

# Development of Korea Local Radar Processing System(KLRPS)

## for Korea Local Analysis and Prediction System and its impact on very short range forecast

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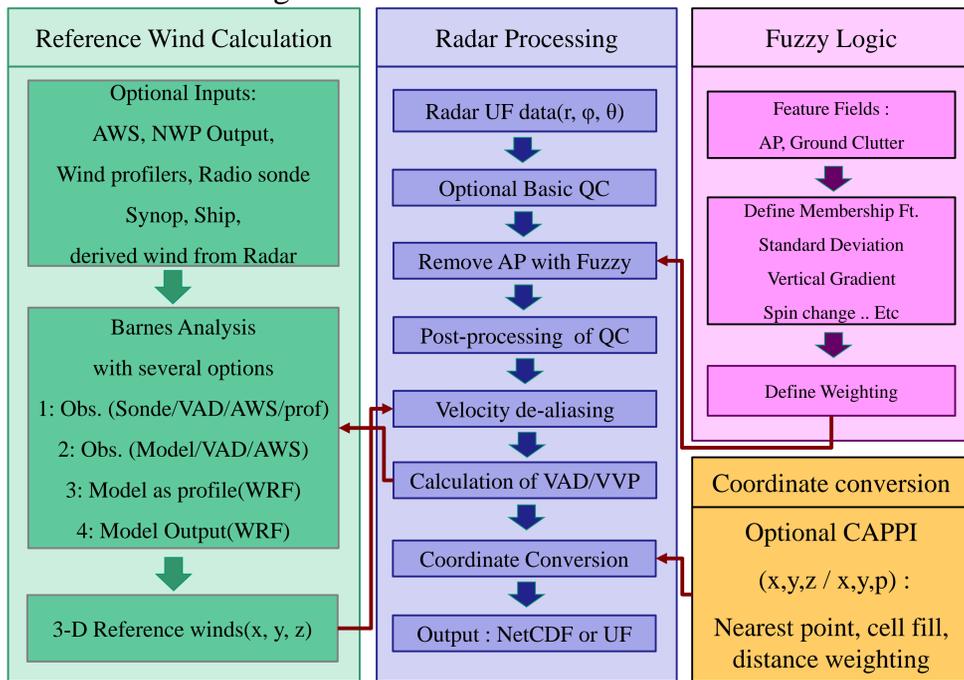
### 1. Introduction

- Korea Local Radar Processing System(KLRPS) is developed to assimilate radar data into meso-scale models(Ahn et al., 2010).
- In 2011, KLRPS is improved with extension to 8-Doppler radar and post-processing of QC. Also, the coordinate conversion algorithm for Korea Local Analysis and Prediction System(KLAPS) is included.
- This research introduce the development of KLRPS and its impact on the very-short range forecast

### 2. Korea Local Radar Processing System

- The local radars over Korea Peninsula can be processed with Reflectivity and Radial Velocity QC algorithms in KLRPS
- KLRPS consists of 4 parts :
  1. Calculation of Reference Wind Fields for radial velocity de-aliasing
  2. Main Radar Processing in Radar polar coordinate
    - Reflectivity(RF) QC, Radial Velocity de-aliasing
  3. Fuzzy Logic – calculation of Membership function, Weighting
  4. Coordinate Conversion – optional CAPPI, vertical coordinate for KLAPS and VDRAS (Variational Doppler Radar Analysis System ; Sun and Crook,1997)

#### ■ KLRPS flow diagram



#### ■ Reflectivity(RF) QC process :

1. Basic QC - remove noise with variance in local grid(var. QC)
  - remove value with gross check
  - remove RF with 0 velocity
2. AP removal - optional Membership function with critical value optional target type
3. Post-processing - de-specking, local continuity check
  - remove AP with ground clutter map
  - recover RF with radial velocity

#### ■ Radial Velocity(RV) QC process(based on Lim et al., 2009) :

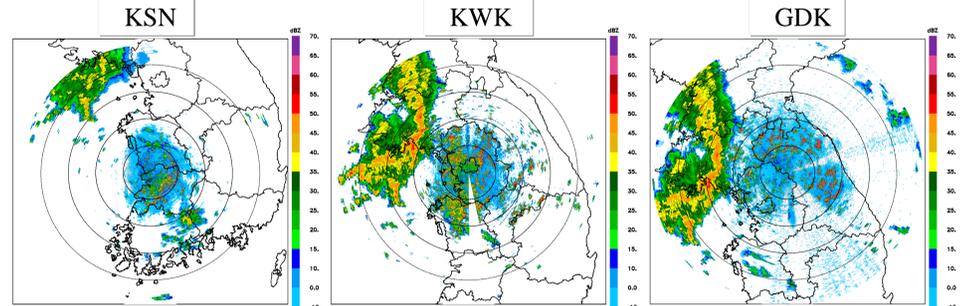
1. Global unfolding(de-aliasing) – use Reference Wind Fields
2. Local unfolding – use Mean radial velocity
3. Horizontal gradient check
4. Vertical consistency check

