Doppler radar for upper-air observations in Japan

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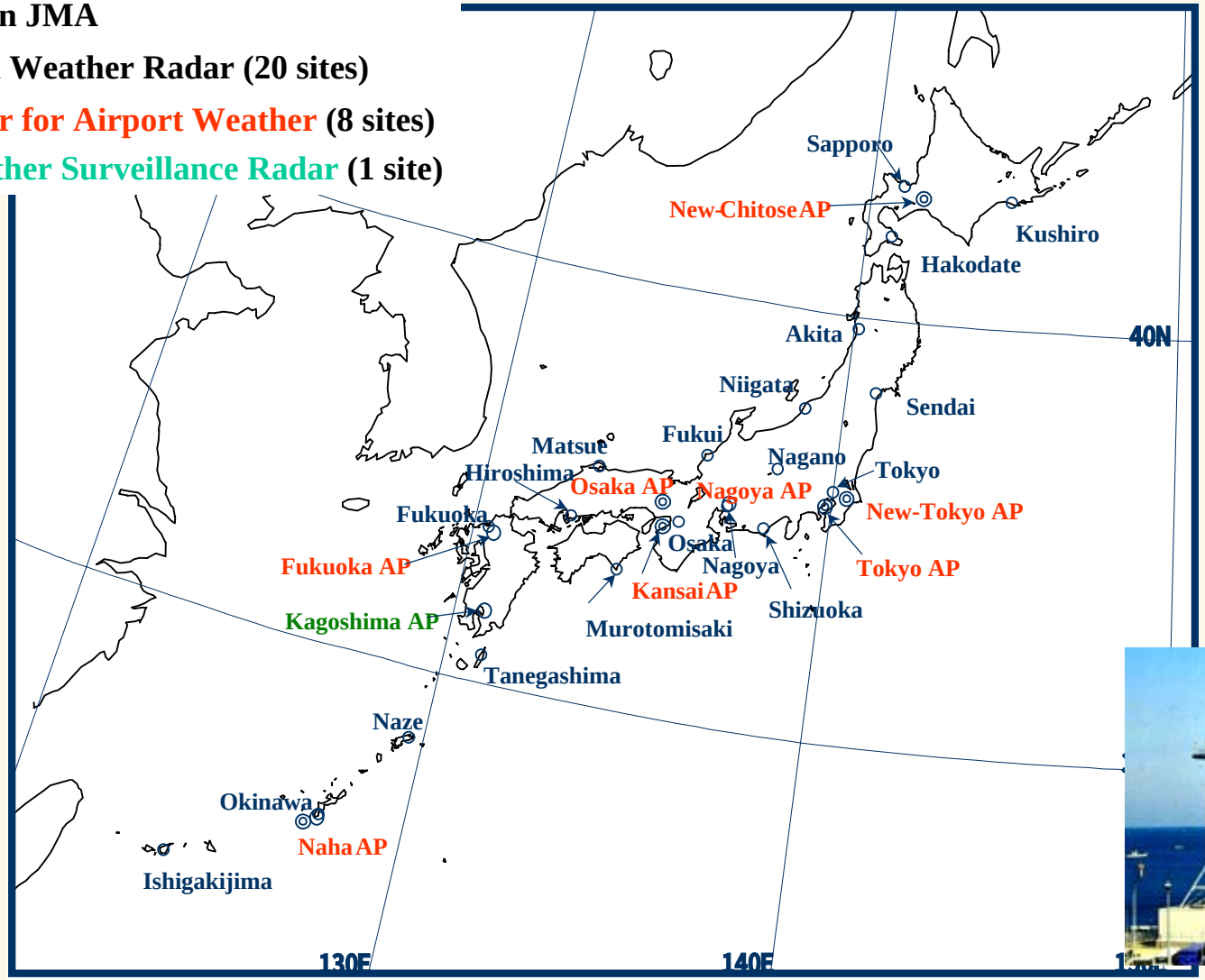
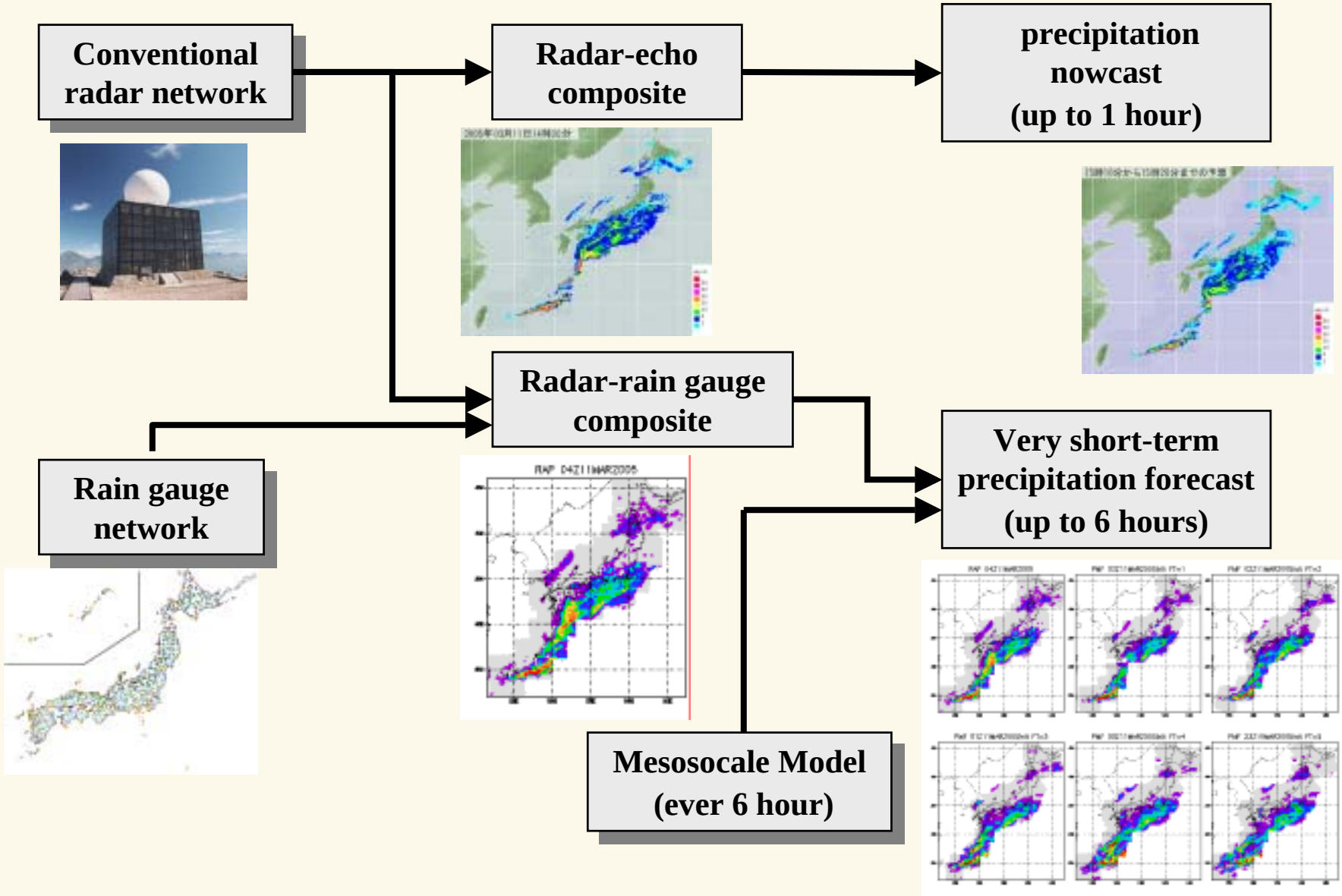
Weather radar network in JMA

