# PACIFIC REGION TECHNICAL NOTES

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## Verification of POP over the North Coast of British Columbia


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### INTRODUCTION

The geographic area referred to as the North Coast is most often split up into two forecast regions: the Queen Charlotte Islands and the Northern Mainland. It would have been better to have a verification site from each area, but only one was chosen. Prince Rupert, located along the coast, of the Northern Mainland was chosen to represent both regions. However there are timing differences in the onset of precipitation between the Queen Charlottes and the Northern Mainland. Another site over the Northern Mainland which should also have been considered is Terrace because the precipitation regimes can be quite different. The verification of three locations instead of one would have been more meaningful, but the time available to extract and prepare verification results was a factor.

### VERIFICATION METHOD

The scoring method is identical to the one chosen in the previous Pacific Region Technical Notes (83-019 and 83-020). The Brier score or mean square error is divided into the reliability and resolution (or sharpness) components. The reliability error varies from 0 to 1, while the resolution error varies from 0 to .25. The latter term is dependent on only the observed frequency of precipitation in each of the eleven 10% categories which yields a weighted mean resolution (referred to as sharpness in the diagram) error. The forecaster should be striving to have the lowest overall error, however zero, although technically possible, is not likely achievable. For example, if the forecaster generated perfectly reliable forecasts of 10% and 90% always, then the error due to sharpness would be .09. Such forecast results would be considered to be excellent on a subjective basis, therefore an actual score near .10 should be considered extremely good.

Forecast skill (1 being perfect) is being measured against a probability forecast based on climatology and also against making a random precipitation forecast by a toss of a coin. The latter is a measure of a forecast being made "in the dark" with no knowledge of the atmospheric condition, while the climatological predictions should represent a more knowledgeable approach to POP forecasting.

### RESULTS

Figure 1 and 2 illustrate the forecast and guidance scores for Sept.-Nov. and Dec.-Feb. forecast periods. The section of the circle cut away

represents the Brier score for that particular time period. This section is also split into the two error components: reliability and sharpness (resolution). The circles on the top of each of these figures represent the PWC results, and the corresponding results for the guidance are given below.

Figure 1 compares the forecasts for September to November 1982. The forecasts were issued at 5 a.m., while the guidance was generated from the 00Z CMC operational run (approximately 12 hours earlier). Both the forecast and the guidance demonstrates skill over all three forecast periods, but the skill levels for the guidance remains generally around 40% while the subjective skill falls from 35 to 22%. In all cases the objective skill is better than that of the forecast. The guidance's reliability appears extremely good (better than the forecasters) for Today and Tomorrow, but appears poor in the Tonight period. However, because the sharpness error falls off by nearly half during the Tonight period, the guidance still shows the best skill during that period. If the forecasters were producing perfectly reliable forecasts, the forecast distribution suggests that the sharpness error would range from .13 for Today to .16 for Tomorrow. This would represent an approximate 30% improvement in the level of skill. On the other hand, if the guidance were yielding perfectly reliable forecasts, the sharpness error would increase to .16-.18, which is a 30% reduction in skill.

Figure 2 compares the forecast guidance for the December to February period. The findings were very similar to the results discussed above. Overall, the level of skill was much lower than those achieved in the Sept.-Nov. period. Except in the Today period, the objective guidance demonstrated more skill (positive in all 3 periods). The subjective forecast verification dropped very markedly over the Tonight period showing negative skill while positive skill was achieved in the Today and Tomorrow periods. Reliability errors between the forecast and the guidance were very similar, while the sharpness errors were marginally better for the guidance. For perfectly reliable forecasts, the sharpness errors were about the same as in the previous 3 month period indicating skill levels would improve dramatically for both the PWC forecasts and the guidance forecasts.

## SUMMARY

The verification results indicate that the objective guidance forecasts are showing skill, with the forecasters only doing better in the Today period. This result was very similar to the one observed for the South Coast (PRTN 83-019), which supports the idea of using the guidance as the initial forecast and making adjustments where necessary.

Overall, it appears that the forecasters are doing well in predicting POP's for Today, particularly since the skill level for Prince Rupert would be around 55% (based on a perfect Brier score of .1).

