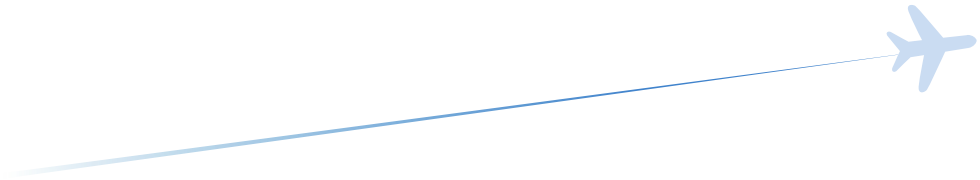

Manuscript "Predictability of snowfall as function of flow direction at certain airports"

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PNOWWA

PROBABILISTIC NOWCASTING OF WINTER WEATHER FOR AIRPORTS

This document is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 699221 under European Union's Horizon 2020 research and innovation programme.

Abstract

This document includes the manuscript concerning Predictability of snowfall as function of flow direction at certain airports.

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Abbreviations

ATM	Air Traffic Management
FAA	Finnish Aeronautical Association
PNOWWA	Probabilistic Nowcasting of Winter Weather for Airports

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None

Introduction

PNOWWA - Probabilistic Nowcasting of Winter Weather for Airports – is a research project developing methods to support the Air Traffic Management (ATM) challenged by winter weather using weather radars as the main instrument observing the atmosphere. The effect of open water areas, namely large lakes and the Baltic Sea, produce particular type of snowstorms called *lake effect snow*.

The manuscript concerns the occurrence of such phenomena near the airports of Helsinki, Stockholm, Tallinn and Lappeenranta, its typical characteristics and the challenges for both radars as an instrument and extrapolation as a method. It also touches the other low-level phenomena creating snowfall: the artificial snow systems at skiing centres.

The manuscript is submitted to Ilmailu, which is the journal of Finnish Aeronautical Association (FAA) is the national and central organization of sport aviation in Finland. Hence it also forms part of the outreach to sport aviation community.

The article is published on Ilmailu webpages. First the article is only available for subscribers of the eprinted version on 13th of March, and in printed version in May 2018. After publication and an embargo to be agreed with the journal, a scanned version will be added to PNOWWA website.

1 Summary of the Manuscript

Snow cannons and sea monsters – the lake effect snow. *Elena Saltikoff*

The article is in Finnish – the main points are described below.

It is well known among pilots in Finland, that the equipment used in ski centres for artificial snow, the snow cannons, is sometimes responsible for visibility reductions at least at airports of Rovaniemi and Kuopio, if wind direction is favourable. Confusingly enough, the Swedish media is using the term “snow cannon” for a completely different phenomena, namely the lake effect sea.

Lake-effect snow is produced during cooler atmospheric conditions when a cold air mass moves across long expanses of warmer lake water, warming the lower layer of air which picks up water vapor from the lake, rises up through the colder air above, freezes and is deposited on the leeward (downwind) shores. The shape and intensity of this phenomena is effected by the fetch over the open sea, the ice coverage and wind and temperature (as seen in case study 1, an event widely reported in media).

Lake effect snow storms move differently from other storms. They stay at same location until either the wind turns or sea freezes. In USA, they cause around 3m snow in certain towns.

Lake effect snow is very shallow, only a few kilometres, while in our climate the summer thunderstorms are 15-20 km, and even frontal precipitation 5-10 km. Hence it is a challenge for weather radars to observe (as seen in case study 2).

2 Conclusions

The article was submitted in Ilmailu. The article is published on Ilmailu webpages. First the article is only available for subscribers of the eprinted version on 13th of March, and in printed version in May 2018. After publication the manuscript will released and published in the frame of the PNOWWA project either in PNOWWA webpage or by providing the direct link to the publication.

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1. Finnish Aeronautical Association (FAA) https://www.ilmailuliitto.fi/briefly-in-english/