Review of Microphysics and dynamics of snowfall associated to a warmconveyor belt over Korea", by Josué Gehring, Annika Oertel, Étienne Vignon, Nicolas Jullien, Nikola Besic, and Alexis Berne, https://doi.org/10.5194/acp-2019-1173

Overview

This very interesting and well written article discusses their interpretation of the microphysics associated with snowfall associated with a warm conveyor belt that occurred over Korea on 28 February 2018. Their interpretations are based on air trajectories using the Integrated Forecast System Model, scanning X-band Doppler dual-polarization radar, vertically pointing W-band Doppler radar combined with an integrated 89 GHz radiometer, and the multi-angle snowflake camera located at the ground.

General Comments

The interpretations of the microphysics of ice particle growth in this storm system are based on air trajectories, scanning polarization radar data and vertically pointing cloud radar data, and the MASC instrument. At first, I thought that it would be difficult to interpret the microphysics (habits, etc), nucleation (secondary ice production) and growth processes within this storm system without the use of in-situ (aircraft or some type of balloon-borne device). I was unexpectedly surprised to find that indeed they were able to conduct this type of analysis and justify their analysis. I therefore strongly support the conclusions reached in their study.

Specific Comments

Page 3, line 9: IFS model: A reference(s) is needed, and a brief description is desirable

Page 6, line 20: 5 cm/s seems too low to. maintain 100% RH in the presence of both ice and snow.

Page 7, line 15: Figure 6 is terrific. It would be just great to use a $V_D=Z_e$ relationship for snow to get a rough estimate of the air vertical velocity. If you want suggestions as to how to best do this, you can contact this reviewer (identified at the end of this review).

Page 7, 25: KH waves need a stable lapse rate. You mention later that the lapse rate supports KH waves, but you could mention it here. A suggestion would be to discuss the stability of the lapse rate from the sounding through the vertical column of the cloud.

General Comment: I feel that you are placing too much accuracy on the measurements of the RH and thus RHi-see for example Page 9, lines 9-11.

Page 8, line 26, Fig 8: What was the collection temperature?

Technical Corrections

Page 4, line 2: national>National

Page 6, line 7: probably should number this figure (6) as (5).

Page 6, line 29: Fig. 5>Fig. 6

Page 7, 11: Micvrophysial>Microphysical

Page 8, line 31: "support" to "supports"

Andy Heymsfield, NCAR