Processing of Doppler radar radial winds for data assimilation

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Doppler radar measures one component of the wind vector, that is, the radar radial component. Variational data assimilation provides a framework to interpret the radar radial wind data. This consists of modelling the radar measurement with the available Numerical Weather Prediction (NWP) model variables. The amount of raw measurements is however enormous, and some preprocessing is needed before using the radial wind observations in data assimilation. One solution is to calculate spatial averages, so called superobservations (SOs), from the raw data. SOs are smoother than the raw observations and better represent the model resolution. Another, but not as good possibility is to use data thinning, i.e. to use raw observations with sparse resolution.

A set of one month experiments have been performed in order to study the fit of the SOs to the model counterparts. Also the thinned raw data is studied. The aim of the experiments is to define the optimal resolution for the SO generation from the NWP model point of view. The results indicate that when the thinned raw data is used, the errors in individual observations can be quite large. SO generation averages out the random errors quite effectively. The best fit between the SOs and model counterparts is obtained when the SO resolution is somewhat higher than the model gridspacing.