Overview and Simulation of a Squall Line in East China on June 3 2009

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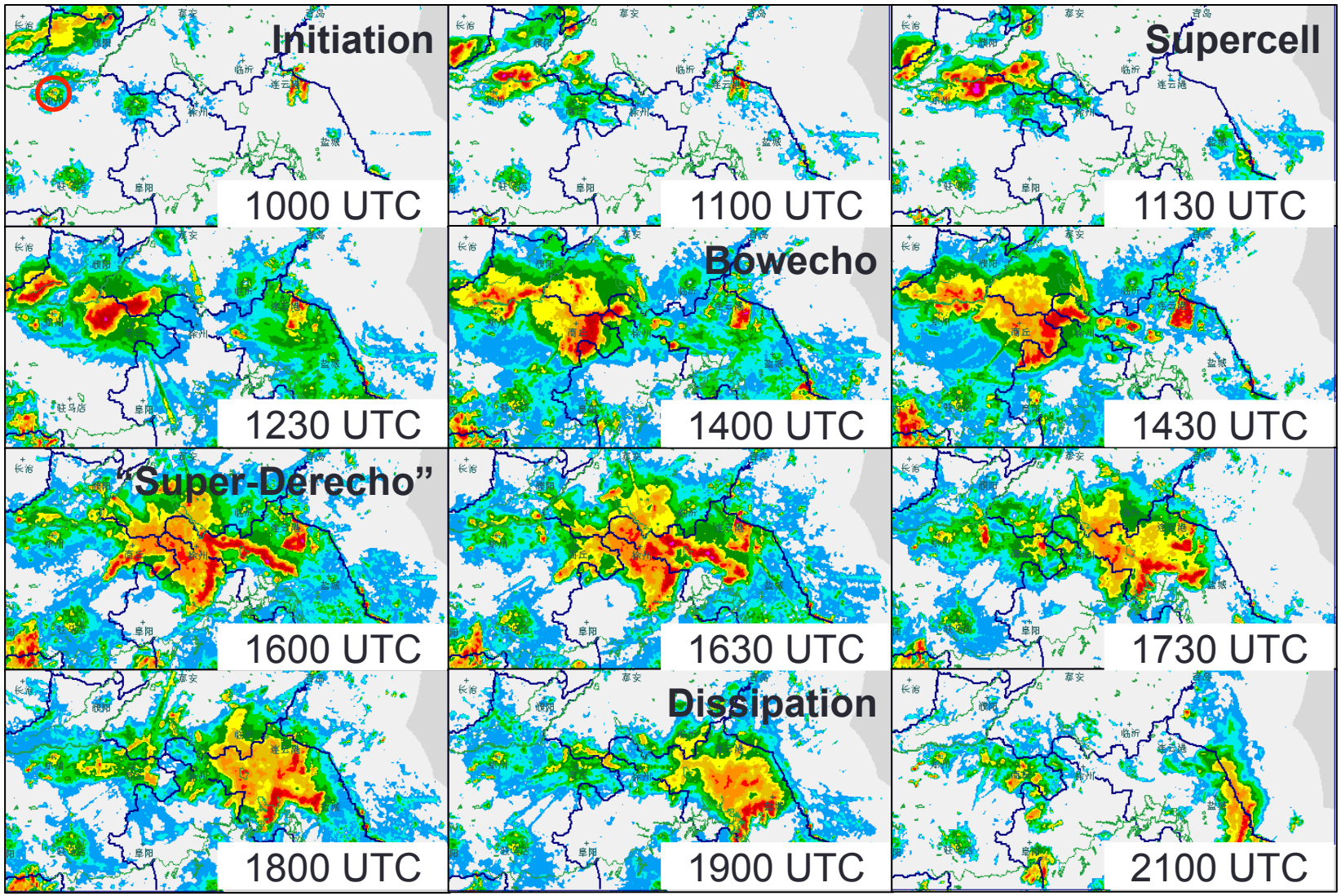
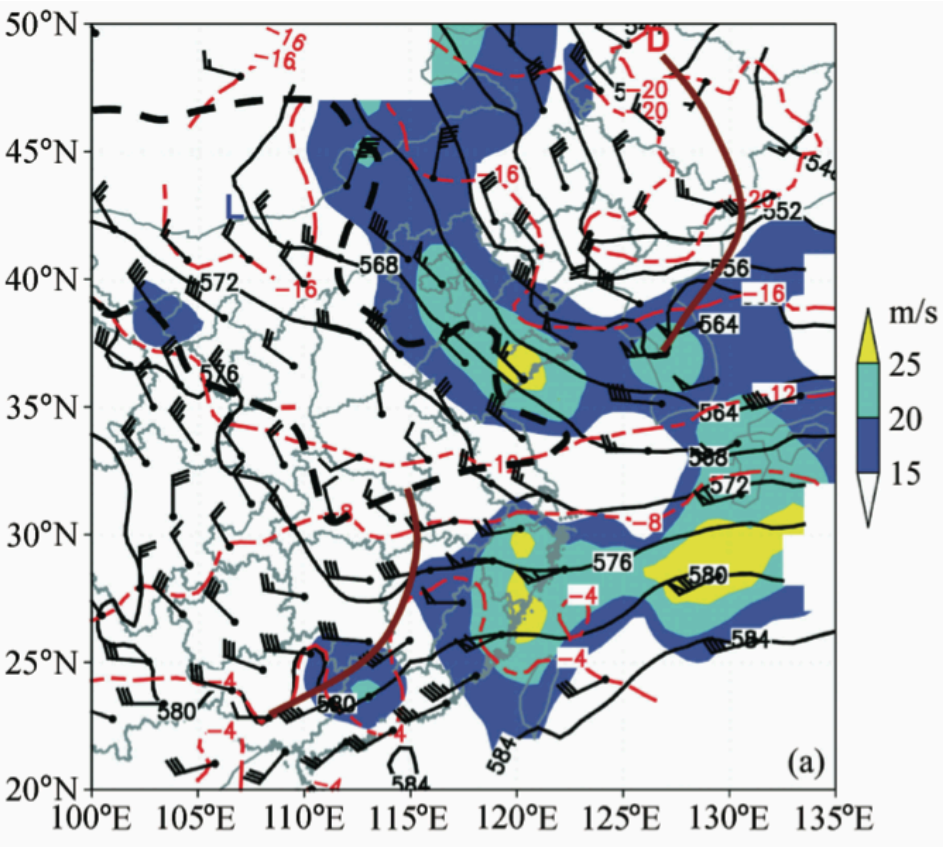
Composite Reflectivity Observations

