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LOCAL AVIATION WEATHER HAZARDS: HOW METEOROLOGISTS LEARN FROM PILOTS

John E. Mullock * and Kent A Johnson
Meteorological Service of Canada
Kelowna British Columbia

1. INTRODUCTION

In March 2001, the Meteorological Service of Canada was contracted by NAV CANADA to study and compile local aviation weather hazards and effects across all of Canada, from coast-to-coast, north to south. These manuals were to be similar in format to the publication “Aviation Weather Hazards of British Columbia and the Yukon” (Johnson and Mullock, 1996). When completed, the project will have produced six aviation weather manuals, corresponding to the Canadian Graphic Area Forecast (GFA) regions. These manuals provide insight on specific weather effects and patterns within each GFA area. The first of these manuals was completed for Atlantic Canada in the autumn of 2001, a second manual for the Canadian Prairies is in its final proofreading stage and two other manuals for Ontario-Quebec and British Columbia are approaching completion. The impetus for this project as well as the steps followed are described by Robichaud (et al., 2002).

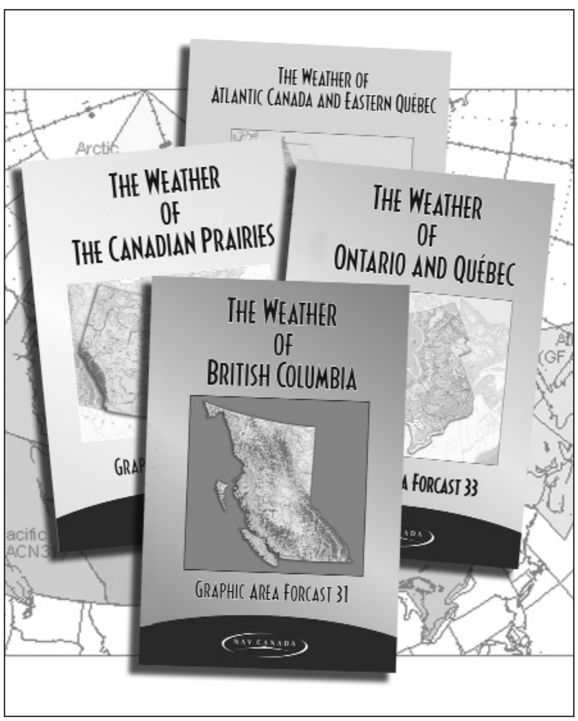

Fig. 1 Covers from several of the LAKP manuals

* Corresponding author address: John Mullock, Mountain Weather Centre, Meteorological Service of Canada, 3140 College Way, Kelowna, BC V1V 1V9; e-mail: John.Mullock@ec.gc.ca

2. LEARNING LOCAL AVIATION METEOROLOGY

Meteorologists are not generally the best source of local scale weather information. Particularly in Canada, operational aviation forecasters have far too large an area of responsibility to render detailed local knowledge possible. Pilots, however, who regularly encounter local weather hazards, tend to be much more knowledgeable on local weather, specific to their region.

During the interview process for the Local Area Knowledge Project (LAKP) weather research, meteorologists travel to various airports as necessary to glean knowledge across all Canadian airspace. Much of this information gathered is not surprising to aviation forecasters while some details require more thought in order to comprehend the phenomena. As the research continues, a feedback process is established. When a certain phenomenon is reported, the meteorologist spends some time thinking as to the probable scientific explanation. Subsequently, speculation as to similar processes in other locations is verified (or refuted) in discussions with pilots in other regions.

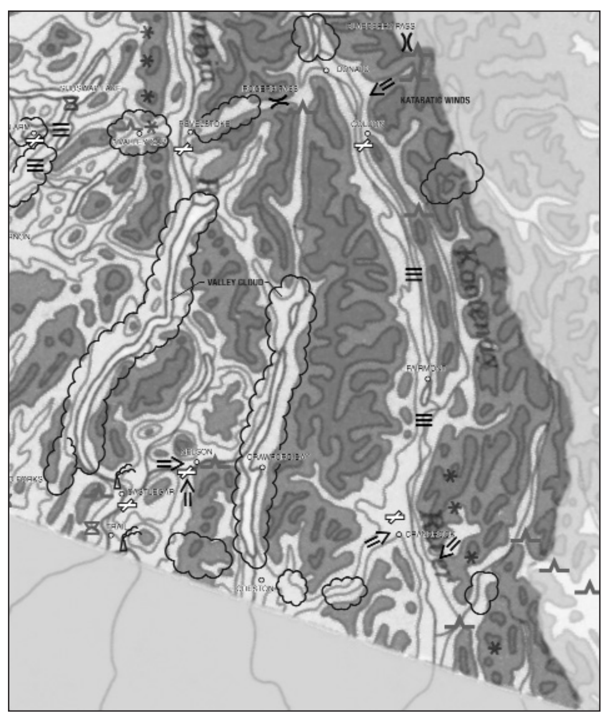

Fig. 2 Areas of weather identified from interviews. Of interest is the lack of reports of significant lee turbulence over the mountains of southeastern BC. The simplest explnation for this development is destructive interference from the various mountain ranges.

