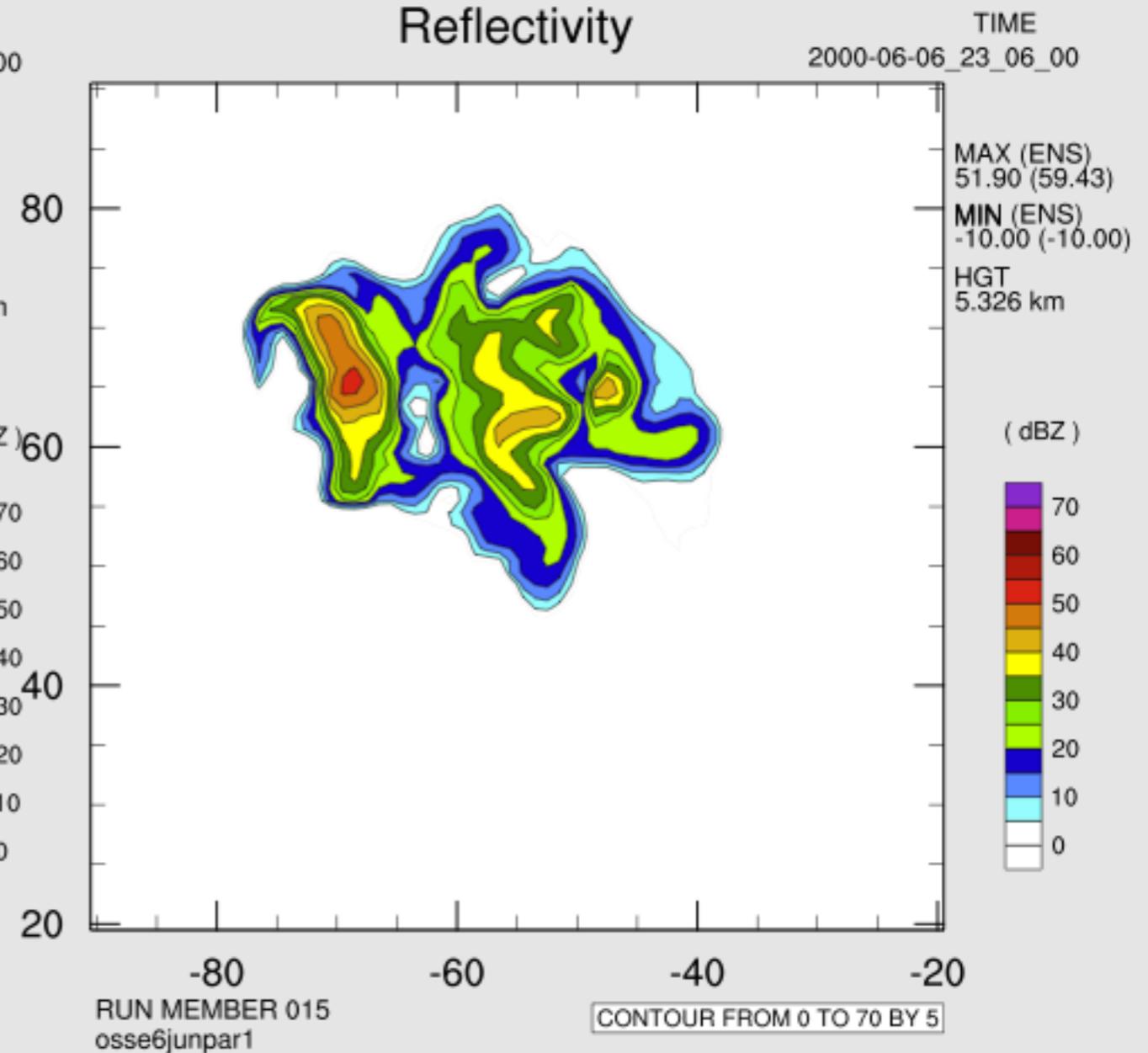
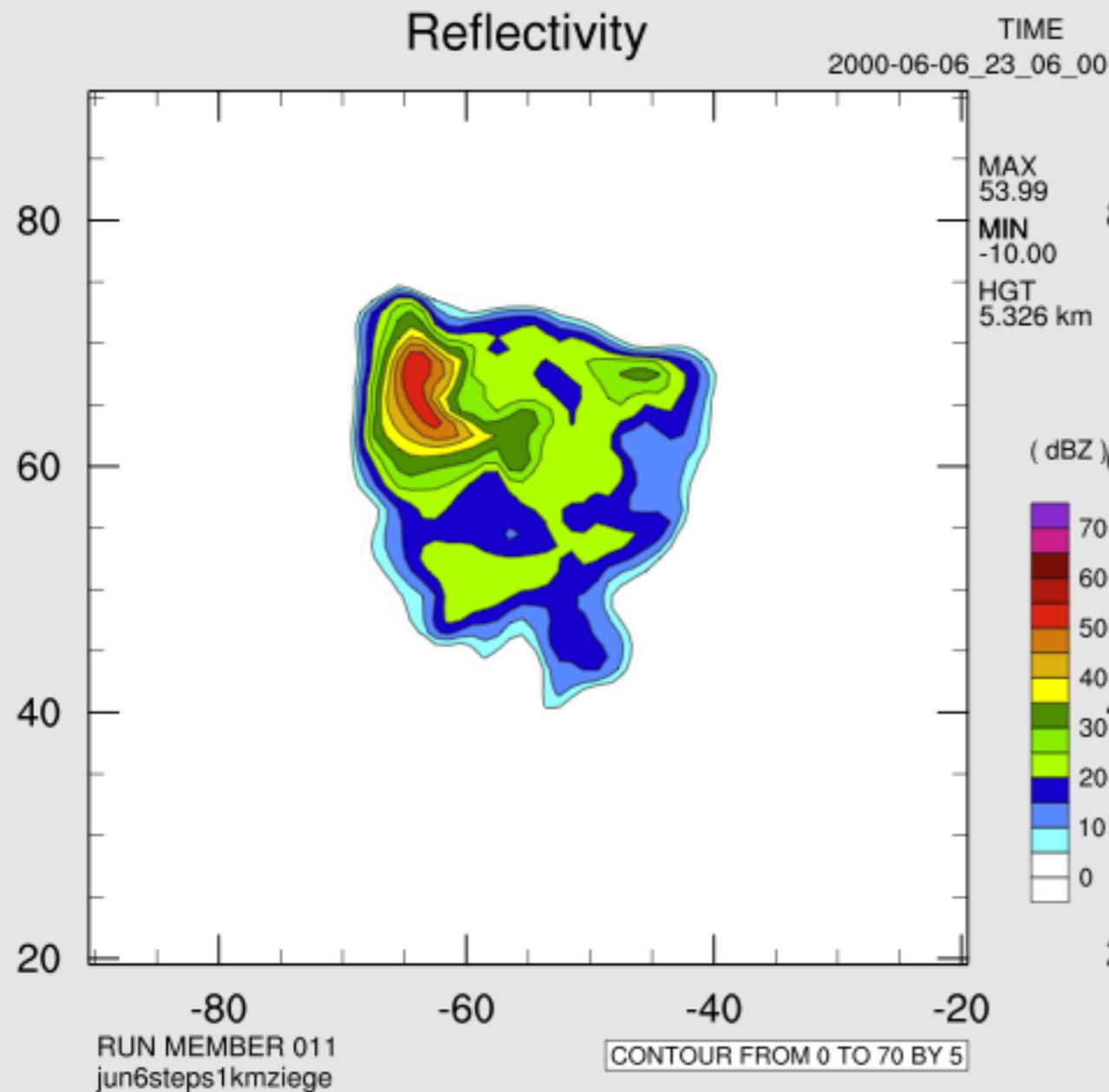