Weather Radar in JMA

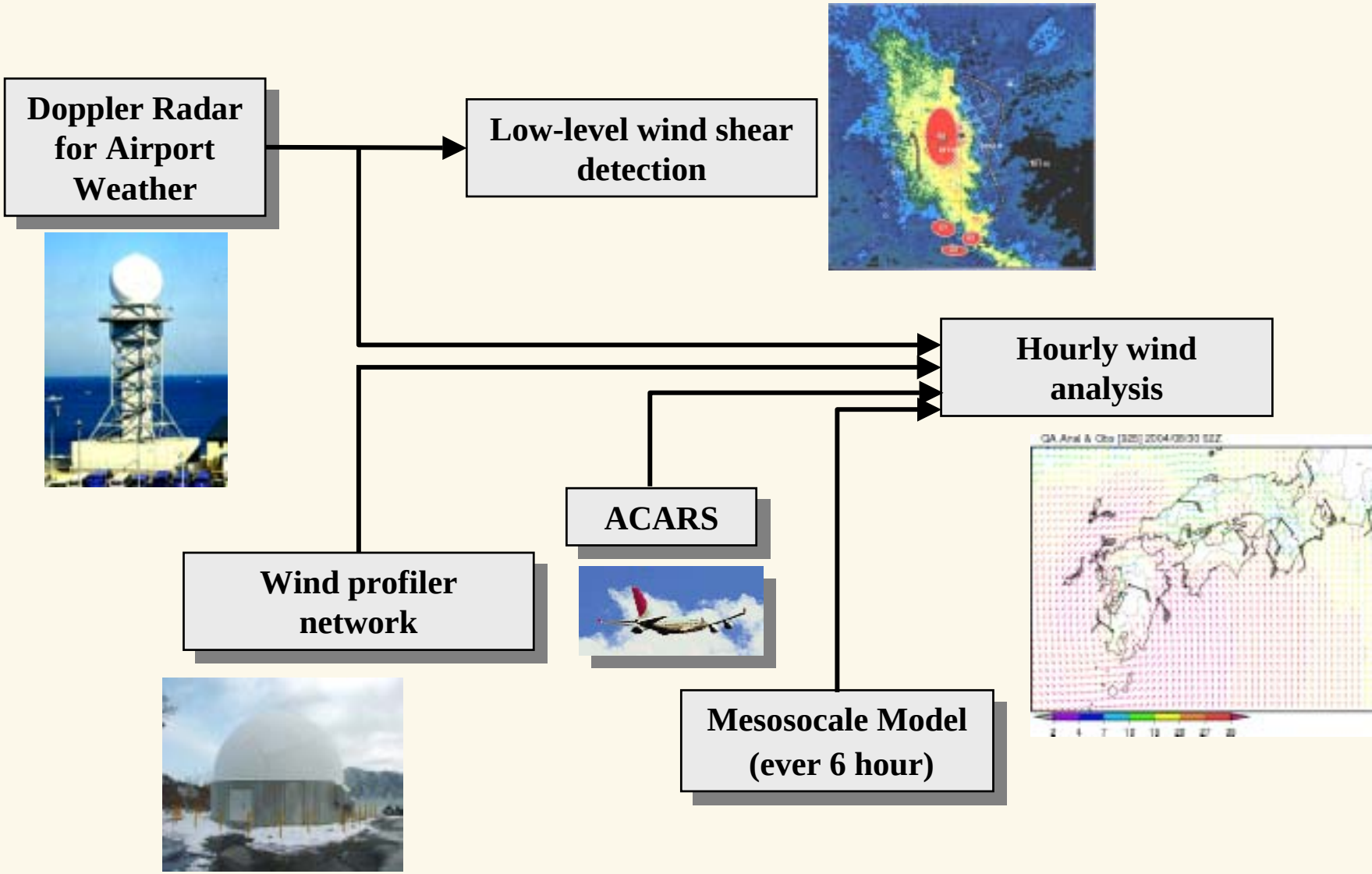
- ●: **Conventional Weather Radar (20 sites)**
- ◎: **Doppler radar for Airport Weather (8 sites)**
- ○: **Airport Weather Surveillance Radar (1 site)**



