**IMPROVING THE USE OF RADIOSONDE AND SATELLITE-DERIVED WINDS**

**AT THE METEOROLOGICAL SERVICE OF CANADA**

Stéphane Laroche, Judy St-James, Iriola Mati and Réal Sarrazin

Meteorological Service of Canada

The extraction of more information from atmospheric observations available for operational numerical weather predictions represents a continuous and challenging research effort. In this talk we will give an overview of recent works on radiosonde and AMV data conducted at the Meteorological Service of Canada (MSC).

Radiosonde data are available in alphanumeric code, and more recently in Binary Universal Form for the Representation of meteorological data (BUFR) code. The latter can include much higher vertical resolution data with the position and time (4D) of observations which are not available in the alphanumeric codes. Since 2005, there has been a progressive transition to the BUFR code. However, as of the end of 2013, only 40% of the upper-air stations transmit data in both BUFR and alphanumeric codes. As a result, NWP centers must establish a strategy to start using the information in BUFR code from part of the stations while still supporting the alphanumeric code for all the others. Until now, the horizontal balloon drift of radiosondes by the wind has been ignored in both the data assimilation and verification systems of MSC. When the 4D position of radiosonde observations is not available, this information can be evaluated from the horizontal wind components and a representative elapsed ascent time profile. Such a pre-processing step has been implemented at MSC for radiosonde reports received in alphanumeric code, allowing these observations to be treated like those received in BUFR code. Thus, the 4D position of all soundings can be taken into account in the assimilation. Forecast impact of 4D radiosonde data has been examined with the global deterministic forecast system. For the winter season, the analysis and short-range forecast errors over the Northern Hemisphere are significantly reduced in the stratosphere and upper troposphere, especially for the wind field.

The work on AMVs has just been initiated. Our first objective is to examine the quality of those over land from the geostationary satellites in the Northern Hemisphere extra-tropics. AMVs located north of 30N over land are currently not assimilated in the MSC forecast systems, but could be beneficial where data from other observing systems are sparse, as over some regions of Canada and Russia. The validation of these AMVs will benefit from improved collation based 4D radiosonde data. This evaluation and other validation statistics pertaining to AMVs will be presented at the meeting.