"Real data OSSE"

- EnKF analysis of storm from 6 June 2000 (STEPS)
 - Assimilated observed radar reflectivity and radial velocity.
 - Activated electrification and lightning in all members
- Selected one ensemble member to serve as 'truth' for observing systems simulation experiment (OSSE). Produced pseudo-GLM "observations" (8 km grid)
- Used graupel echo volume (GV) - flash rate (FR) relationship from Cohen (2008) as observation operator: $FR = 0.0407 GV - 3.64$
 - Thermal perturbations added to initiate convection where lightning is present

Good match....



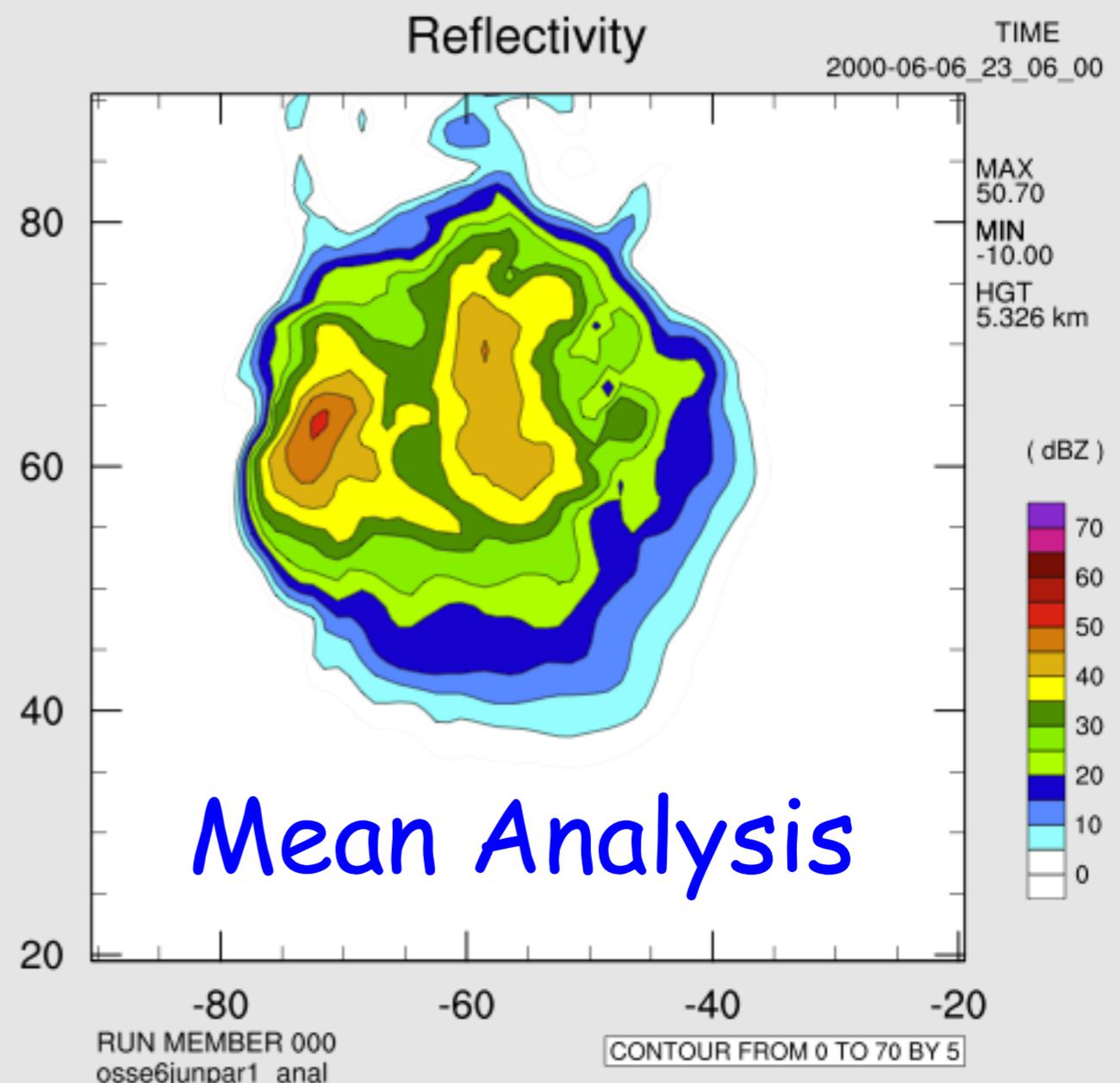
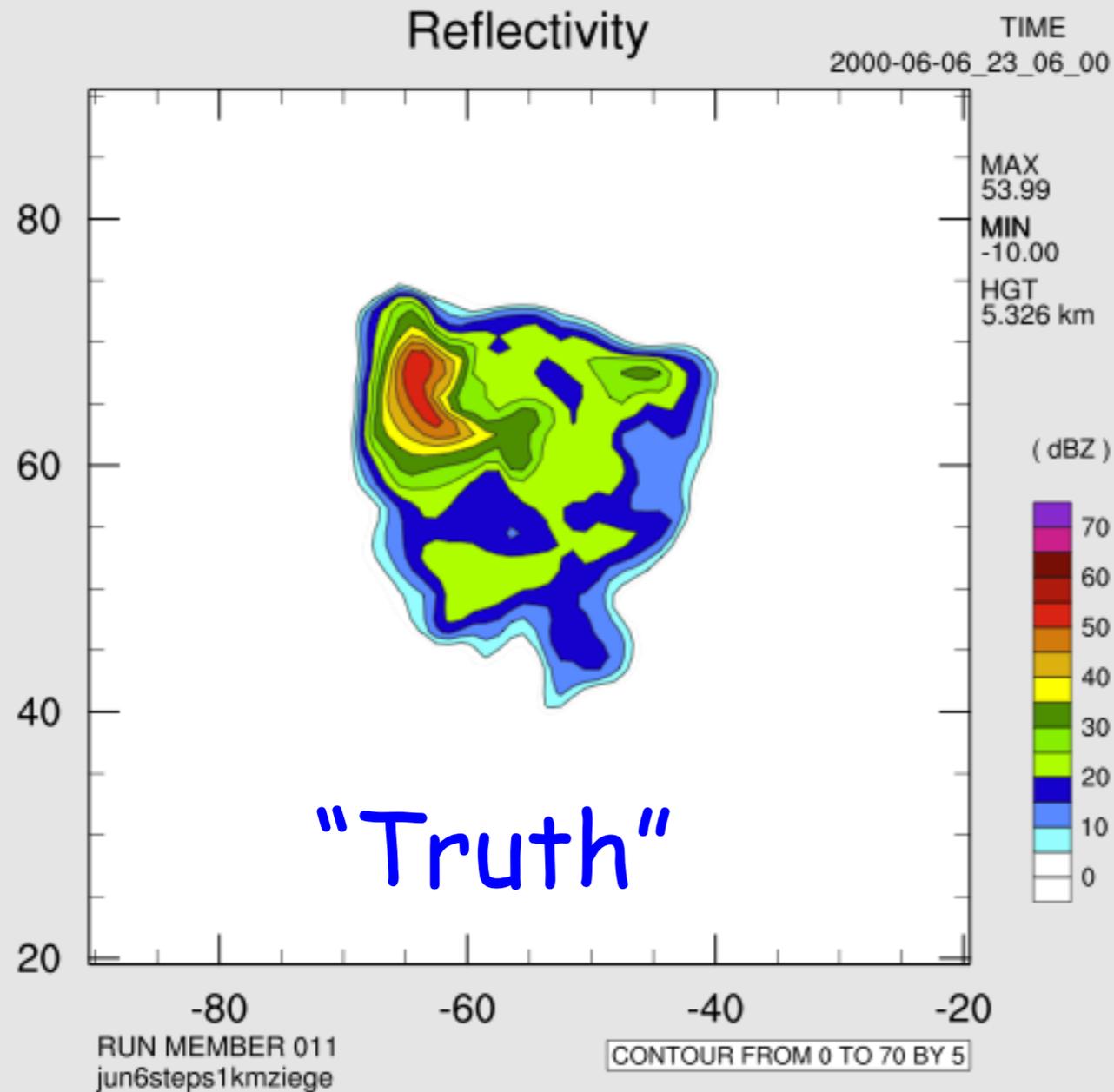
"Truth"