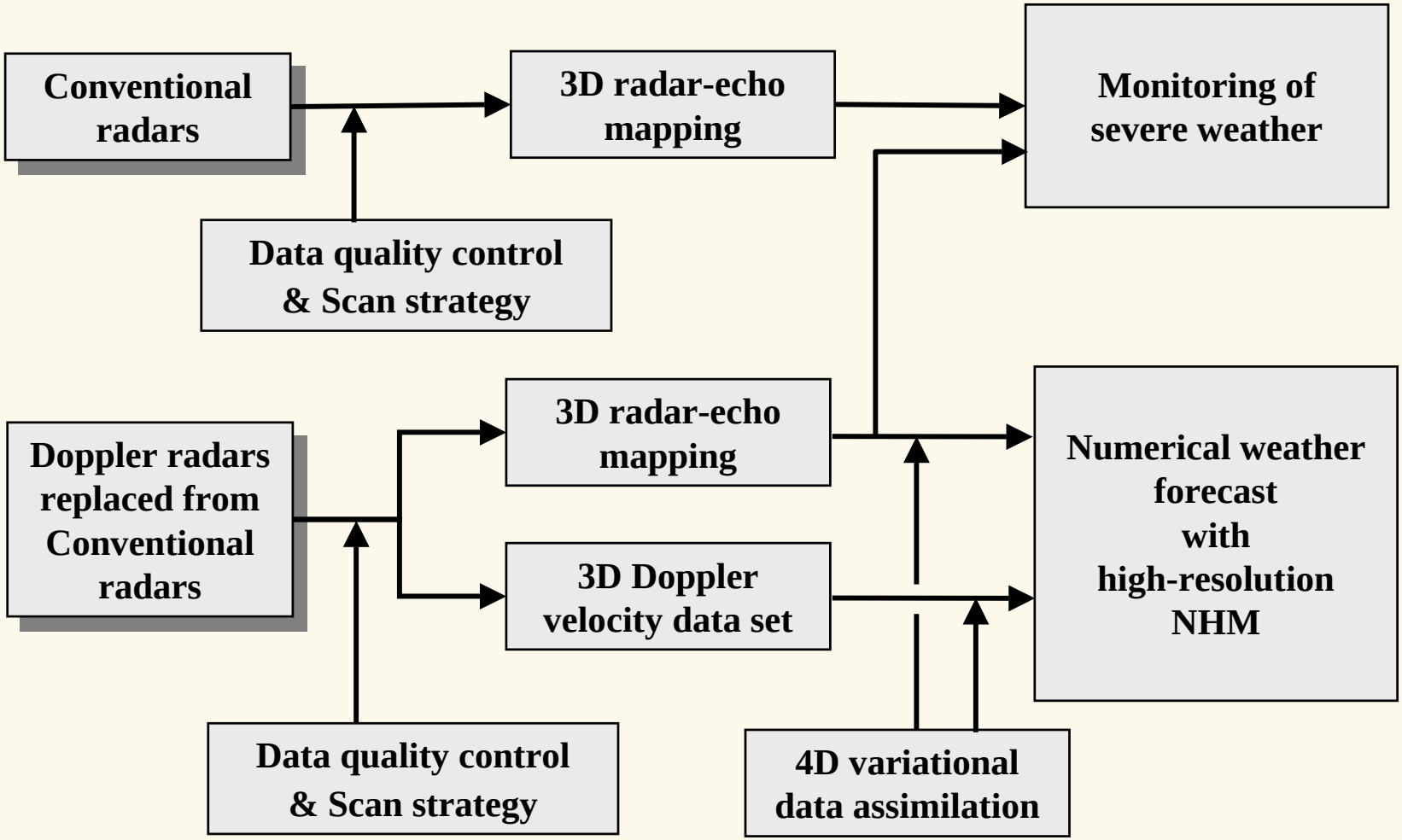
Present framework of JMA conventional radars



