Mobile soundings in VORTEX2

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with

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acknowledgments:

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Instrument description

- 2 MGAUS units from NCAR/EOL + 1 helium supply vehicle
  137 sondes* allocated for ‘09
- 2 MGAUS-equivalent sounding units from NOAA/NSSL
  130 sondes* allocated for ‘09
- 1 comparable unit from SUNY-Oswego (Scott Steiger)
  on-station for 2 weeks (25 May-9 June)
  ~20 sondes* allocated for ’09
- basic specs:
  nominal ascent ~ 4 m/s
  launch interval ~40-60 min *while stationary*
  can receive data on the move (but winds may suffer)
  can transmit data once sounding is complete
- staffing of MGAUS trucks: M. Parker and G. Bryan (coord. vehicle)
  + 2 EOL technicians + 5 NCSU students
  = 2 people/vehicle + a “hot spare”

*Vaisala RS-92 GPS sondes

Science objectives

- pre-storm environment and mesoscale heterogeneity:
  - refinement of V2 forecast/target (+ SPC/other centers)
  - NWP, storm simulation, and data assimilation projects
  - baseline for study of environment modification by storms

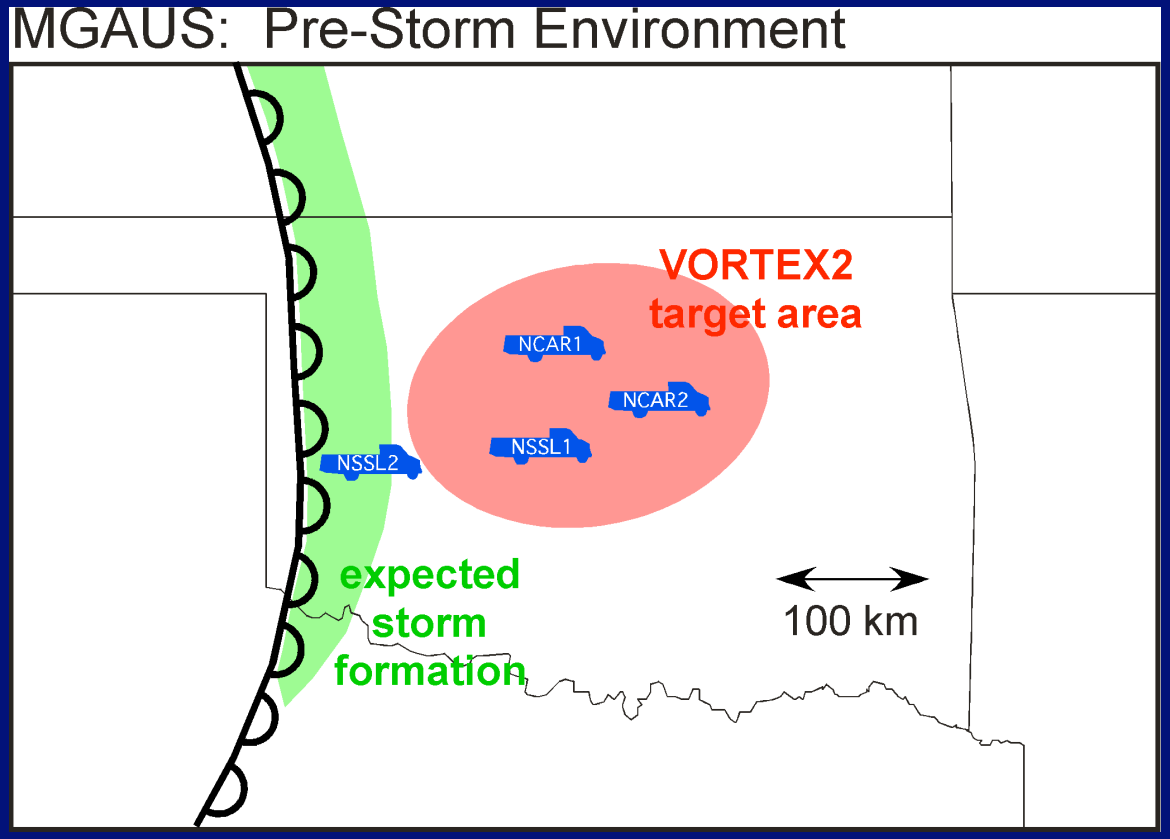
- storm-environment interactions:
  - pre-existing mesoscale boundaries and interactions
  - storm-scale baroclinity and horizontal vorticity generation (forward flank and anvil shading boundaries)
  - near-storm lapse rates, evolution in time and space, cause/effect assoc. with tornadic vs. non-tornadic storms
  - upshear environment and relationship to RFD properties
  - evolution of PBL structure and lid in afternoon/evening