Member 15

Summary

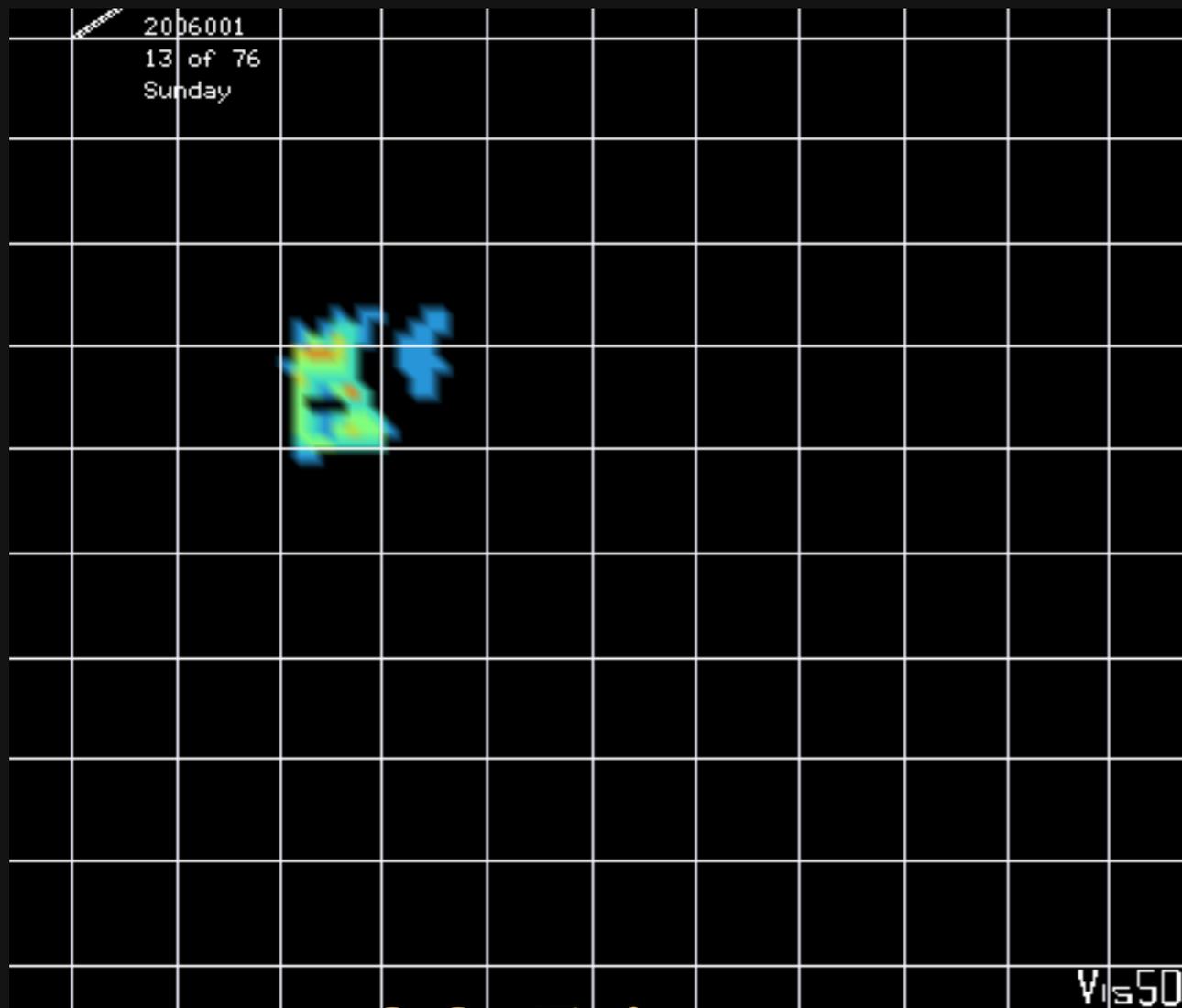
- EnKF assimilation of pseudo GLM data seems to work! Note broadening of small cells, particularly as storms cross pixel boundaries.
- OSSEs properly adjust variables (e.g., updraft) unconnected to the flash rate relationship.
- Work in progress: EnKF assimilation of detailed data (radar) and compare observed flash rates (e.g., LMA) and model (graupel, flash rate, charge separation rate, etc.)
- Next step: Generate and assimilate GLM proxy from LMA data

