The main difference between both methods was caused by motion vector.

Both method similar in direction of forecasting, but some different in position of storm. 

Forecasting future position of storm.

Goal:
To combine both methods by utilizing complementary characteristics. Two approaches were examined by combination of two methods for determination of future position of convective cells.

2. DATA

- Radar reflectivity
  - CMAX(column max) of reflectivity from KMA radar network(10 radars)

- MAPLE
  - Forecast field(reflectivity)
  - Motion vector from VET

- Other
  - VET: variational echo tracking

3. NOWCASTING SYSTEM IN KMA

FAST
- Identification: Dual threshold identification (35 dBZ & 45 dBZ)
- Tracking: Based on fuzzy logic
  - Calculate feature parameters
    - speed(SPD), area change ratio(ACR), axis transformation ratio(ATR)
  - Calculation of total membership value of continuous storm by applying weight to each member value

- Forecasting: Using past storm track
  - X̄ = aᵢ + β ᵃ₁t,  ᵃᵢ = β ᵃ₁t,  ᵢ index of track
  - W = 0.7ᵢ⁺¹

MAPLE
- Forecasting

4. HOW TO COMBINE

- Methodology ①: Storm identification + motion vector over storm
  - Future position
    - Storm identification in observation field
    - Calculate motion vector entire field
    - Apply mean motion vector to each storm
    - Forecasting future position of storm

- Methodology ②: Advection by MAPLE + storm identification
  - Future position
    - Advection by MAPLE
    - Storm identification in advected field
    - Tracking storm by FAST
    - Forecasting future position of storm

5. RESULT

- Case I: Isolated storm
  - Methodology ①
  - Both method similar in direction of forecasting, but some different in position of storm
  - The main difference between both method was caused by motion vector

- Case II: Storm associated with mesocyclone system
  - Methodology ②
  - 2nd method forecast a small storm of the future(but usually merged)
  - Both methods exhibited the same error when the direction of the wind suddenly changed at the front line

6. SUMMARY & FUTURE WORKS

- To combine two radar-based nowcasting method by utilizing complementary characteristics, two approaches were examined: “identification + motion vector”, “advected + identification”
- Two types of cases(isolated, systematic) were used for analysis and qualitative verification was performed. In case of isolated, both method similar in direction of forecasting. In case of systematic, both methods show the same error when the direction of the wind suddenly changed at the front line
- In the future, quantitative verification will be conducted

REFERENCES


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