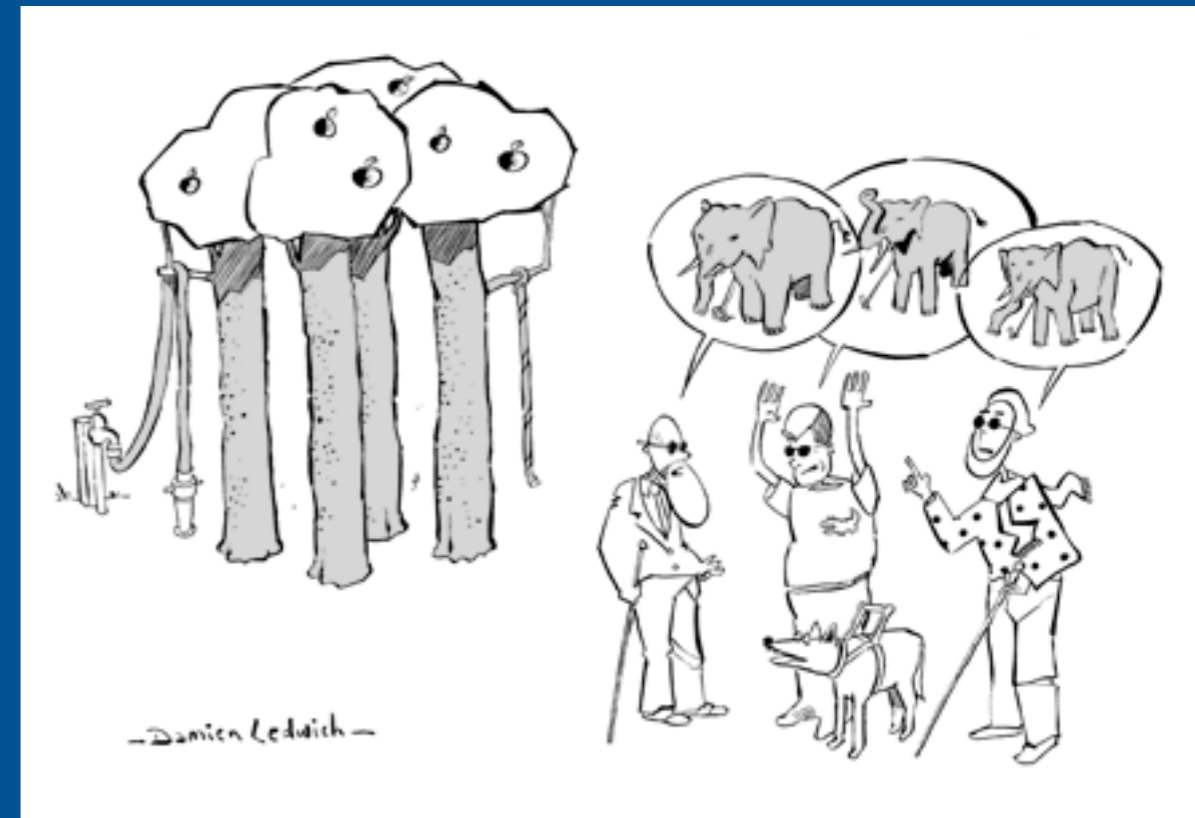
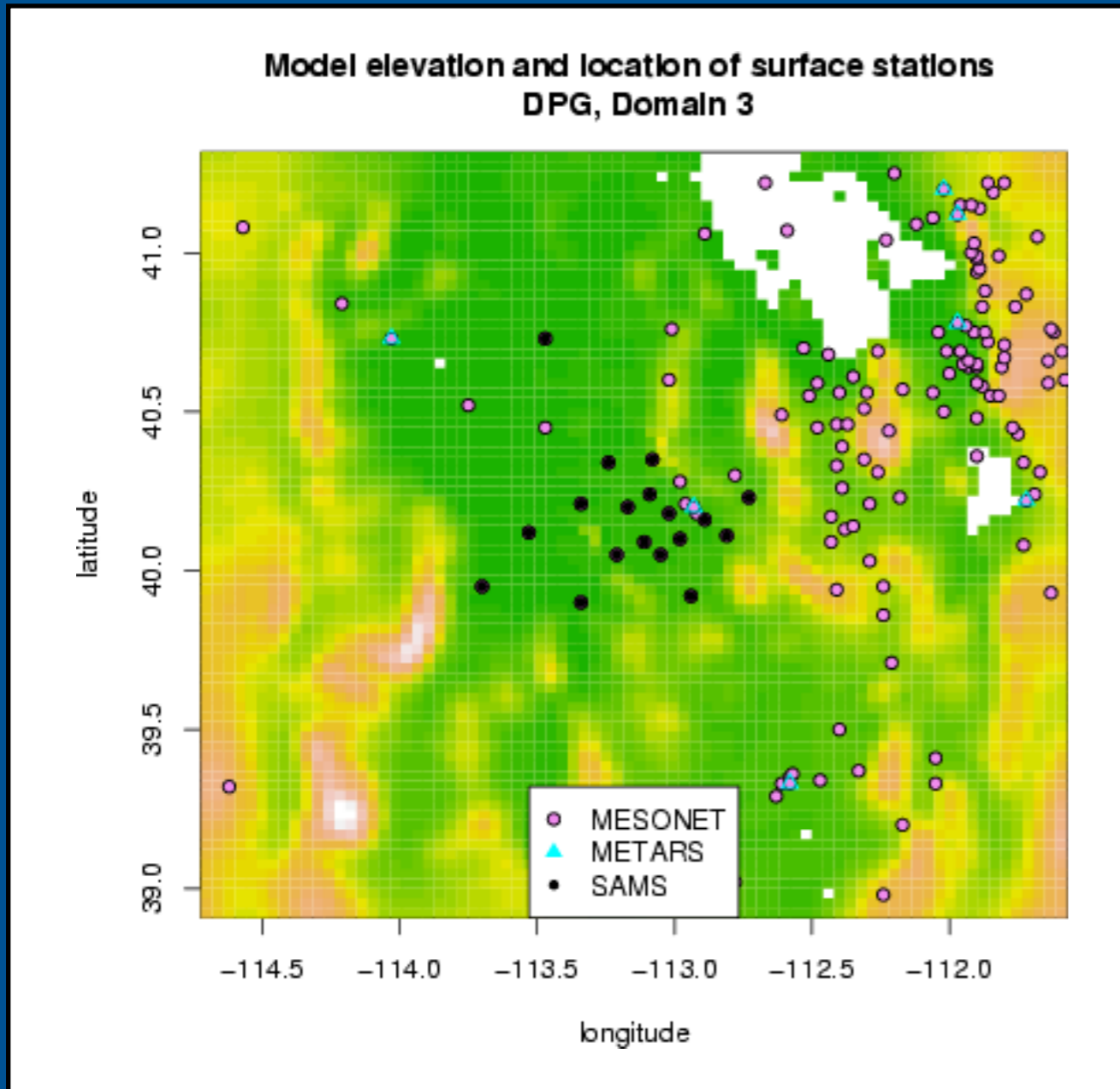