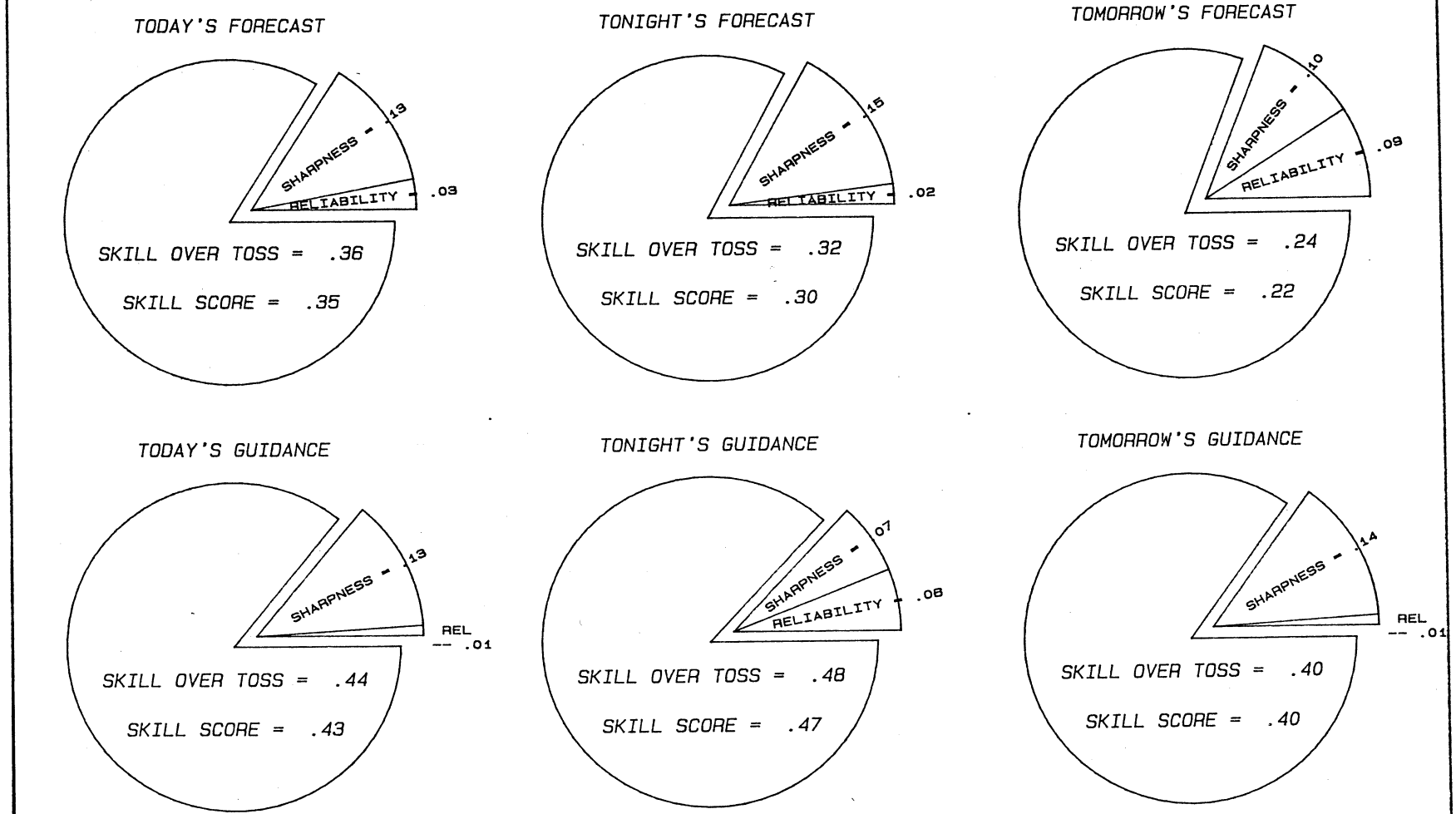
## REFERENCES

Grimes, D., 1983, Verification of POP over the South Coast of British Columbia, PRTN 83-019.

Grimes, D., 1983, Verification of POP over the Southern Interior of British Columbia, PRTN 83-020.

# 5AM POP...PRINCE RUPERT...SEPT-NOV '82

*Figure 1*



# 5AM POP...PRINCE RUPERT...DEC-FEB '83

*Figure 2*