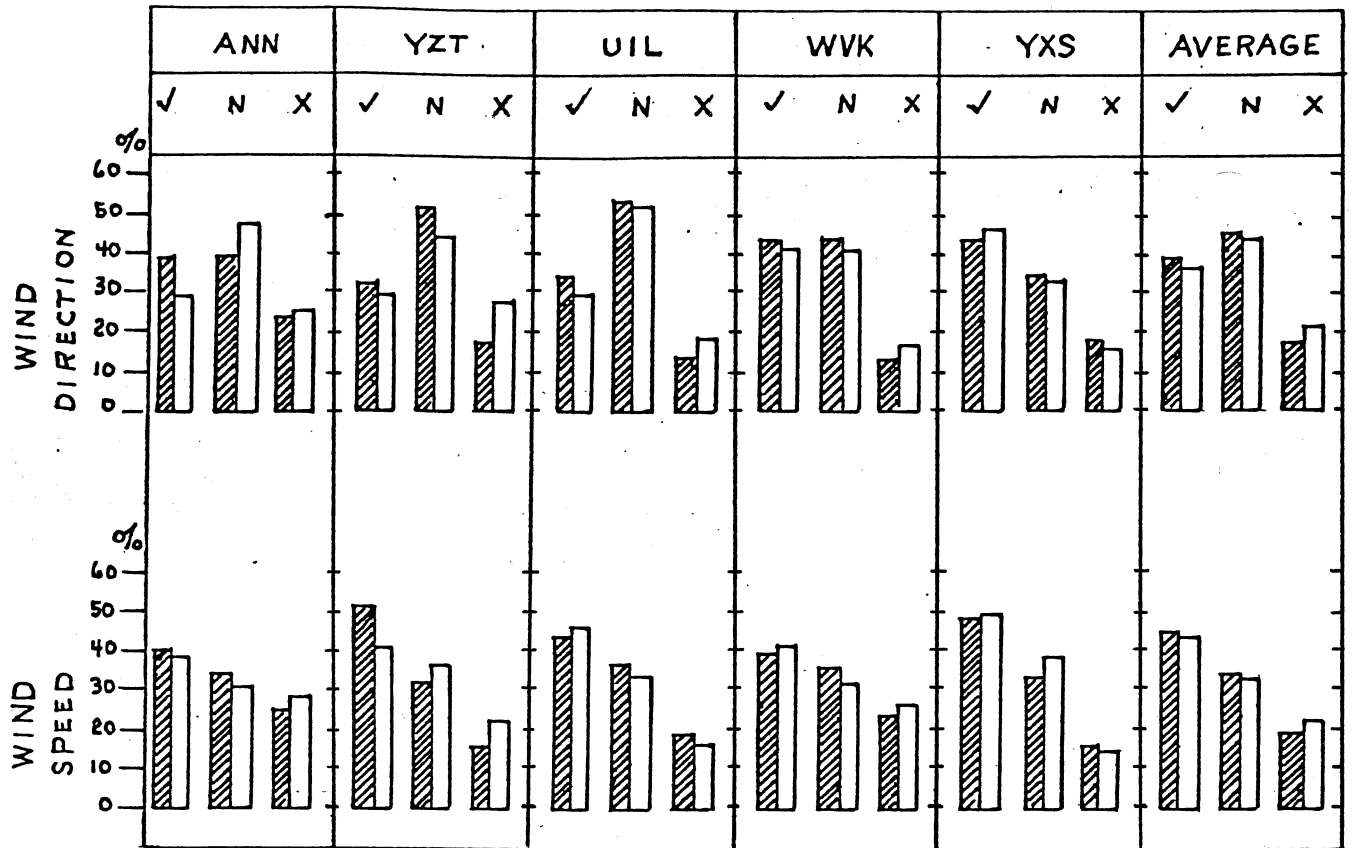


Figure 1.
Map showing the mountain forecast regions and the location of the five radiosonde sites.

	DIRECTION	SPEED
HIT	within $22\frac{1}{2}^{\circ}$	within 10 km/hr
NEAR MISS	$22\frac{1}{2}^{\circ}$ - 45°	11 to 25 km/hr
MISS	beyond 45°	out by more than 25 km/hr

Figure 2. The verification categories for wind.



✓ HIT
 N NEAR MISS
 X MISS

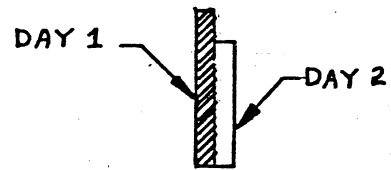


Figure 3

Mountain Top Wind Verification
 Déc. 1982 to Mar. 1983