# Climatological Analysis with GCAT and MetVault

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# Climate is the synthesis of the weather in a particular region



Location of surface stations on  
DPG, Domain 3

# Global Climatological Analysis Tool (GCAT)

- GCAT uses the RTFDDA system (MM5/WRF mesoscale model + assimilation of observations) to build a database of gridded “weather” phenomena over a particular region of earth.
- “Weather database” extends over many years (usually 20-40) which are then “combined” to estimate the expected weather and its associated variability and/or uncertainty over a particular region.

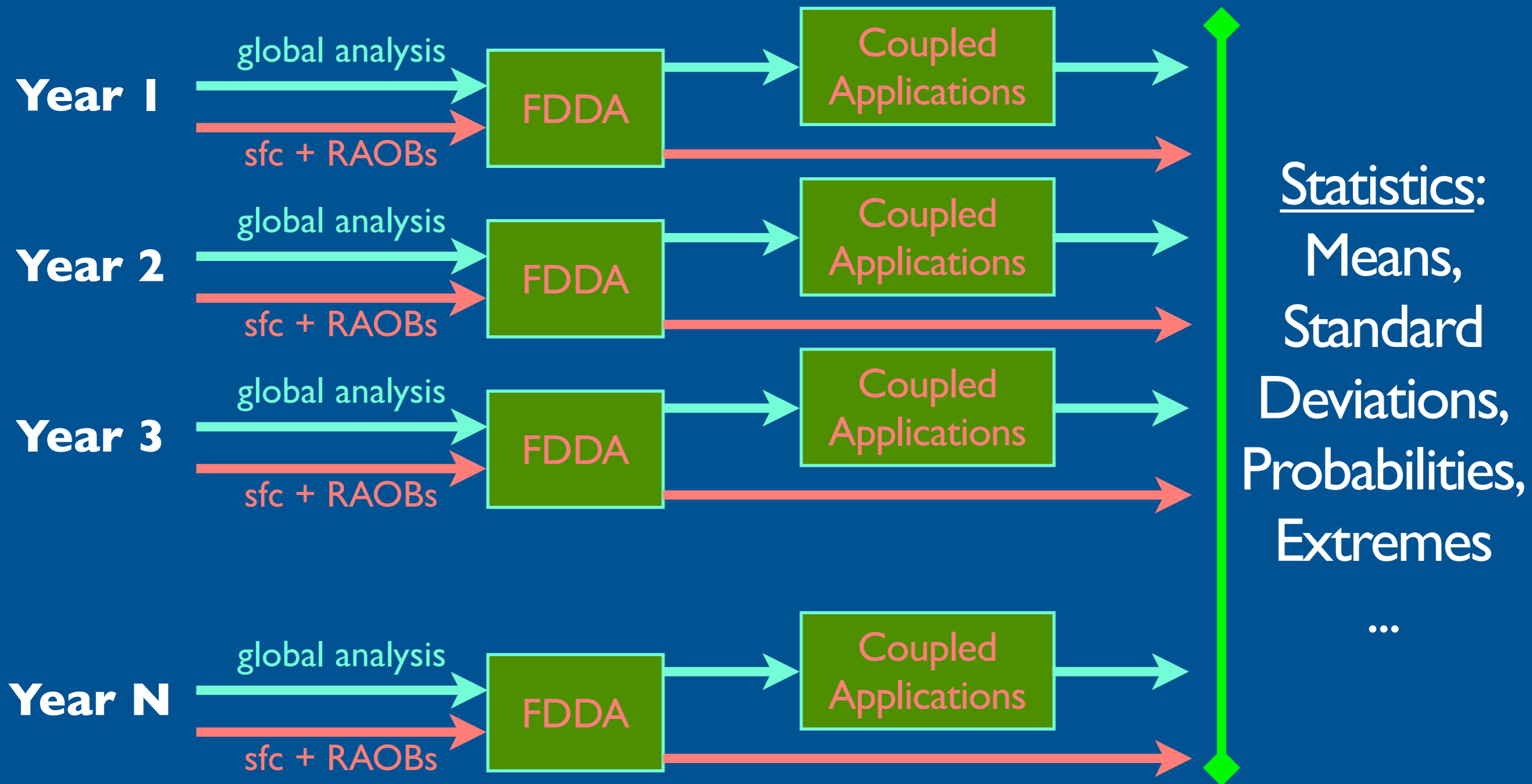
