**OBSERVING SYSTEM EXPERIMENTS OF MTSAT-1R RAPID SCAN AMV USING THE JMA OPERATIONAL MESO-SCALE aND LOCAL NWP SYSTEM in 2011 AND 2012**

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Abstract

High resolution winds are increasing importance for NWP centres to assimilate them in high resolution NWP system. However, there are no standout solutions for assimilation of high resolution winds. Meteorological Satellite　Centre　of　Japan　Meteorological　Agency　(JMA/MSC)　carried　out　operational　Rapid　Scan　observation by MTSAT-1R in 2011 and 2012 summer, and produced MTSAT-1R Rapid Scan Atmospheric Motion Vectors (RS-AMVs) from the satellite images with 5 minute interval. As RS-AMVs which are one of the high resolution winds are derived from short satellite image intervals, they can catch many short lifetime atmospheric patterns in wind fields. Therefore, a more accurate analysis around mesoscale disturbance is expected by using RS-AMVs in the NWP system. Aiming to use the RS-AMVs in JMA operational Meso-Scale NWP system (4D-Var data assimilation system: Horizontal Res.: Outer/Inner/Layers: 5 km/15 km/50 layers), two quality control systems; two-step thinning scheme and super-observation scheme; have been developed since 2008. And these two schemes have been compared about forecast accuracy through observing system experiments (OSEs). The two-step thinning scheme is a method which thins to a resolution of 100 km (one AMV in each 1 deg. x 1 deg. x 100 hPa box in the hourly time window) after 200-km thinning (one AMV in each 2 deg. x 2 deg. x 100 hPa box in the 3-hour time window) of other AMVs. The other method, super-observation scheme, is a method which uses an average of AMVs (RS-AMVs and other AMVs) with 100 or 200 km intervals in hourly time window. Averaging of AMVs is carried out about time, level, space, wind directions and speeds.

Ongoingly we performed OSEs for MTSAT-1R RS-AMVs in both 2011 and 2012 summer using the JMA operational Meso-Scale NWP system. RMSEs of forecasts in 2011 summer against radiosonde observations in Japan were slightly reduced same as results of OSEs in the 11th International Wind Workshop. In case of typhoon Ma-on hitting Shikoku Island and bringing heavy rainfall in Niigata and Fukushima prefectures, moderate precipitation forecasts was improved in 33-hours forecast with 100km super-observation scheme. But in other cases of typhoon Muifa passing Okinawa Island and bringing thunderstorm by atmospheric instability, there was degradation of precipitation forecasts in 33-hours forecast with the super-observation scheme. Detailed results of OSEs will be presented in the workshop.

Additional OSEs for MTSAT-1R RS-AMVs also have been performed using the high resolution operational Local NWP system which has started on August 2012. Its initial condition is generated from a 3D-Var rapid update cycle at a resolution of 5 km. Its model has the 2 km horizontal resolution and 60 vertical layers. We also examined a forecast accuracy relationship between horizontal resolutions in NWP models (Meso-Scale and Local) and MTSAT AMVs generated from each time interval images (5, 10, 15, 30 minutes) to find an optimum AMV in high resolution NWP system.

We will give a presentation and discuss about these results at the workshop.