Present framework of JMA Doppler radars

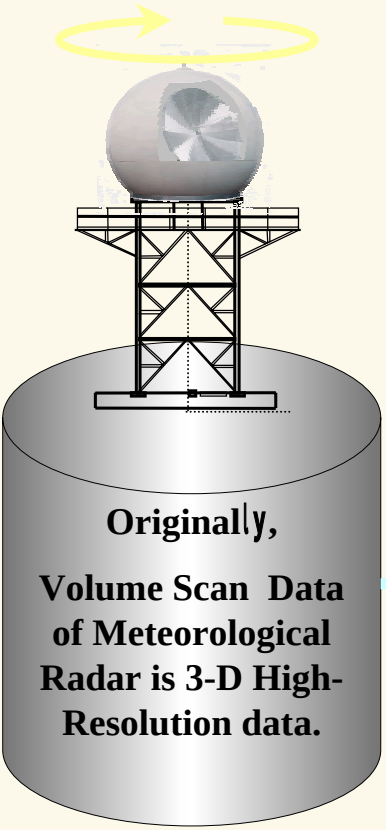


Plan of JMA radar network



3D high-resolution radar data products

19 EL Volume Scan
every 10 min.



- Current Radar Data

H: 2.5km×2.5km
V: 2km internal 5layer

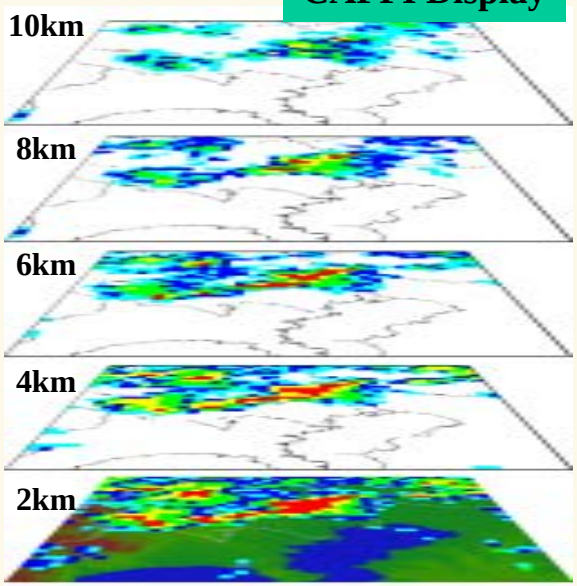
3-D Low-Resolution under Low speed communication Network