"Truth" vs. Analysis with GLM after 54 minutes of assimilation

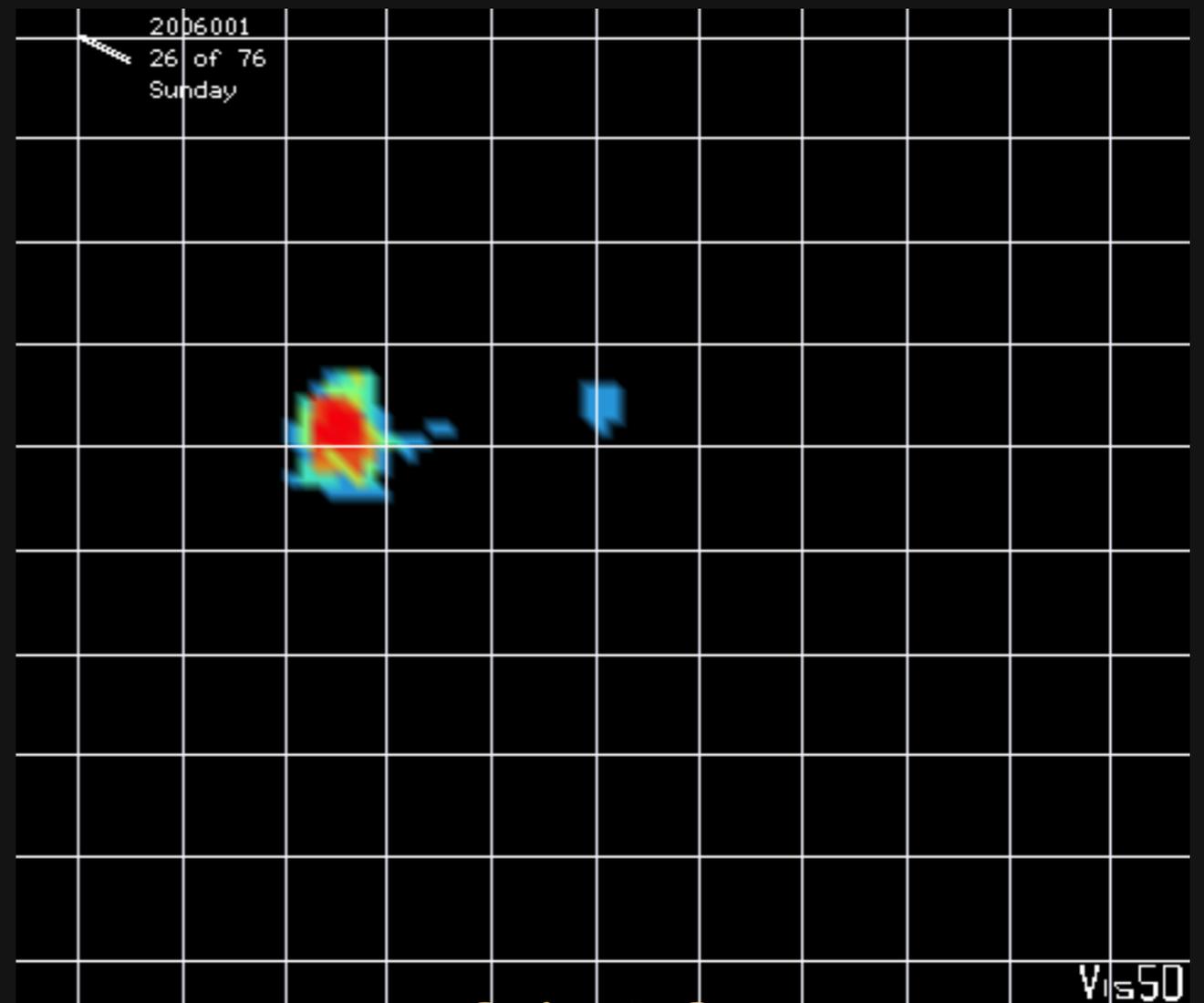


Gets strong cell in good location, but too broad

"Truth" lightning (1km vs. 8km)