Deployment strategies

pre-storm environmental soundings

a) uncertain/diffuse/distant target: we travel/stay with V2 armada, and launch 1 balloon periodically as able

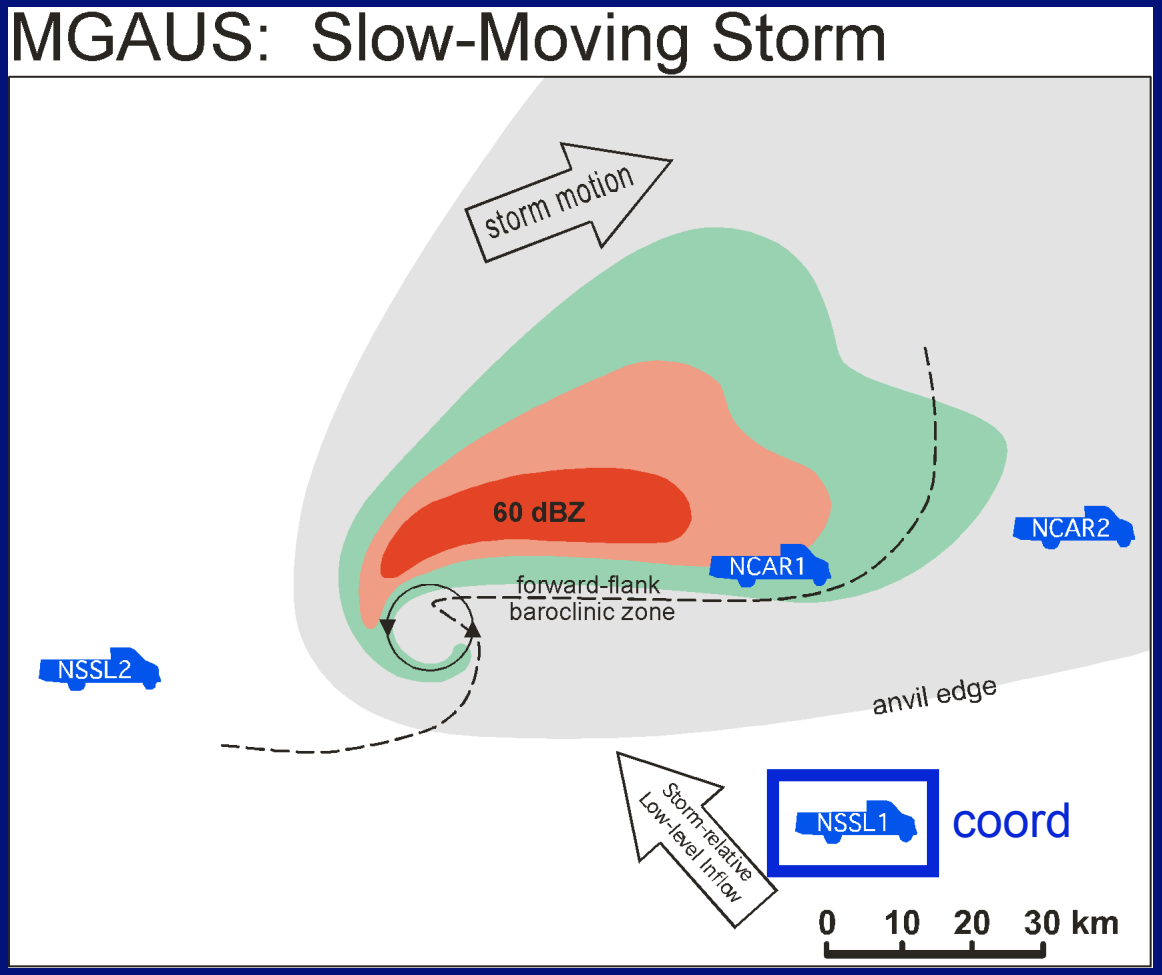
b) well-defined & nearby target: simultaneous 4-vehicle launch coordinated with 18Z or 21Z NWS/ARM soundings:



Deployment strategies

SUNY-Oswego not shown; they will supplement

Very slow-moving storms

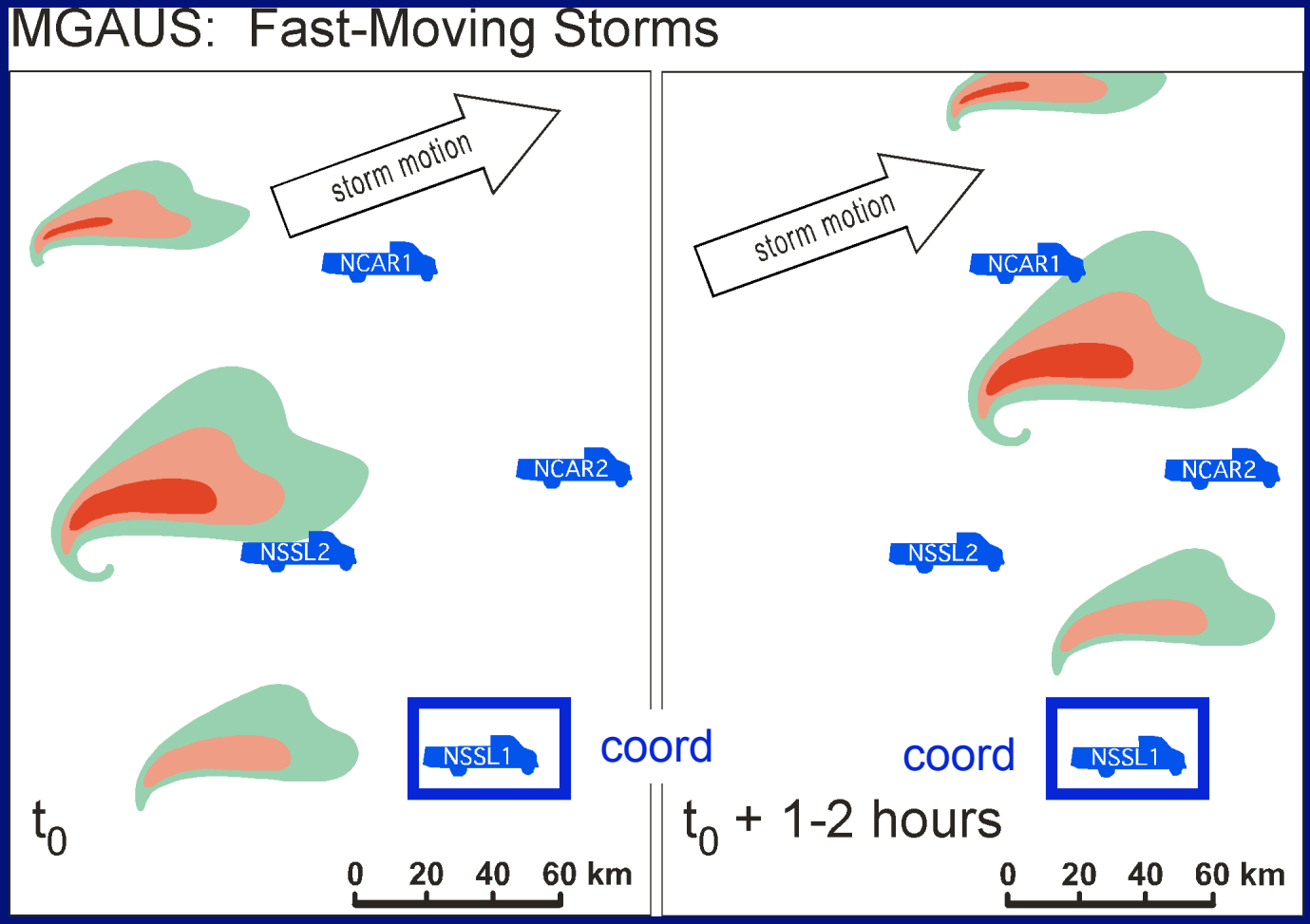


Given the necessary set-up/tear-down time, forward-flank launches are only possible in very slowly-moving storms.