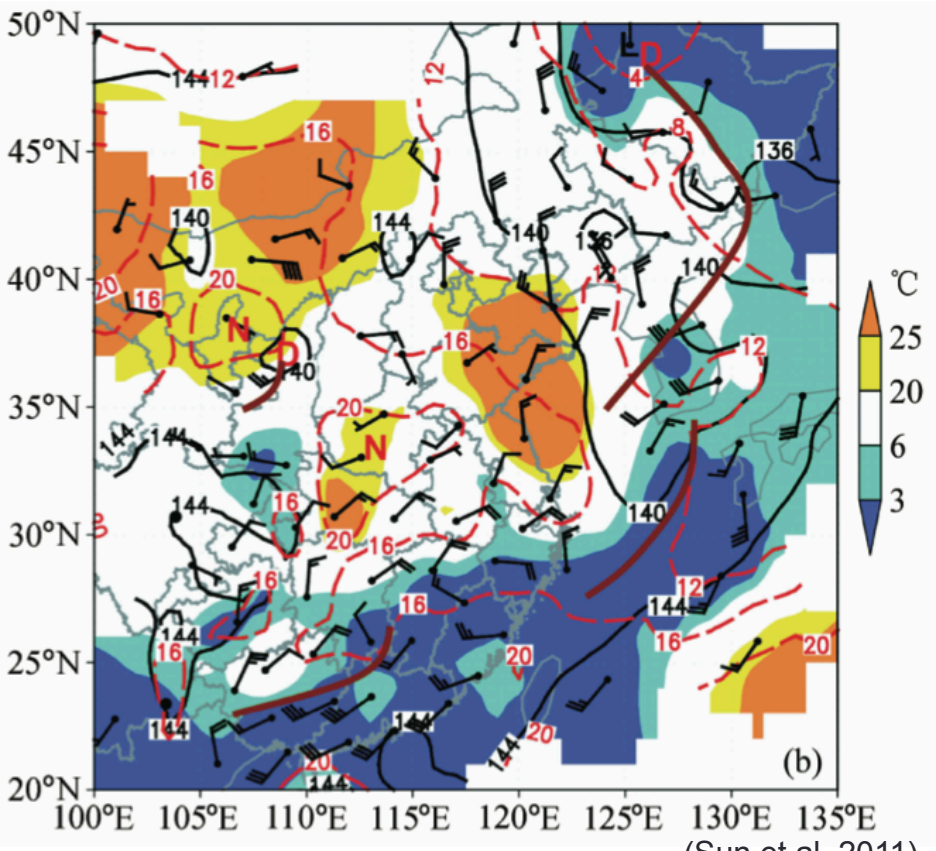


Synoptic Environment

- Cold advection aloft warm and dry lower troposphere



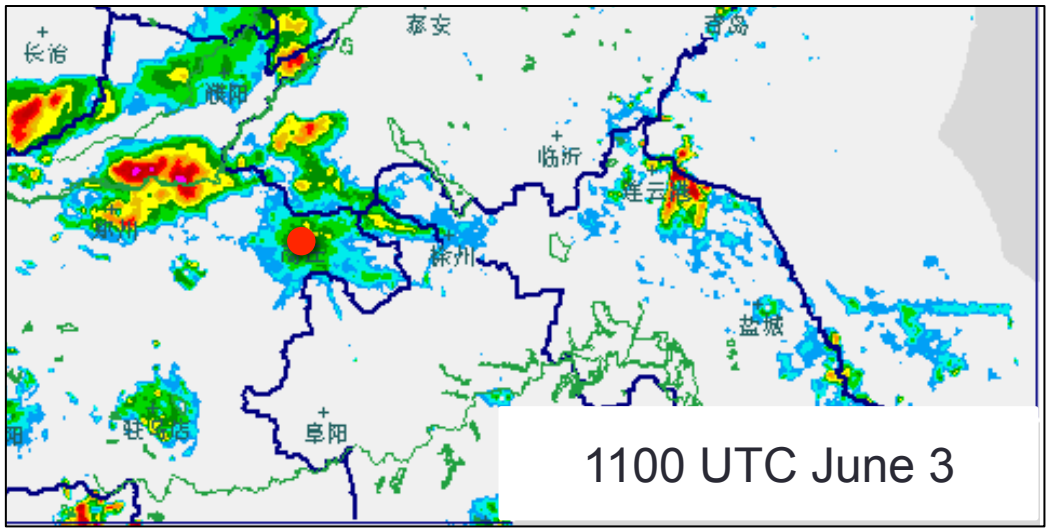
500hPa GH, T and wind speed