# GCAT purpose - continued

- GCAT “extends” the climatology from the observation locations (SAMS, RAOB, etc.) to a fine-resolution grid using a dynamically consistent tool (takes into account fine-resolution topography, land, coastline, etc.)
- The generated “weather” and its uncertainty could then be used to drive coupled applications:
  - ▶ transport and dispersion; urban dispersion models
  - ▶ sound propagation
  - ▶ energy generation potential and siting

# Possible applications of GCAT at the ranges

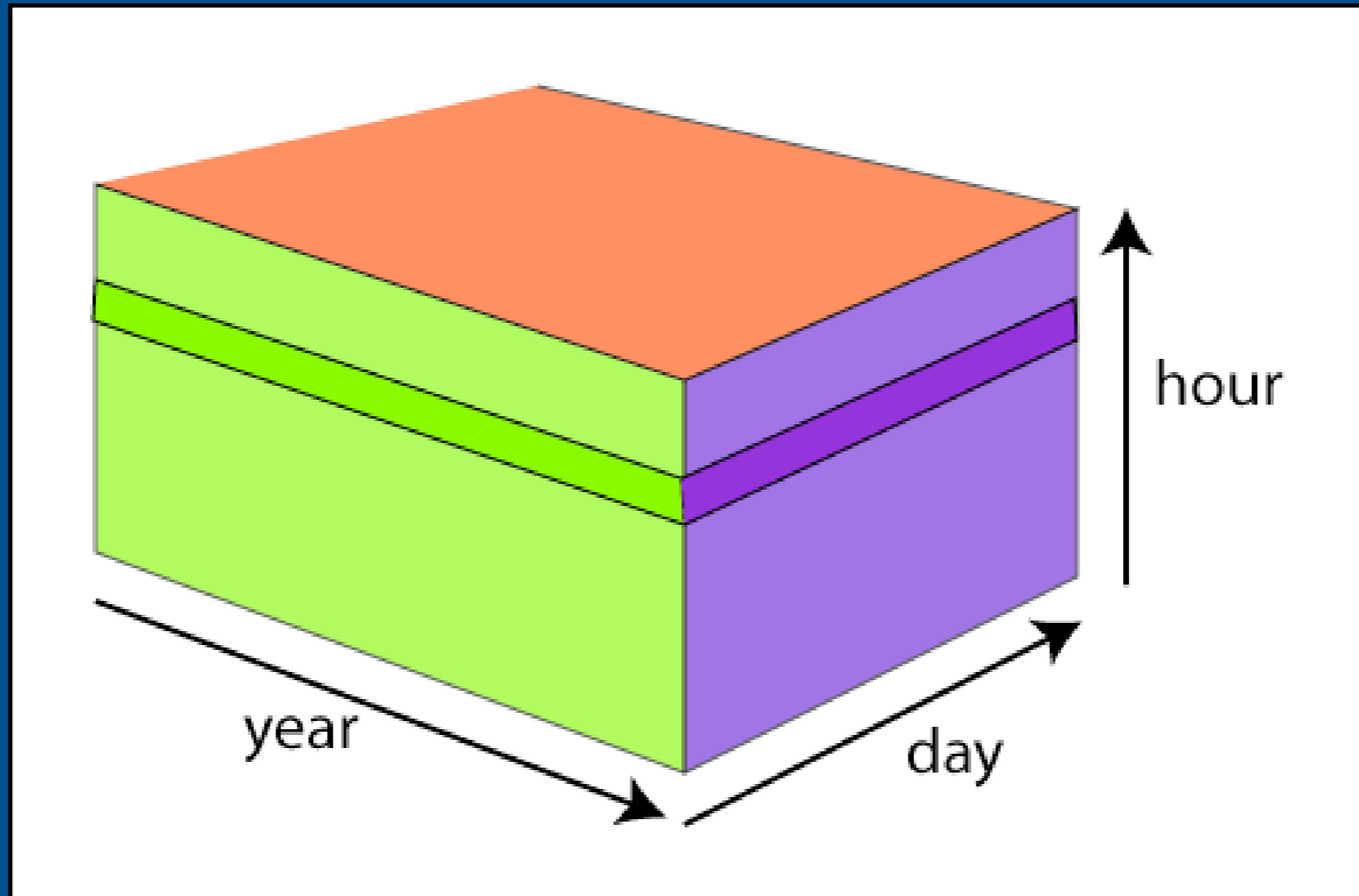
- Help locate weather-sensitive installations (air strips, roads, permanent test siting)
- Help decide on time of the year and location for a specific test (how hot/cold, how windy) - apply weather-specific thresholds;
- Possible uses for quality control of observations
- Help locate new observing systems

# GCAT procedure



GCAT GUI demo...