3. UNDERSTANDING LOCAL AVIATION METEOROLOGY

The next step, once local aviation meteorology has been learned, is to develop an understanding, which can be used for ongoing training of aviation forecasters. This portion of the project in its infancy and will begin formally once the LAKP Aviation Manuals have been completed.

In most cases, reported aviation weather phenomena can be easily explained meteorologically. This information is developed and shared with forecasters. Other phenomena are not as easily understood either conceptually or mathematically. In these cases, additional development efforts must be completed in order to be able to improve both diagnoses and forecasts. Once a comprehensive explanation of a certain phenomenon has been established, the same conceptualization can often be applied to other regions. Further, an understanding of local aviation weather can provide benefits for other types of local meteorology. This component does, however, require additional development work beyond that of the NAV CANADA funded aviation manual development.

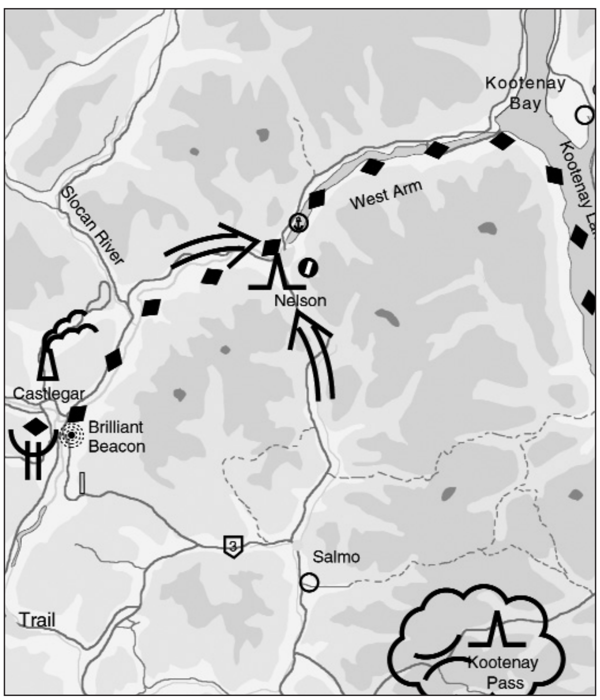

Fig. 3 Icing near Castlegar. Pilots report some of the worst icing ever experienced between 10,000 and 16,000 feet over the Brilliant Beacon just to the north of the Castlegar Airport.

4. SUMMARY

From experience, it is clear that meteorologists can learn a considerable amount from pilots in terms of local aviation weather. In particular, safe Visual Flight Rules aviation activity requires an intimate knowledge of small-scale weather knowledge, well beyond that required of an operational meteorologist. Once the local weather aspects are known, the opportunity exists for meteorologists to gain an understanding of the underlying processes and thereby contribute to higher quality, more accurate aviation forecasts.

4. REFERENCES

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Robichaud, B.E., Mullock, J.E. & Johnson, K.A. (2002). Local Aviation Weather Hazards of Atlantic Canada. American Meteorological Society Conference on Aviation, Range and Aerospace Meteorology: Portland, OR.

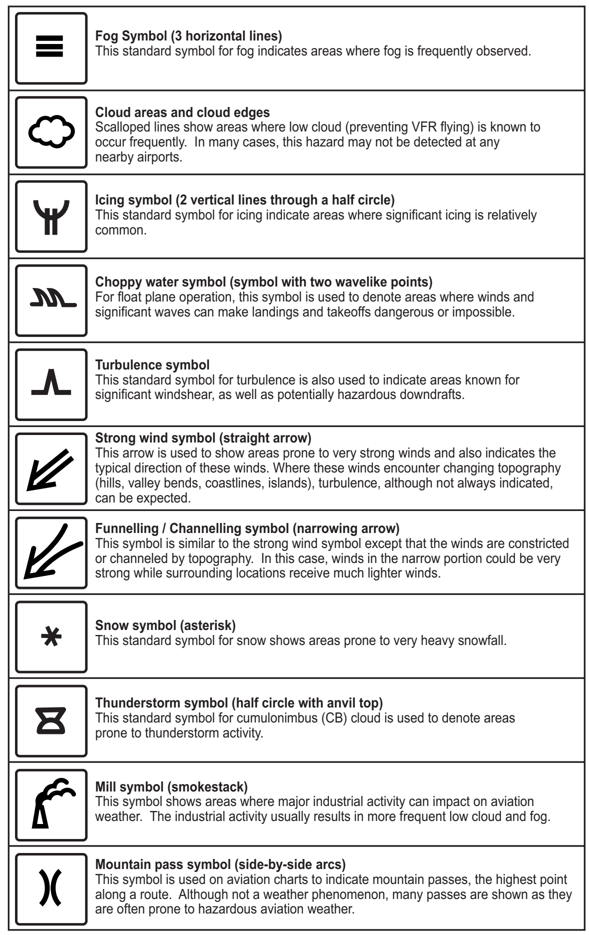

Fig. 4 Symbols used in this manual