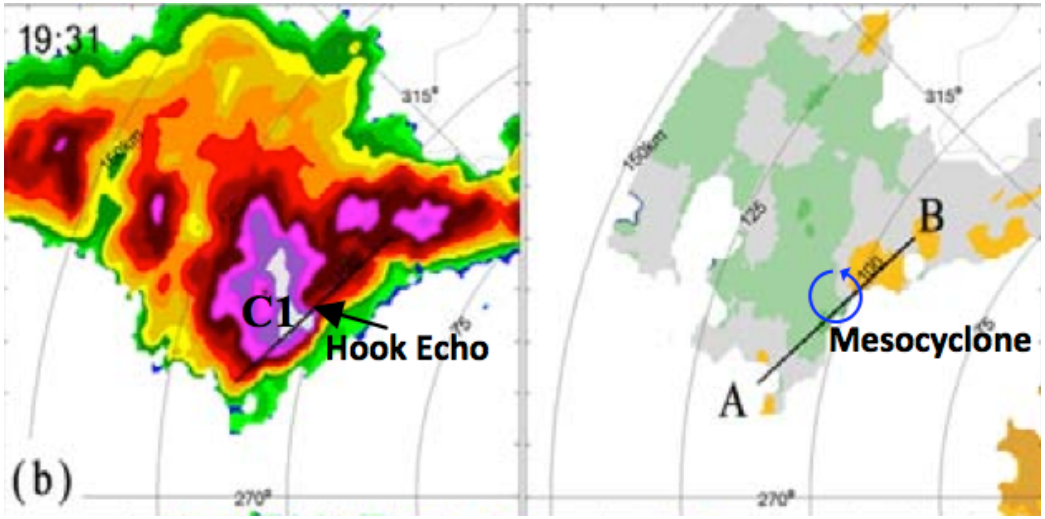
850hPa GH, T and ($T-T_d$)

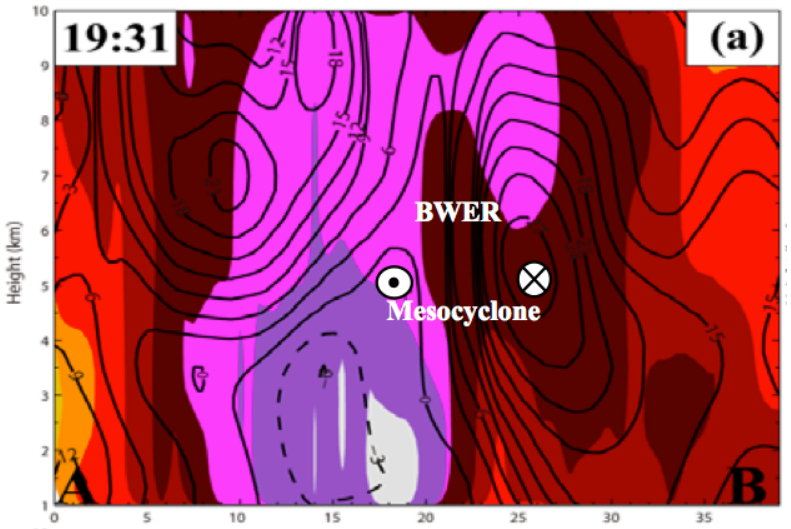
(Sun et al. 2011)

Development from Supercell (1100UTC)

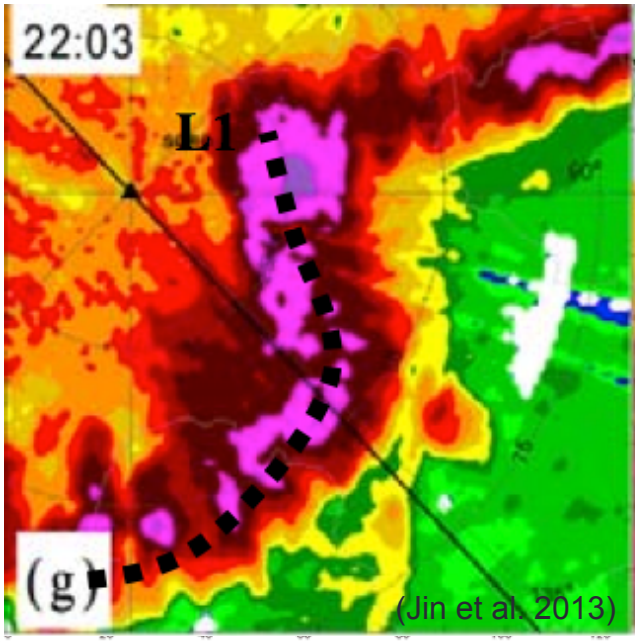


(Jin et al. 2013)