#### ■ Coordinate Conversion process

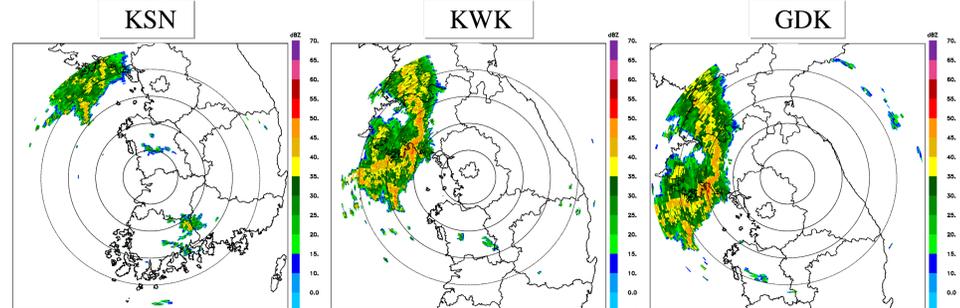
- optional coordinate conversion
- radar polar coord. in Azimuth. → x-y-p in Lambert. x-y-z in Azimuthal Equi.
- several interpolation methods – nearest, distance weight, cell fill(averaged)

### 3. Case Study

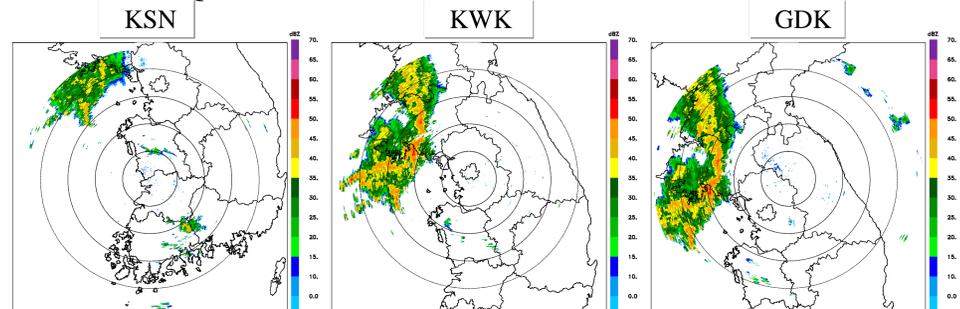
#### ■ Raw Radar Reflectivity < 201107260250 UTC >



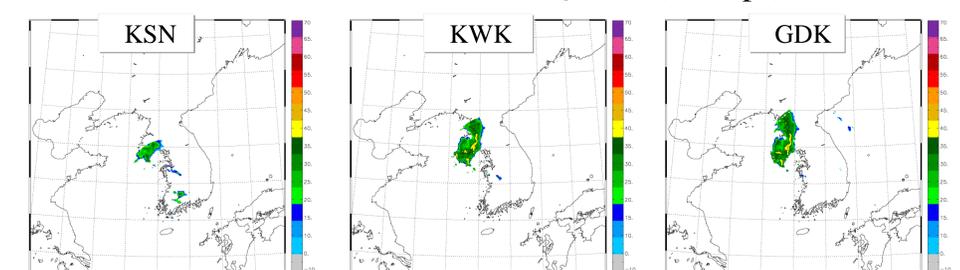
#### ■ KMA QC < 201107260250 UTC >



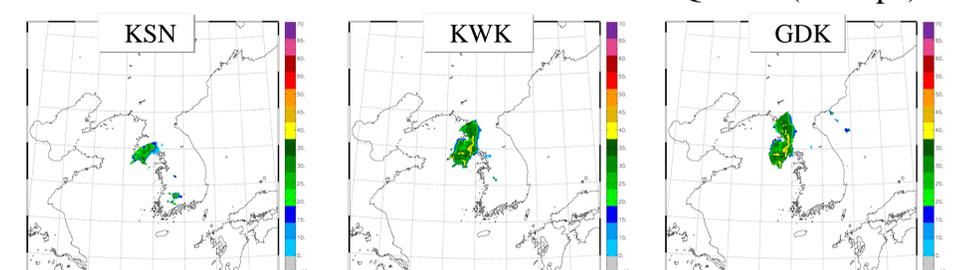
#### ■ KLRPS QC < 201107260250 UTC >



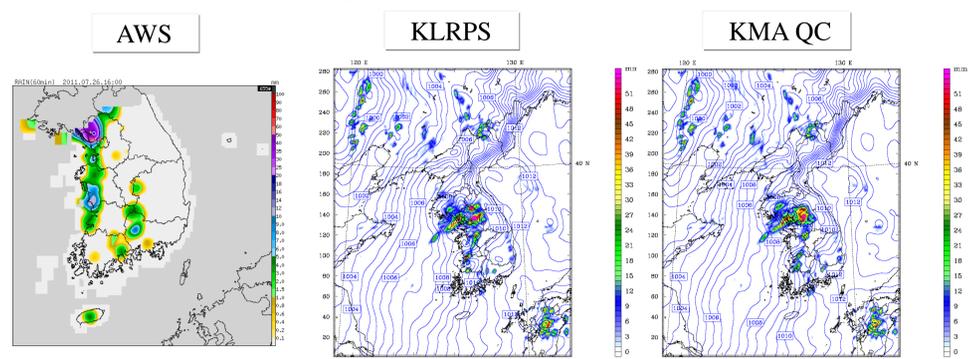
#### ■ Coordinate conversion with KMA QC data(700 hpa)



#### ■ KLRPS Coordinate conversion with KLRPS QC data(700 hpa)



#### ■ 4hr forecast results(1hr acc. Rainfall)



### 4. Conclusion

- In this research, Radar preprocessing system(KLRPS) is extended to 8- radars over Korea Peninsula. Also, new coordinate conversion algorithm is developed in KLRPS.
- From the preliminary results, the difference in KLAPS forecast fields is slight. But investigation of analysis fields and more cast study are needed.