# “GCAT Data Cube”



# Model Statistics: ATC, D3, Jan-Feb

Mean T at 00Z

Max T

Min T

ATC Domain 3

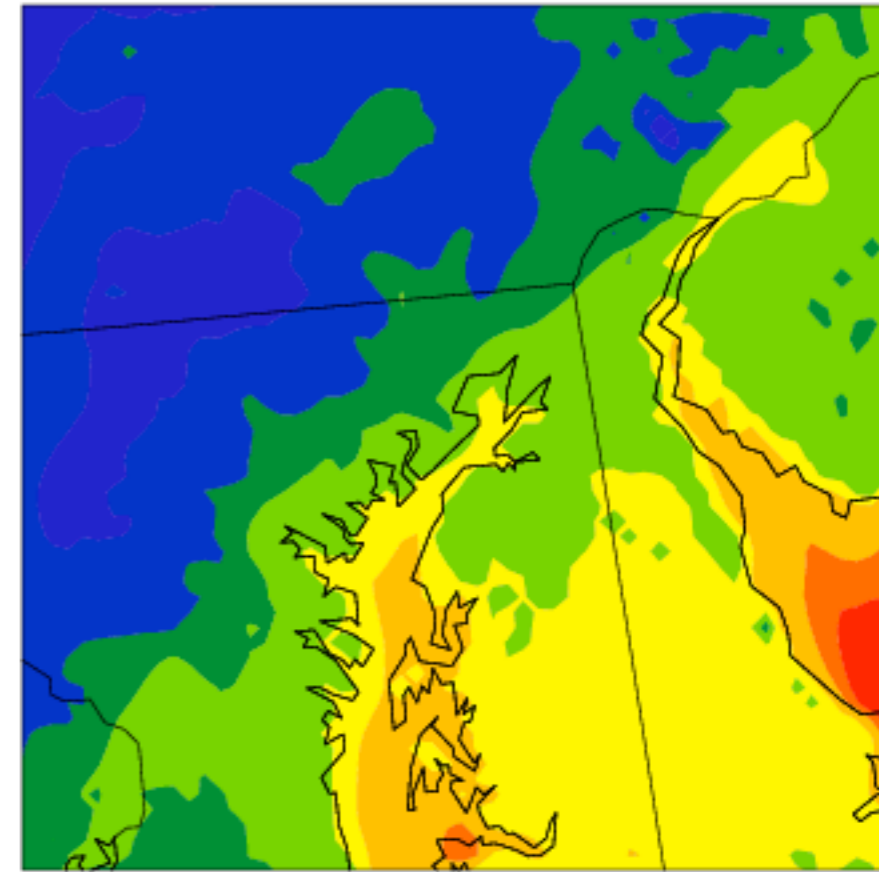
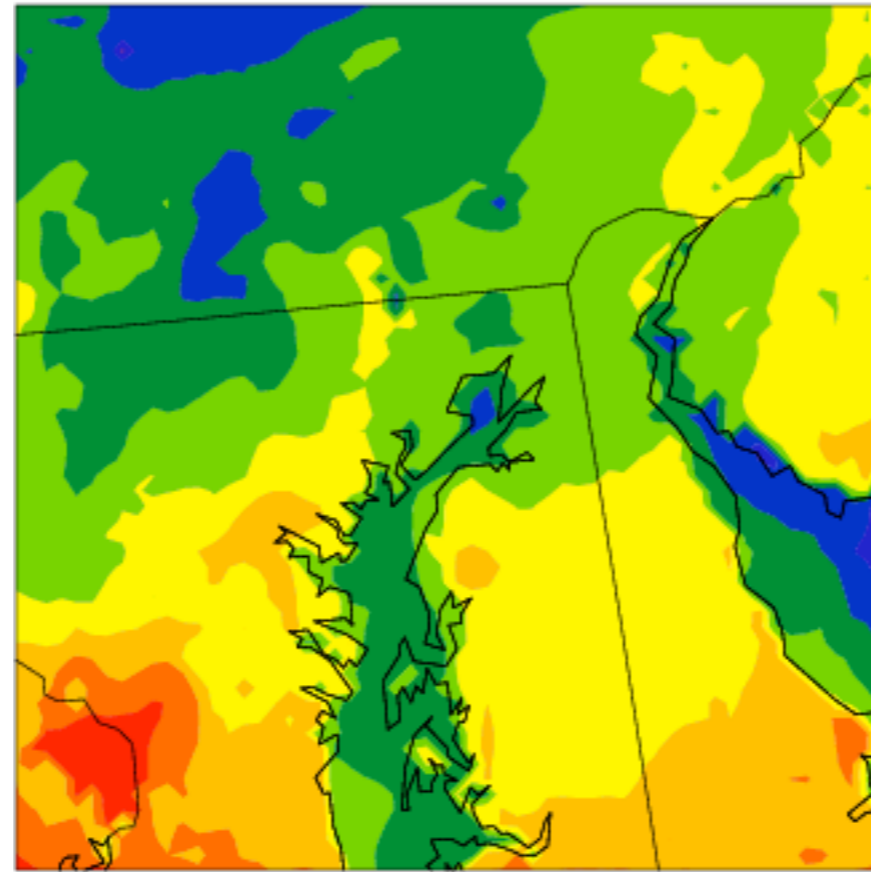
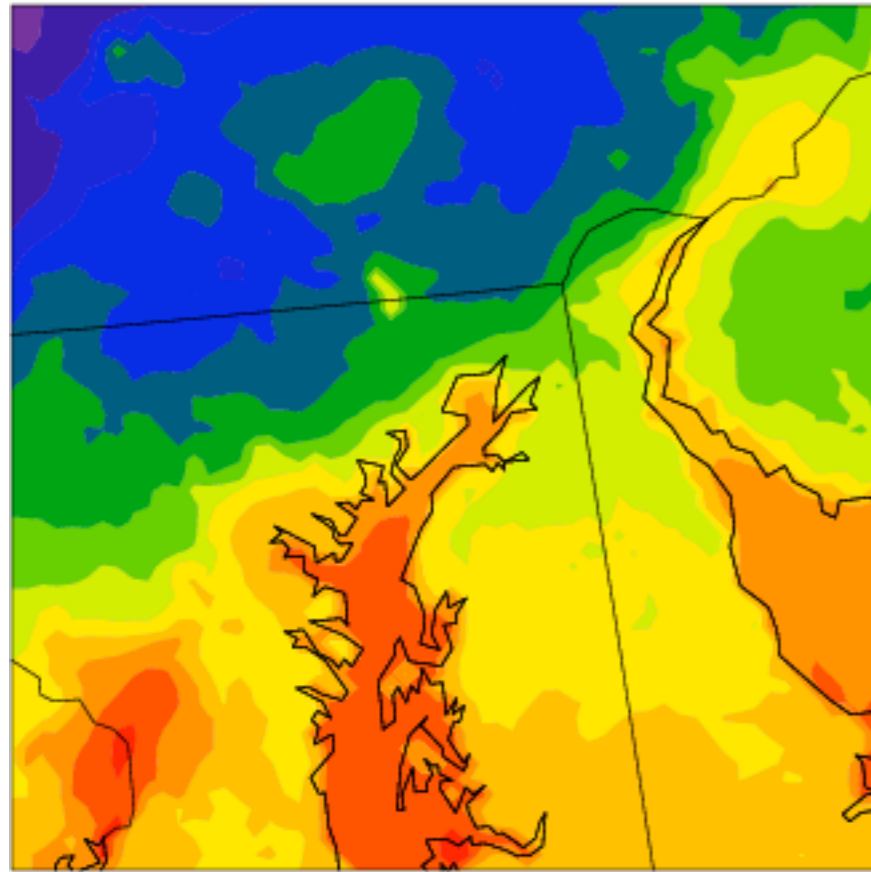
T2