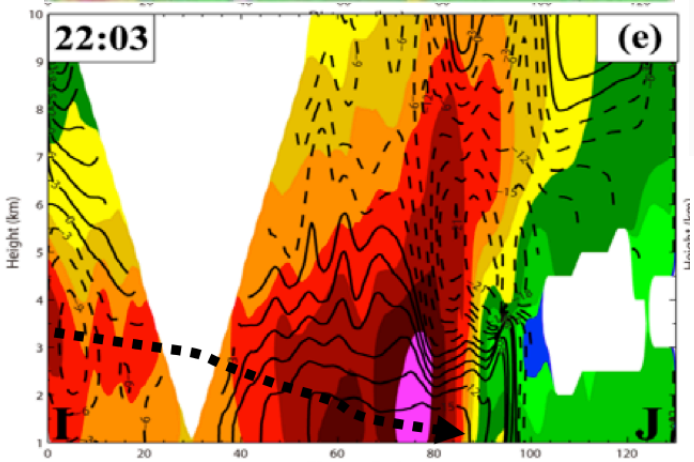


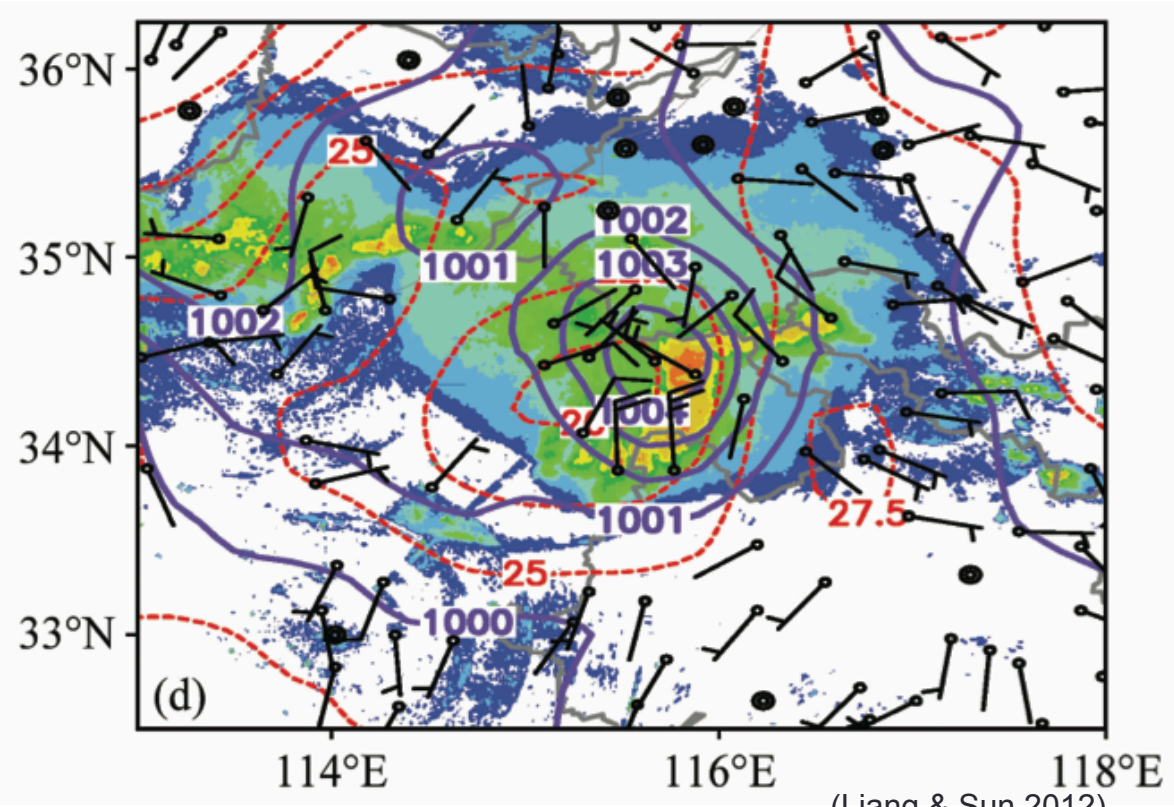


Bow Echo Stage (1400 UTC)



(Jin et al. 2013)



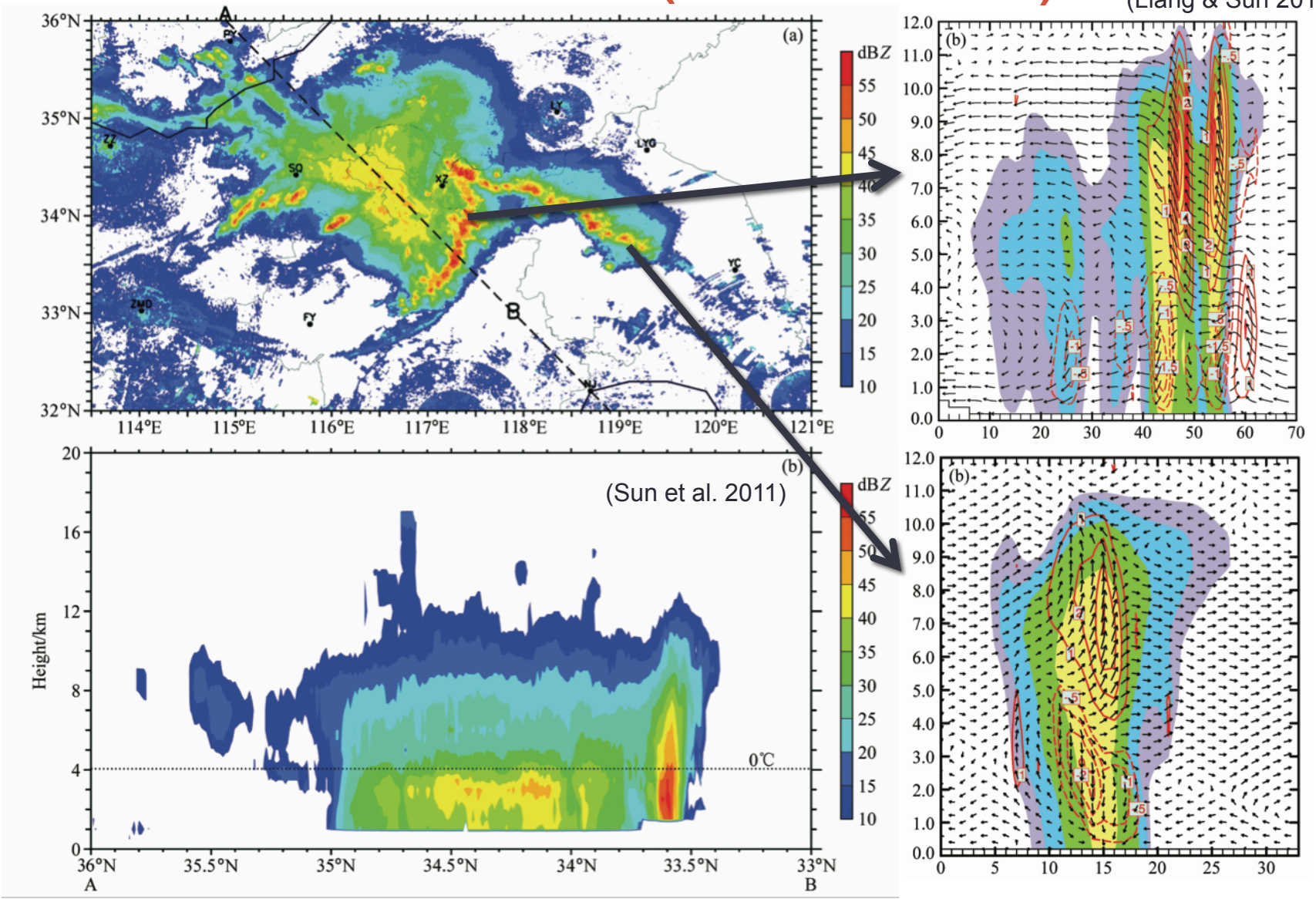


(Liang & Sun 2012)