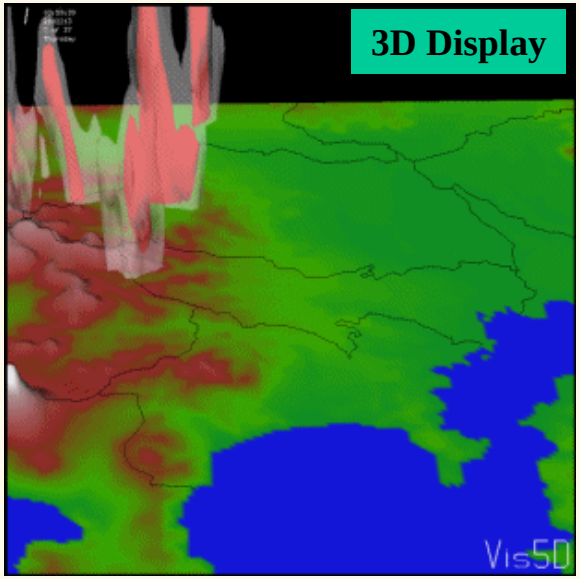
- Planning Radar Data

H: 1km×1km
V: 1km interval 15layer

3-D High-Resolution under High speed communication Network

CAPPI Display

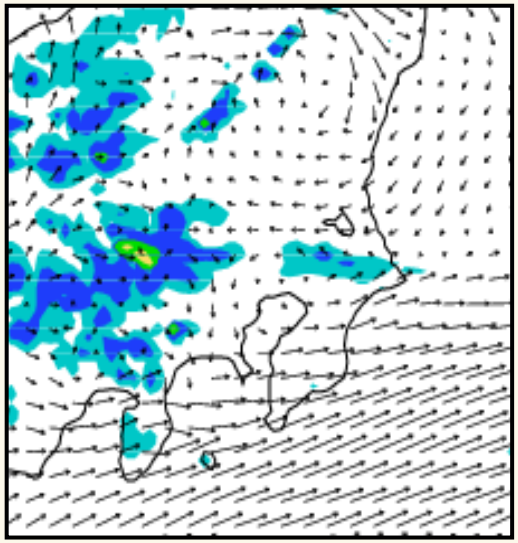




Impact of Doppler velocity on NWP

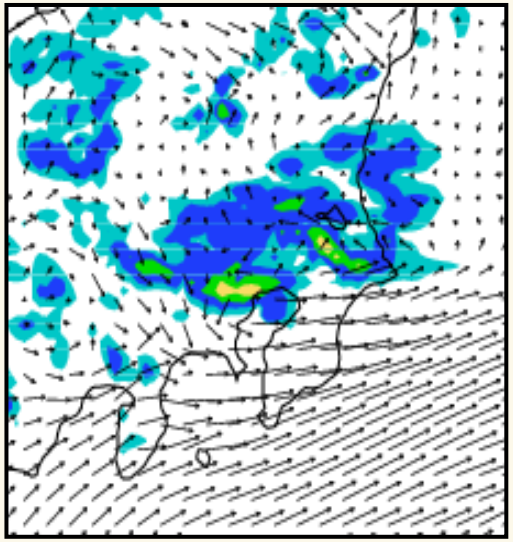
5km NHM Prediction
1-hour rainfall at 17JST July 21st, 1999 from 15JST Initial

1-hour rainfall by radar-rain gauge composite



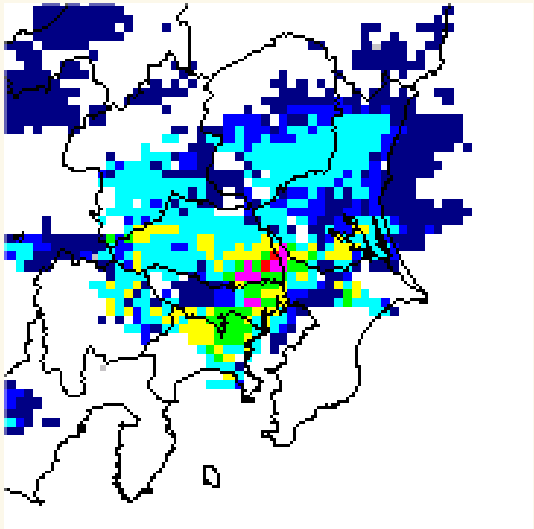
without

Doppler & GPS water vapor



with

Doppler & GPS water vapor



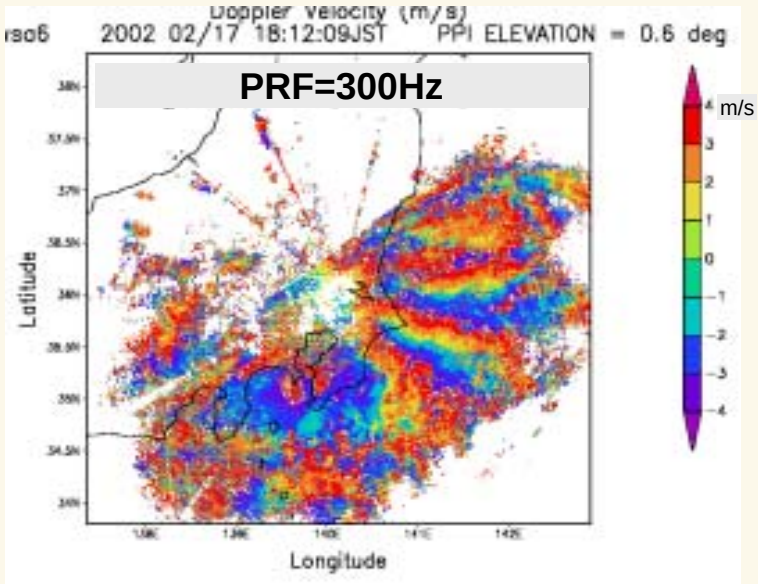
Data quality control and scan strategy for operation of Doppler radars