ATC Domain 3

Max T

ATC Domain 3

Min T



273.5 274.5 275.5 276.5 277.5 278.5



286 290



260 262 264 266

# Model Statistics: ATC, D3, Jan-Feb

Max Wind Speed

Prob.  $V > 5$  m/s

Prob.  $V > 10$  m/s

ATC Domain 3

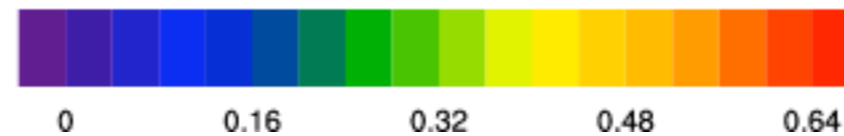
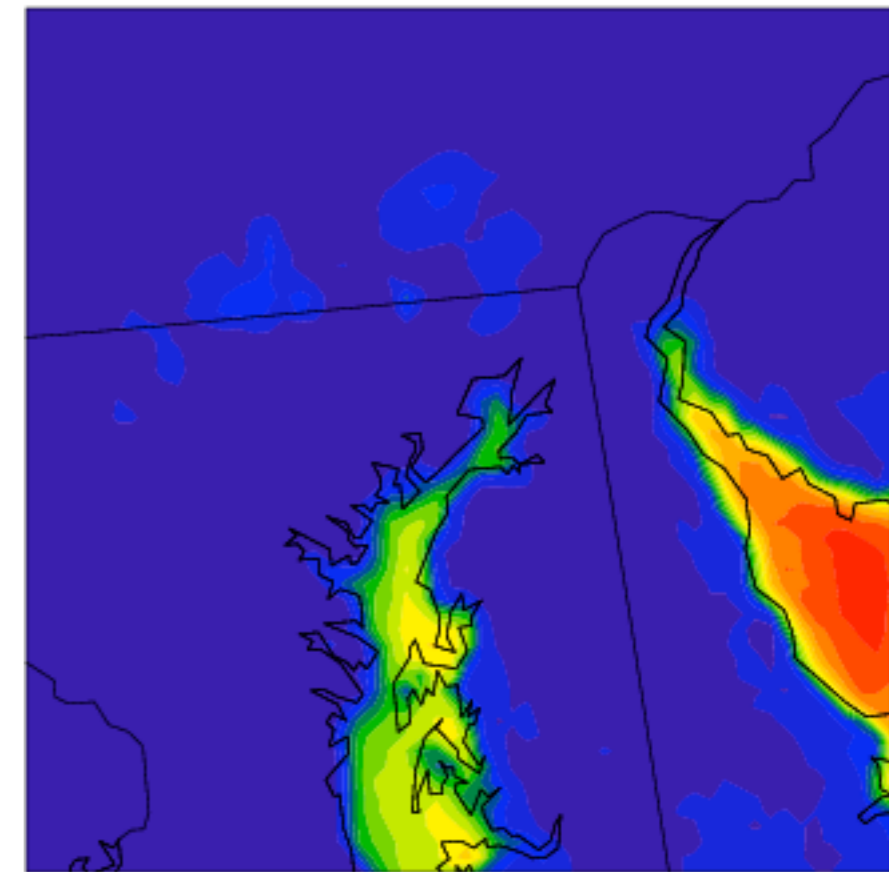
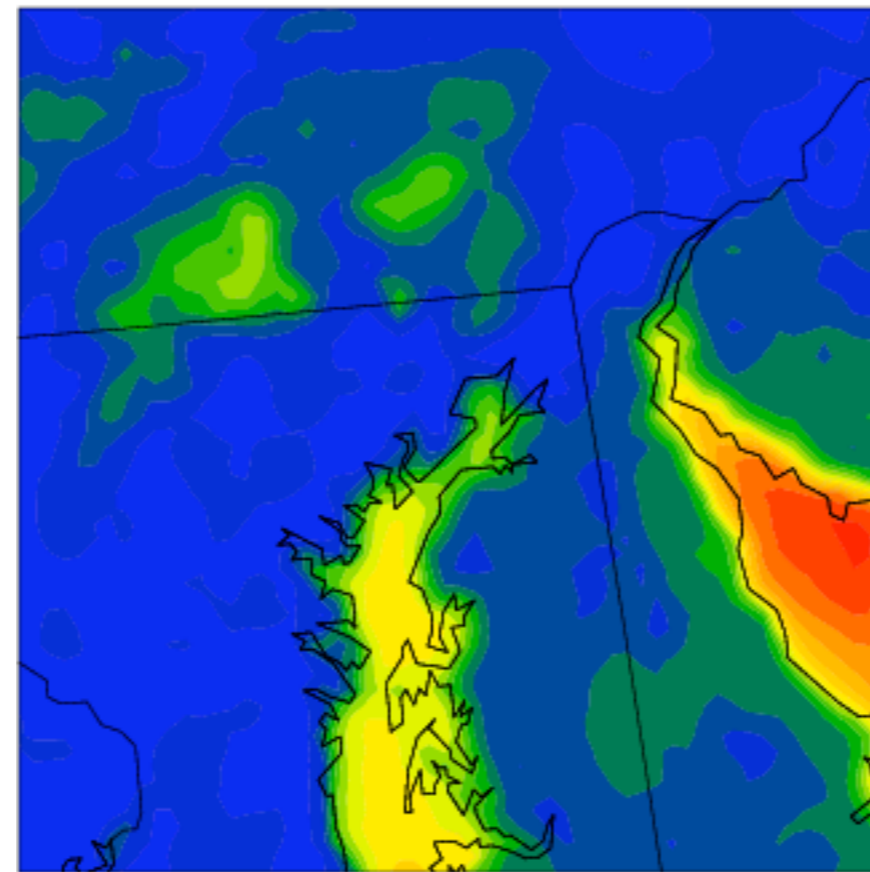
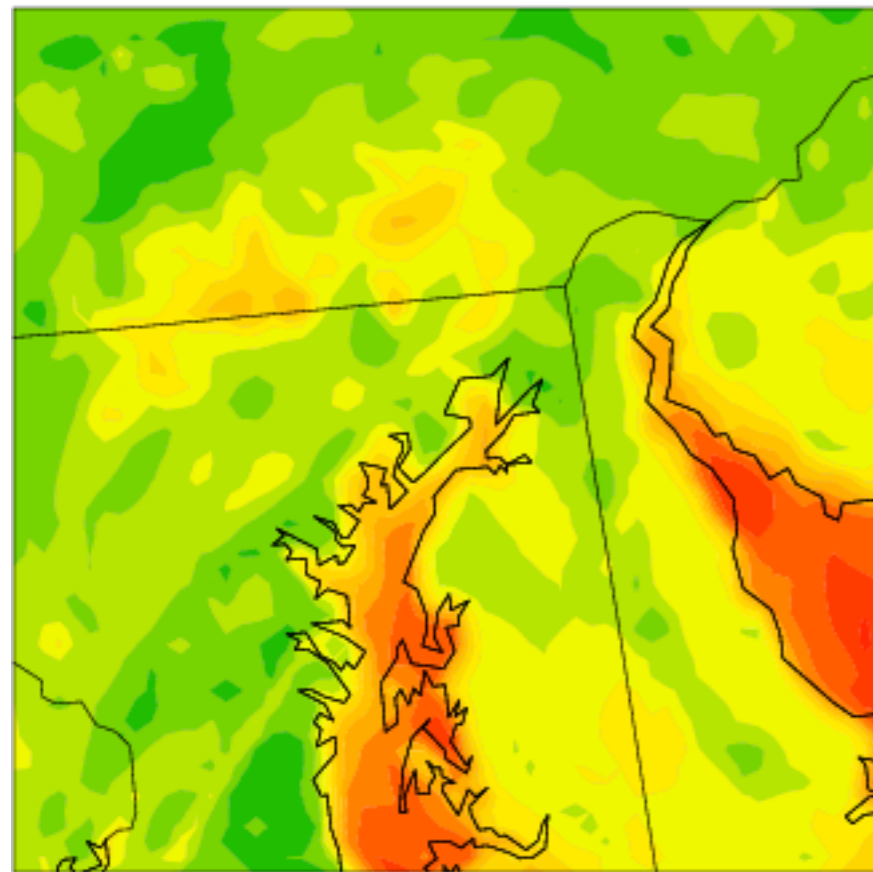
WSPD