Wind damage occur:
Historical records in 2 stations, more than 50 stations recorded gusts > 20m/s, maximum 29.1m/s

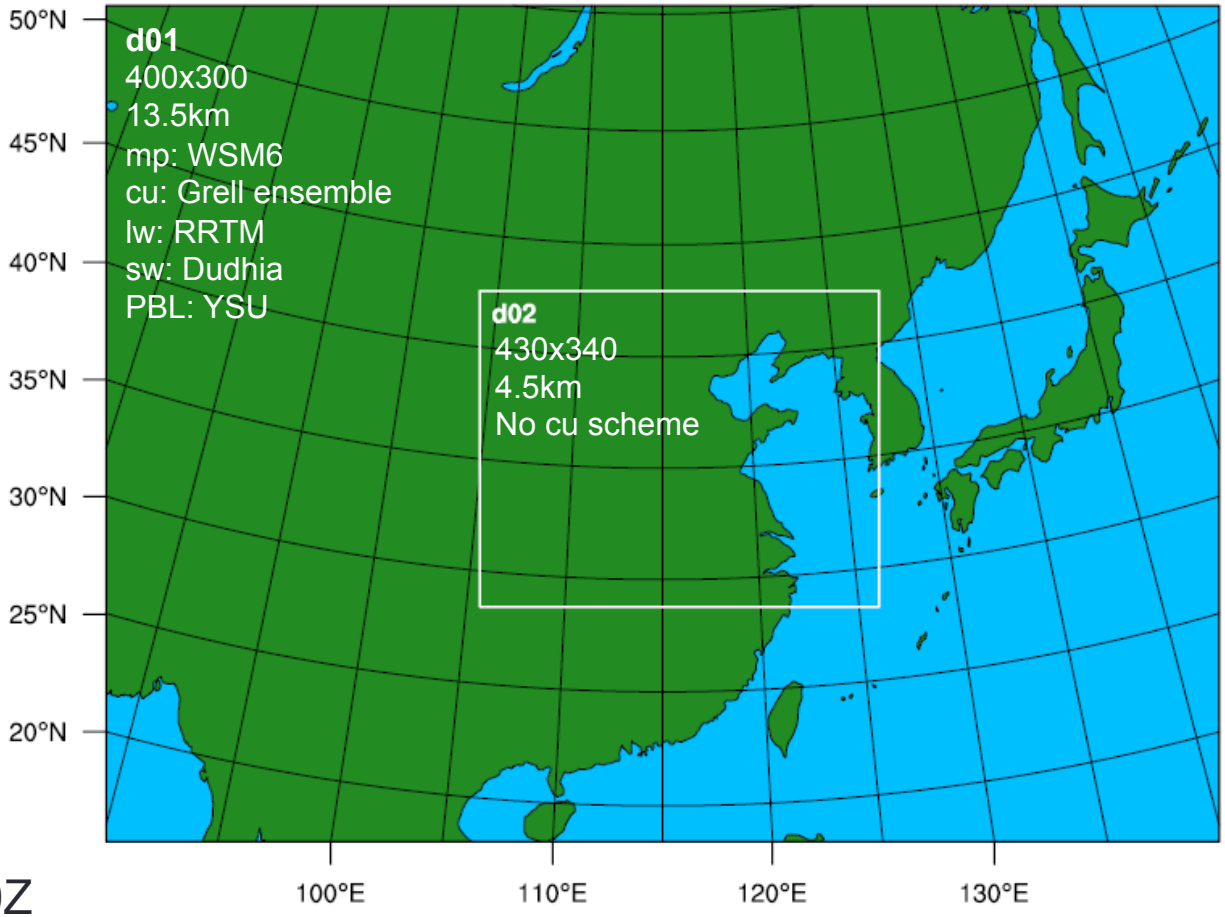
Mature Structure (1600 UTC)

(Liang & Sun 2012)