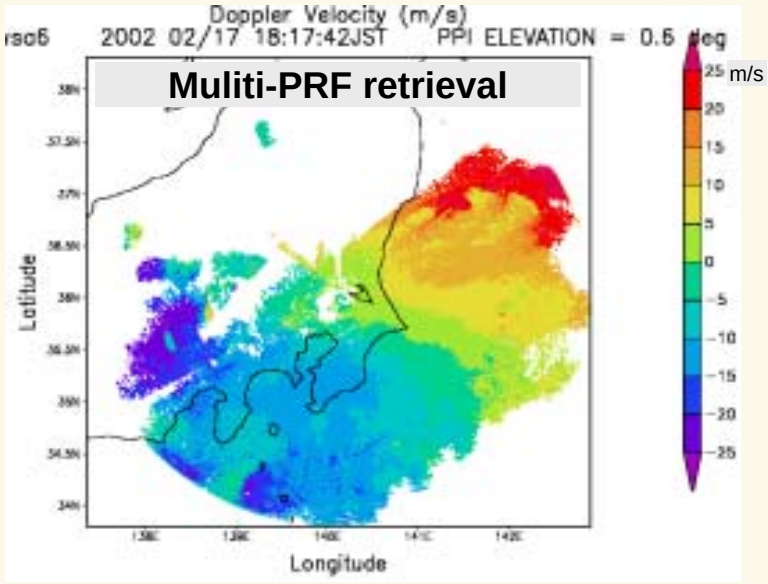
Strict data quality control with high performance is needed in real-time for operational use of Doppler radars.

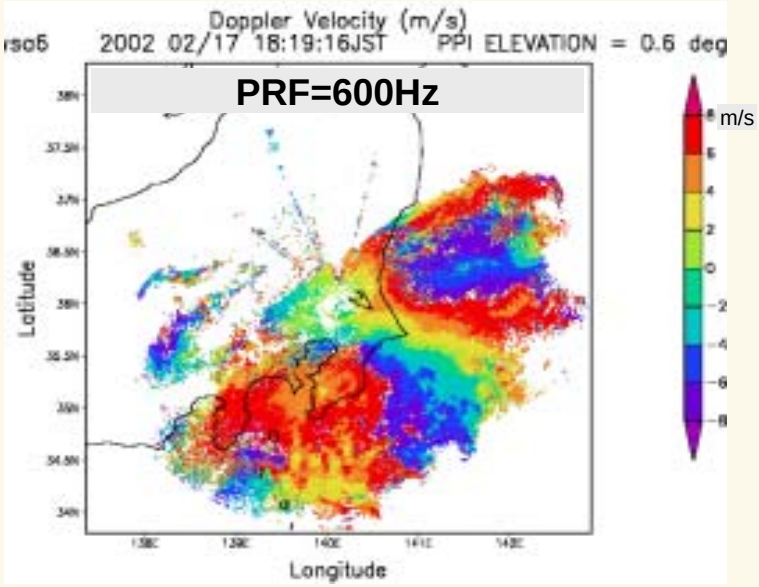
- **Ground clutter rejection**
- **Doppler velocity unfolding**
- **second-trip echo rejection**
- **Extension of observation range**

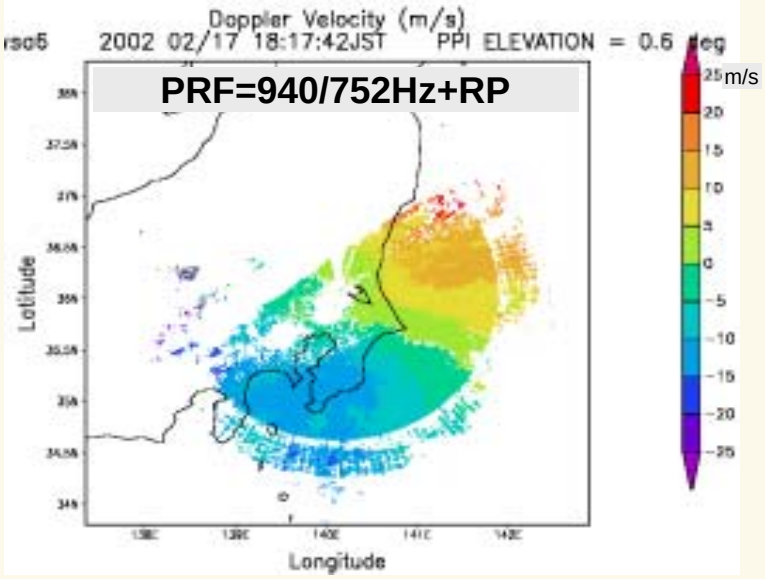
Optimal antenna scan strategy is needed accordance with topography around radars and structure and time-evolution of weather targets.