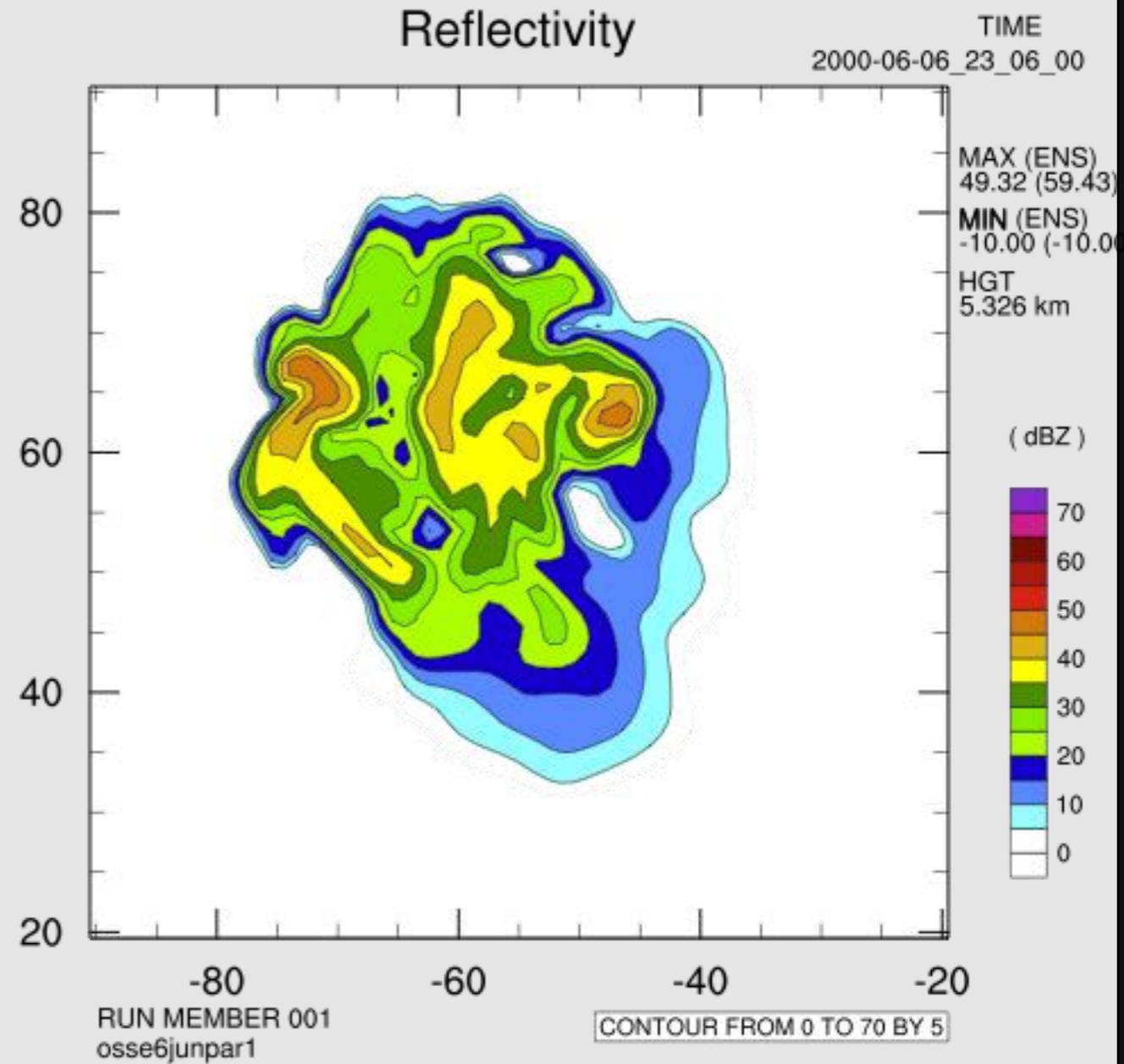
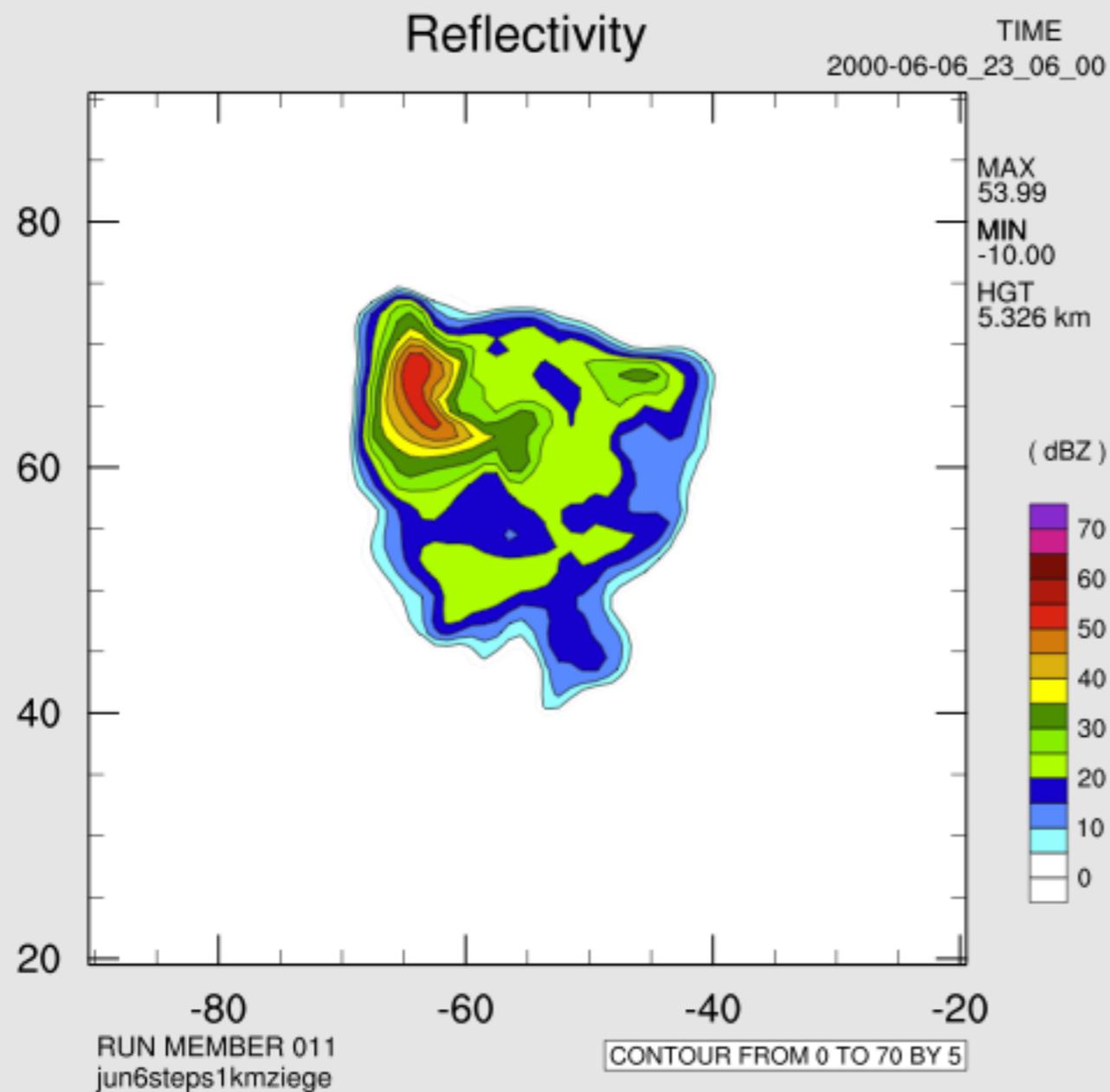
00:54



01:20

Grid Lines = 8 km pseudo GLM resolution:
Gives location of electrified convection, but
artificial broadening.