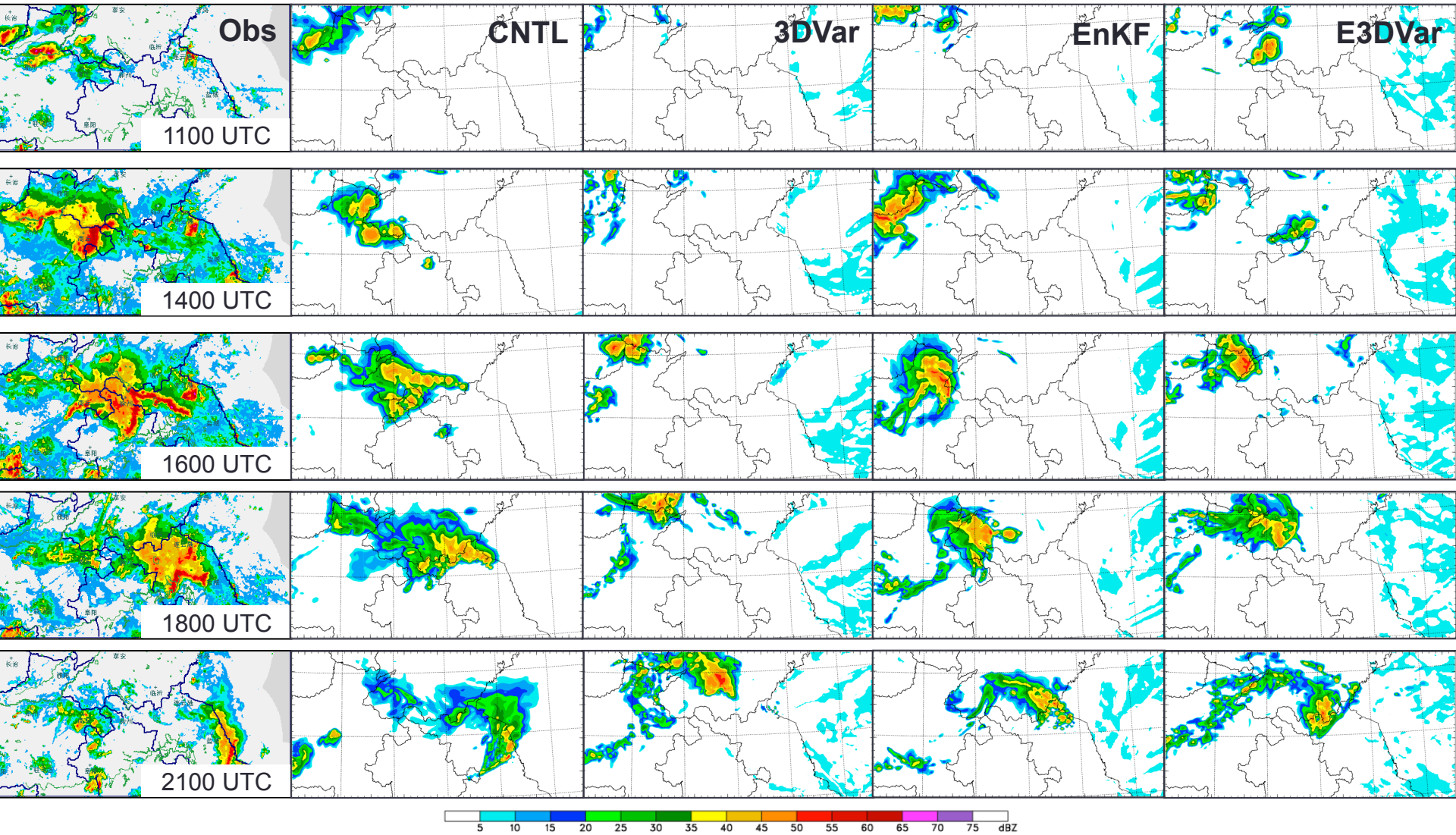


Model Setting

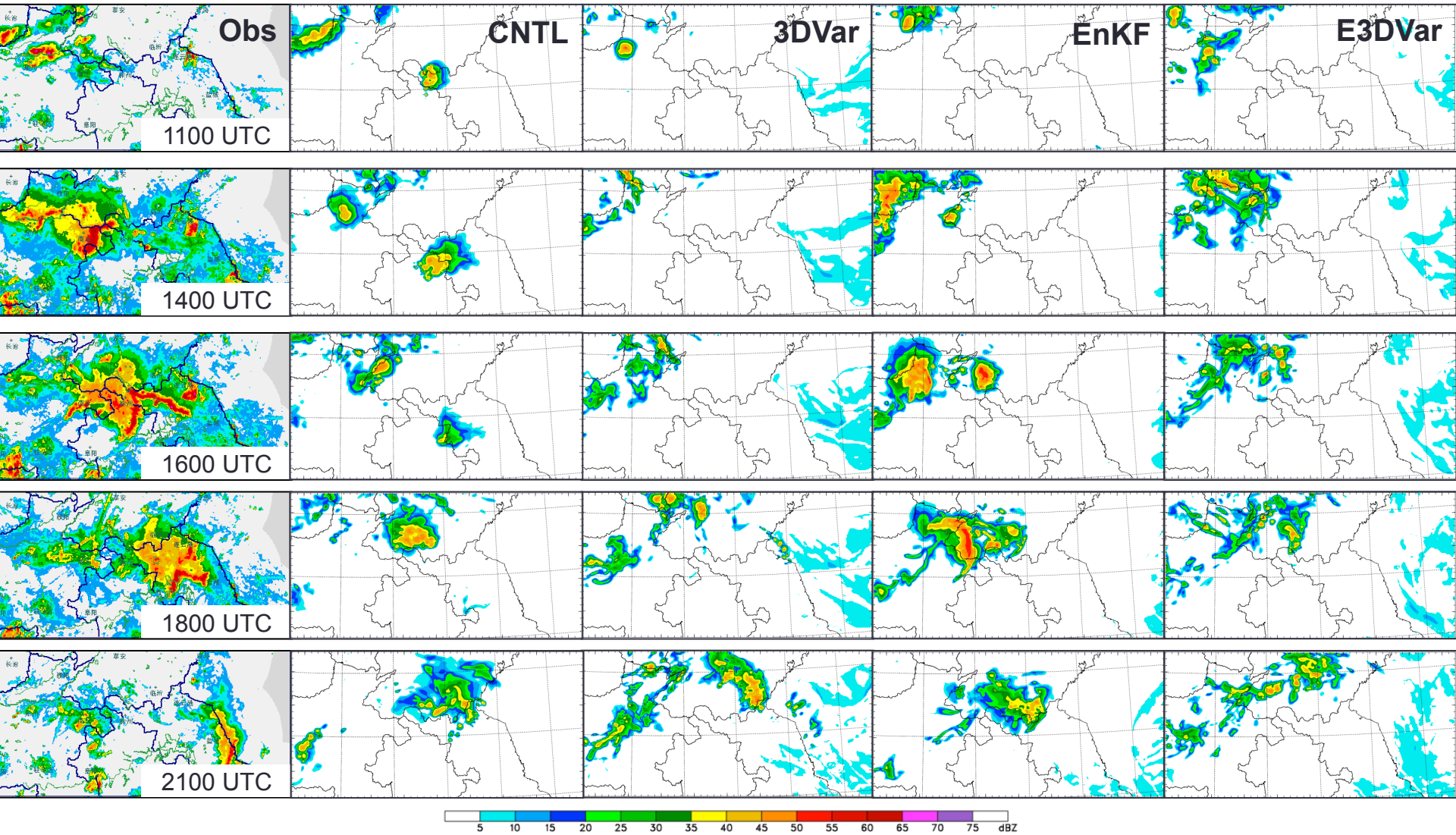
- 3DVar/EnKF/E3DVar
- Initiated 00Z 06/02
- FNL IC/BC
- DA cycles without d02
- DA every 6 hours from 06Z 06/02 to 06Z 06/03
- GTS without radiance
- 60 members ensemble
- Nested forecast from 00Z and 06Z 06/03 analysis