Deployment strategies

SUNY-Oswego not shown; they will supplement

moderate or fast-moving storms (default setup)



Calculations and discussion with prior MGAUS staffers suggest it won't be practical to keep repositioning the vehicles. By staying put, we can launch more frequently and thus capture a greater number of storm-relative positions. The parallelogram can be morphed into a 'T' or 'L' when desired.

Remaining issues to be worked out:

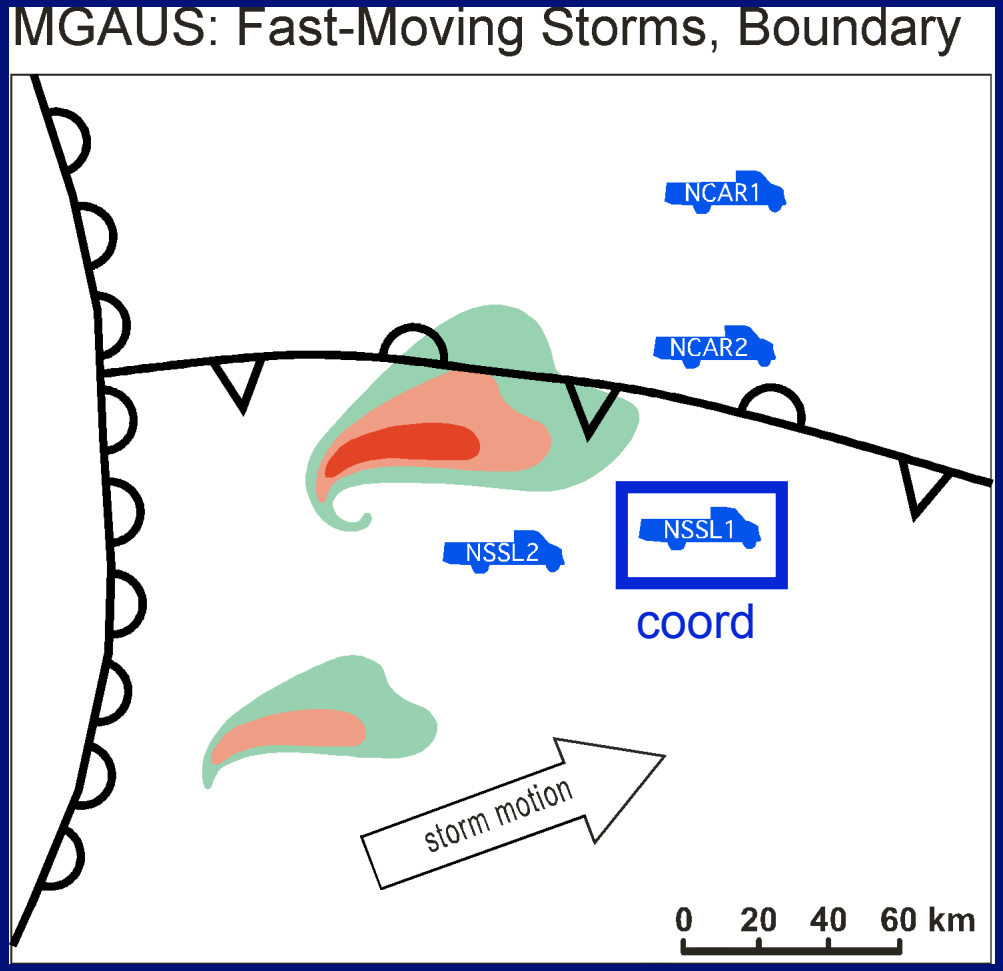
- What is the best use of the ~20 supplemental SUNY-Oswego soundings?
- Is it important to have a surface observing station at the launch point for QC purposes? Is a conventionally available portable surface station (e.g. like a WXT510 or a "Sticknet" sensor) suitable for this purpose?
- Helium re-supply logistics
- Launch procedures in high wind or heavy precipitation
- Unique communications demands as we will be too far away/apart to use VHF radio or the MDN

Extra slides

Deployment strategies

SUNY-Oswego not shown; they will supplement

variant: faster-moving storms near pre-existing boundaries



This variation on the default setup will be attempted when a targeted storm approaches a well-defined pre-existing boundary.