ATC Domain 3

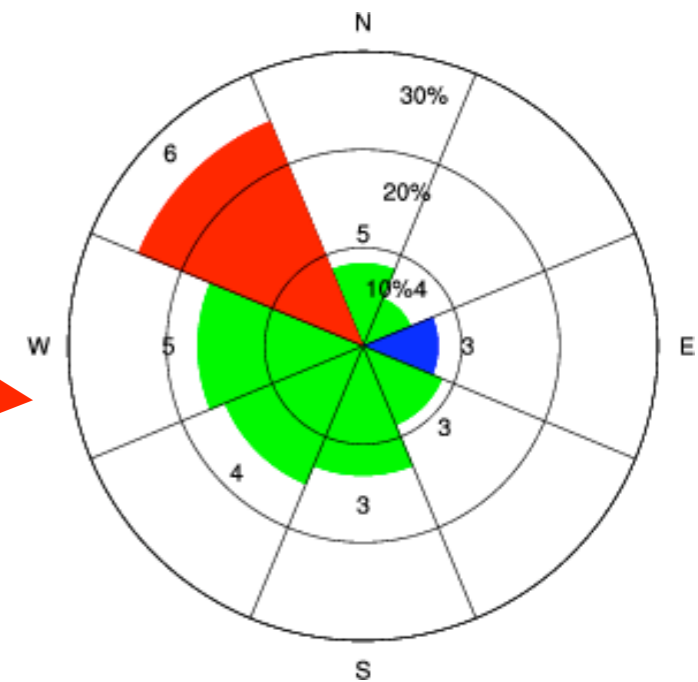
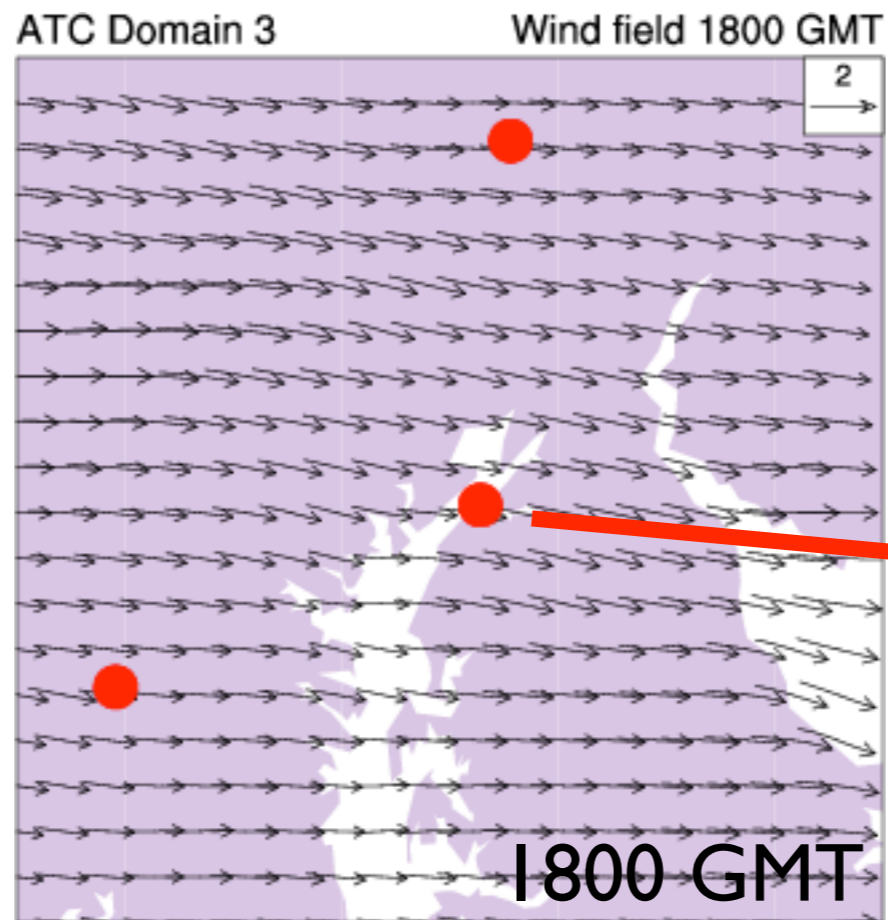
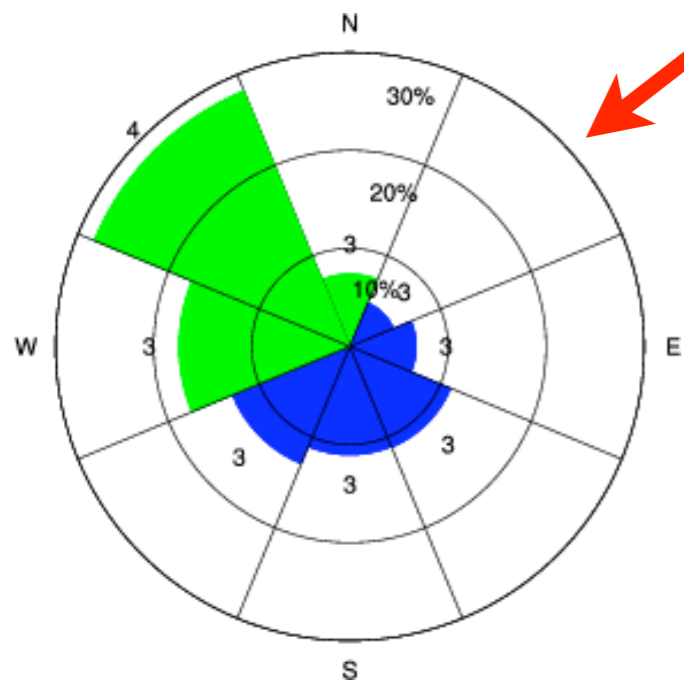