00Z 06/03 Simulations

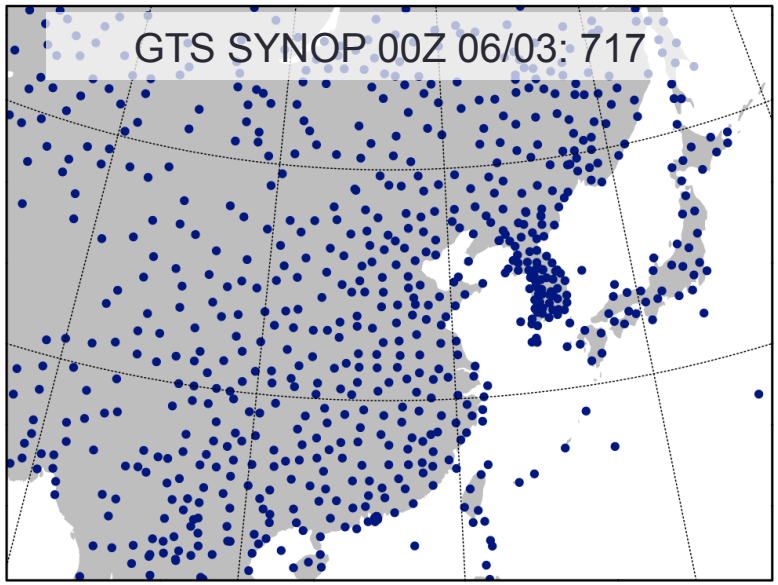


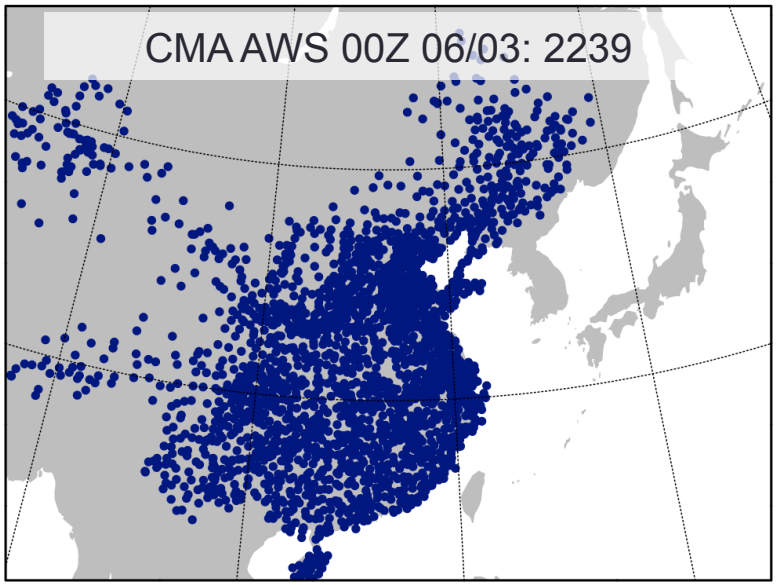
06Z 06/03 Simulations



AWS Observations

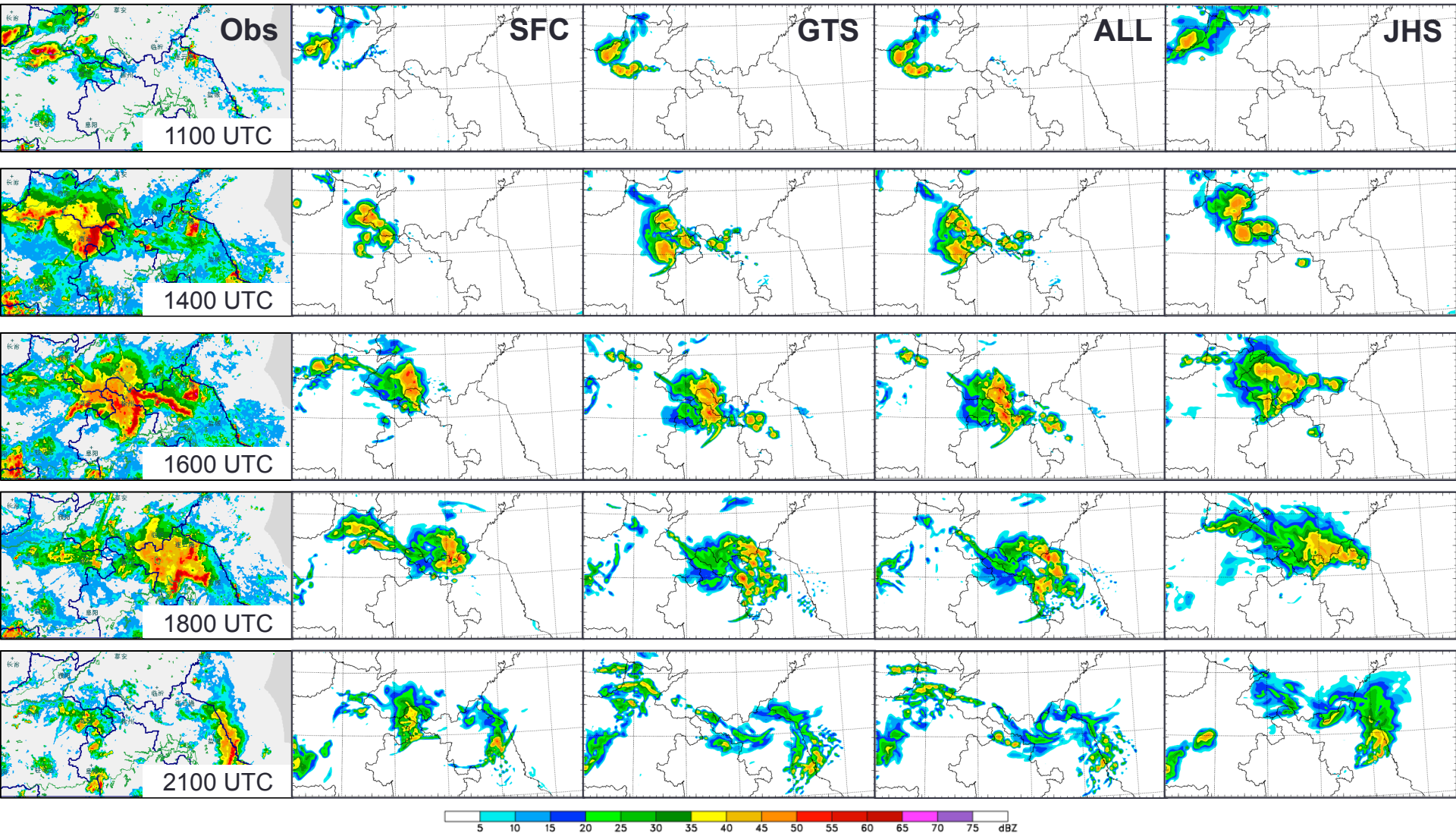
- Hourly surface AWS from CMA:



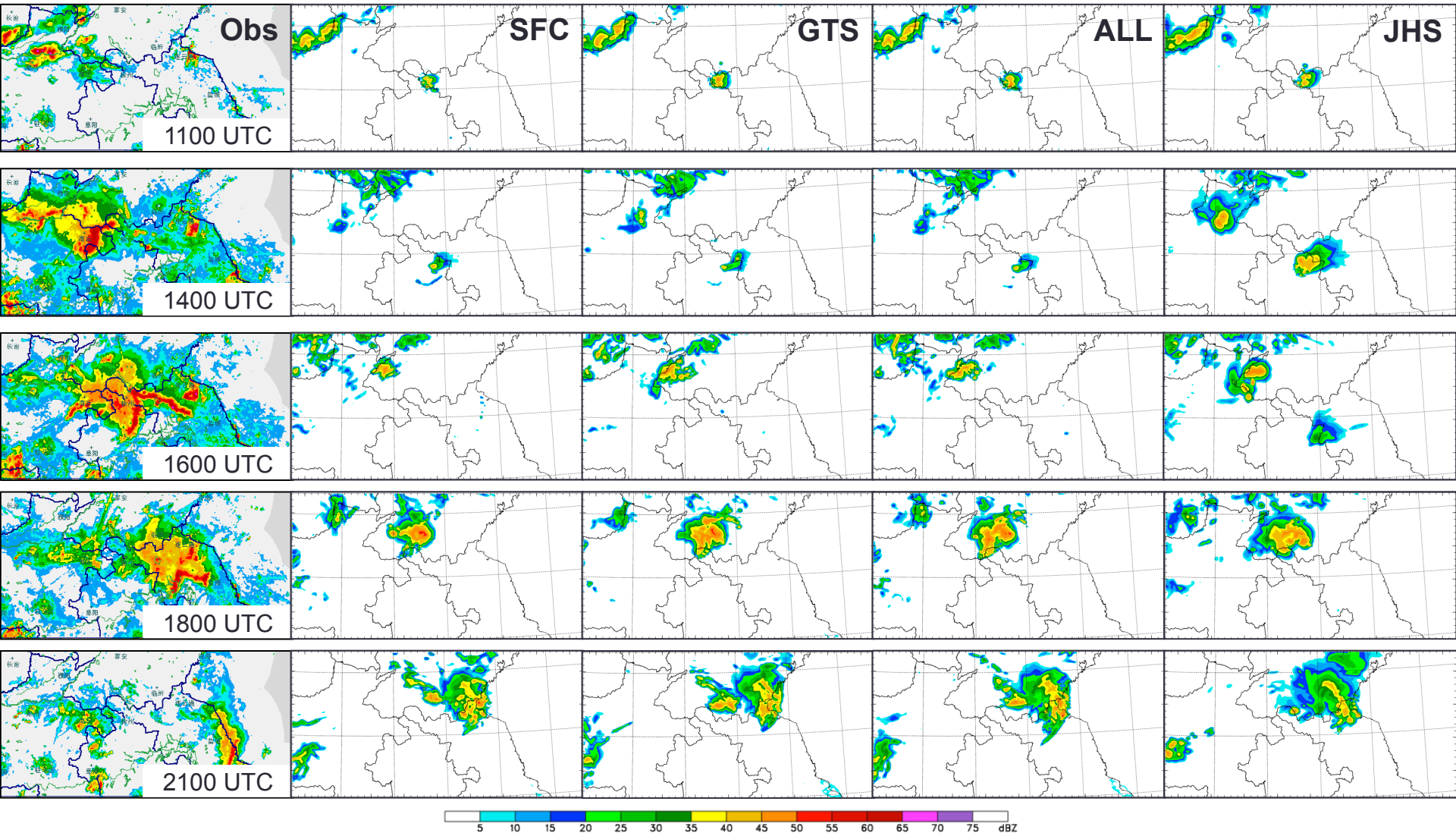


- OBSGRID (objective analysis) IC: 00Z and 06Z 06/03
  - SFC: Only CMA surface AWS observations are applied
  - GTS: Only GTS observations are applied
  - ALL: Both SFC and GTS observations are applied
  - JHS: SFC IC with Kain-Fritsh cu, Morrison mp and Noah surface

00Z 06/03 Simulations



06Z 06/03 Simulations



Forthcoming Works

- Getting 4DVar and E4DVar started
- 6-h DA cycles with GTS obs using 4DVar and E4DVar
- Surface observations
  - 1-h DA cycles with GTS obs
  - 1-h DA cycles with GTS and CMA obs
- Radar V_r observations