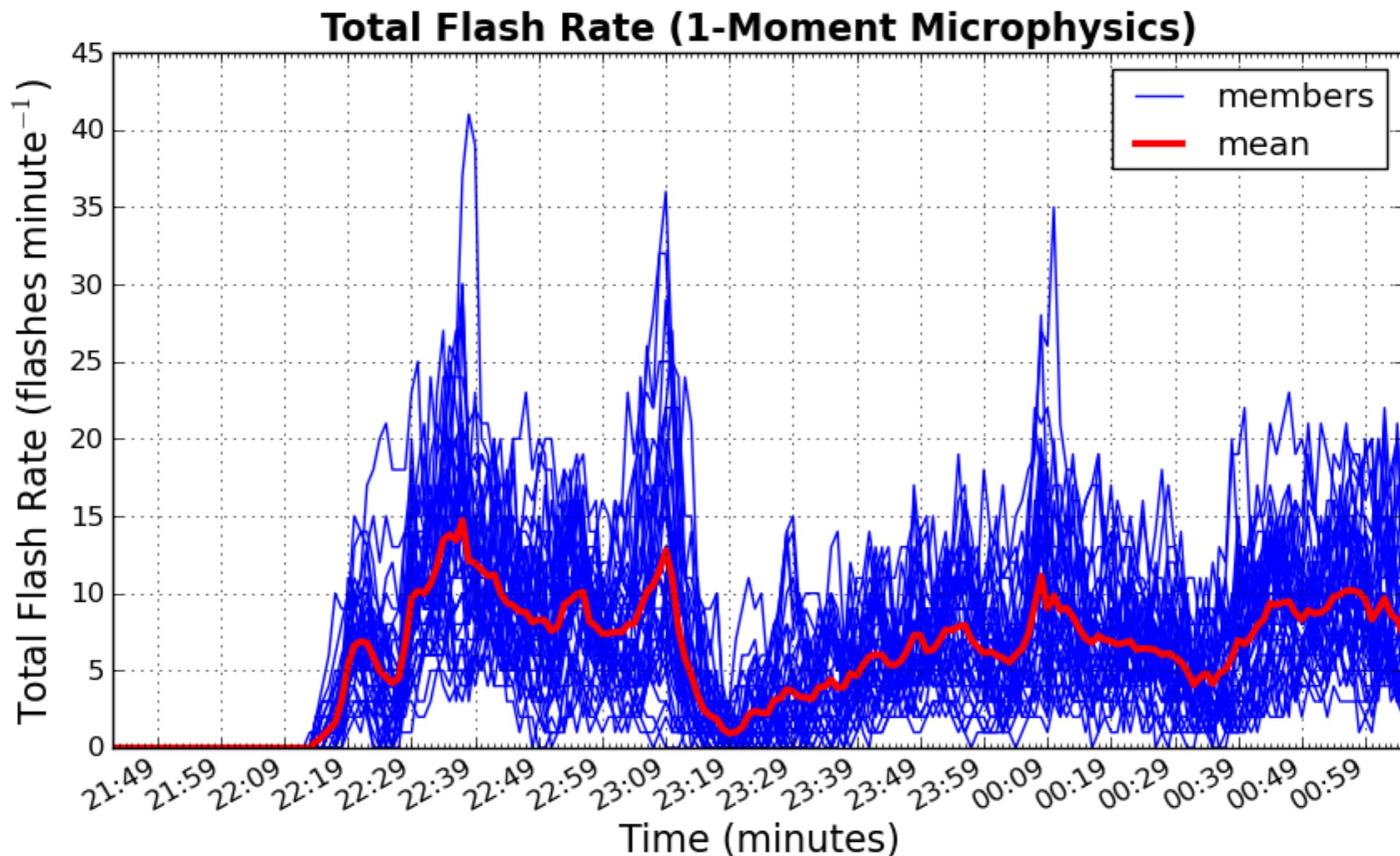
Not as good match, but still in the ball park



"Truth"

Member 1

Real data EnKF radar assimilation



Selected member 11 as "truth" for OSSE