Geophysical Research Abstracts, Vol. 9, 09927, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09927

Winter precipitation studies using weather radar

D. Hudak and P. Joe

Science and Technology Branch, Environment Canada, Toronto, Canada

(David.Hudak@ec.gc.ca / 01-905-833-3896)

Winter precipitation evolves from a complex interaction among microphysical process. These include depositional growth, accretion, aggregation, secondary ice production, melting and re-freezing. There has been significant progress with dual polarization and multi-frequency techniques in the qualitative identification of these precipitation generation areas using weather radar. However, further advances are required in order to use information derived from radar for quantitative applications. These include the validation of sub-zero microphysics in numerical models, the assimilation of radar measurements directly into numerical models and the retrieval of geophysical parameters from radar for use in cold season hydrology.

Winter storms have been studied in the Great Lakes area of Canada for the past two years to address these topics. This geographic area lies along the winter storm track to the lee of the Rockies, and is also affected by local lake enhanced snow squall due the proximity of the open waters of the Great Lakes. Early results from this field project will be presented.

The suite of radars included both ground-based and aircraft radars. In-situ validation of precipitation intensity and type was provided by ground based microwave (passive radiometers and active XBand POSS), optical sensors and particle probes onboard a cloud physics research aircraft. Examples of space-based products from CloudSat data will also be shown.

The advantages of the various radar systems at characterizing winter precipitation will be described. Gaps in our knowledge in dealing with variability in the relationship among particle size, shape, density and dielectric properties will be discussed. Recent approaches to overcoming some of these limitations on the quantitative use of radar measurements in winter applications will be presented.