Extension of Doppler radar coverage

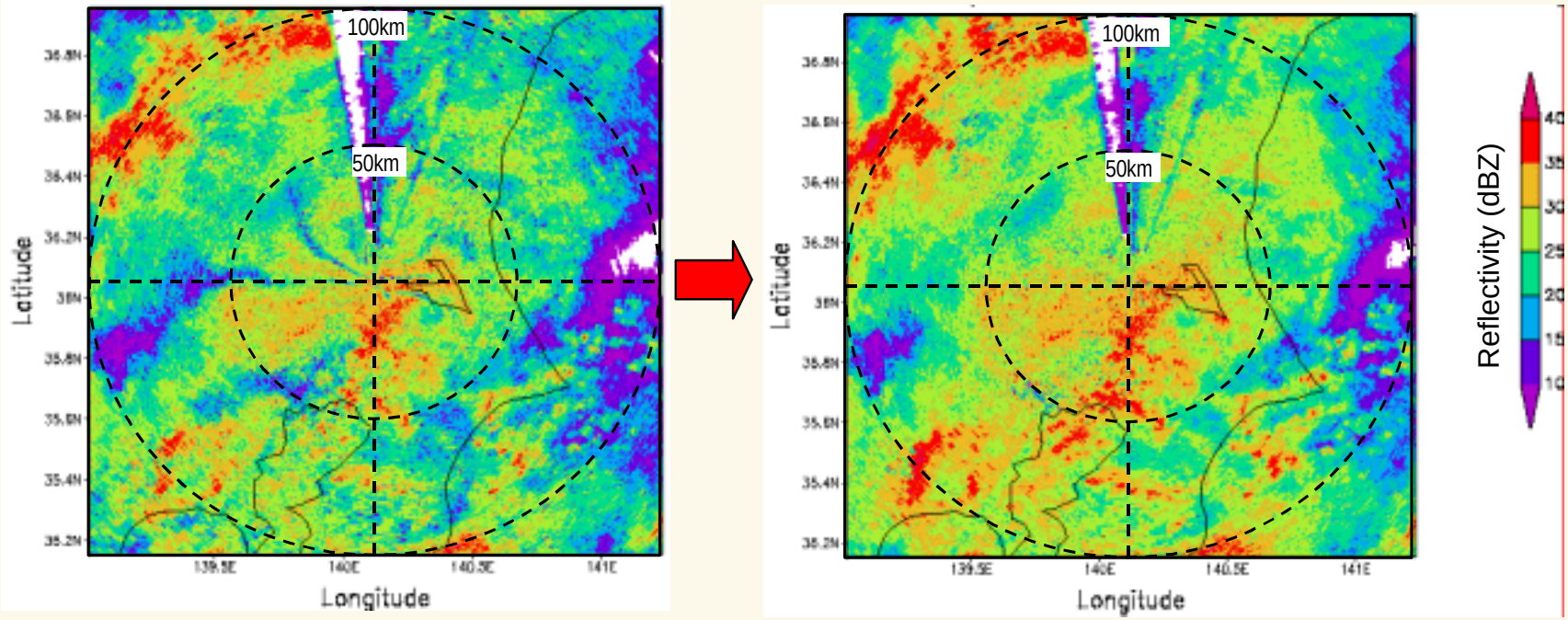








Ground clutter rejection in Doppler radars



Summary

- **Doppler radars are being used in the aviation weather services in Japan mainly in order to detect low-level wind shear.**
- **JMA has examined effectiveness of Doppler radars for numerical weather predection (NWP) and for monitoring severe weathers.**
- **JMA will start the operation of a Doppler radar mainly for NWP being replacing conventional weather radars to Doppler radars in 2006.**
- **Data quality control is one of the most important issues to use Doppler radars for weather services effectively.**