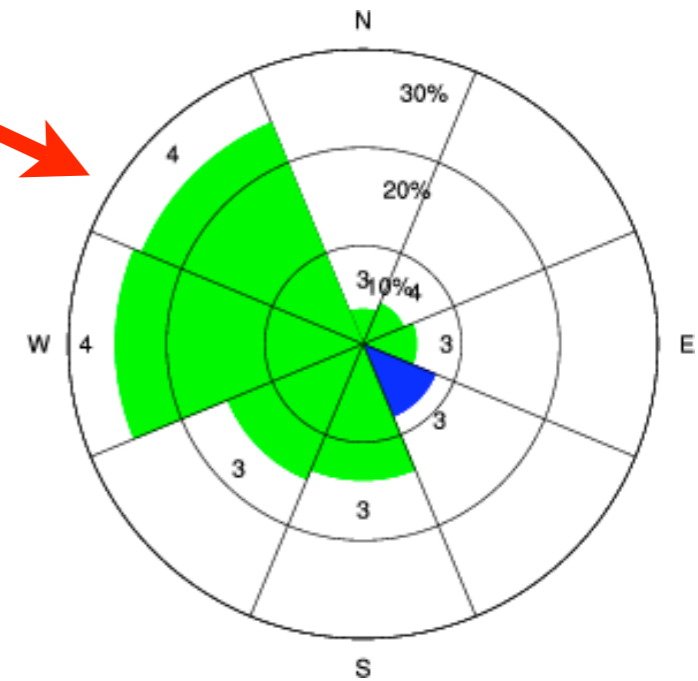
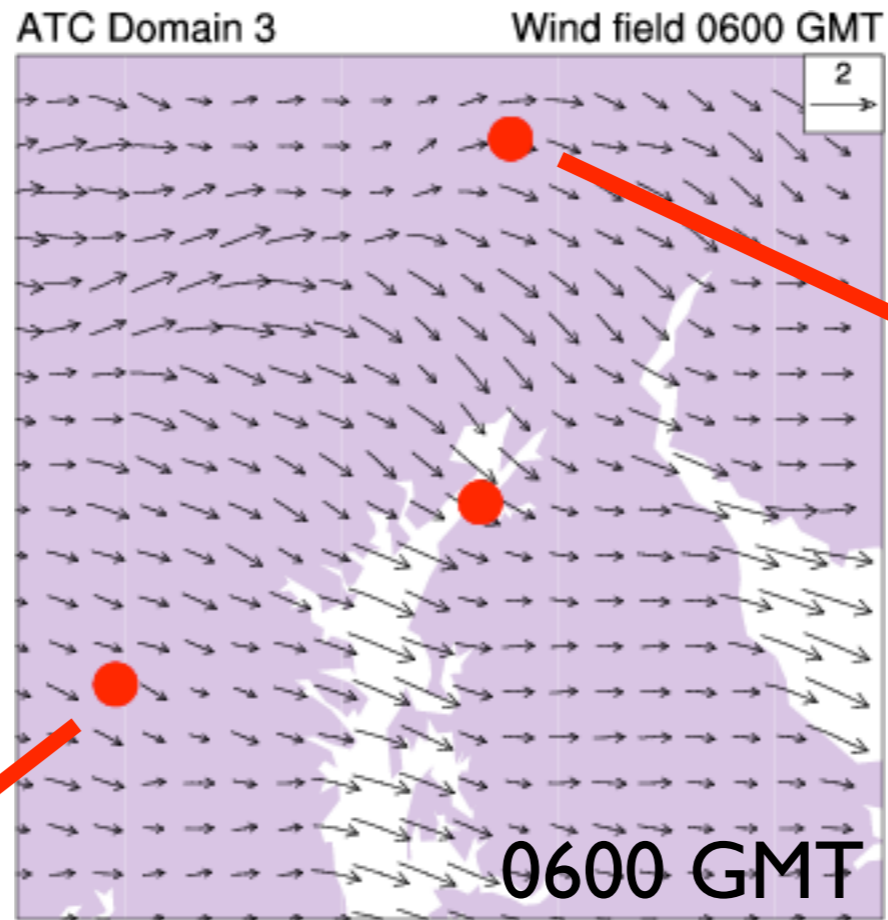
WSPD > 5 m/s

ATC Domain 3

WSPD > 10 m/s



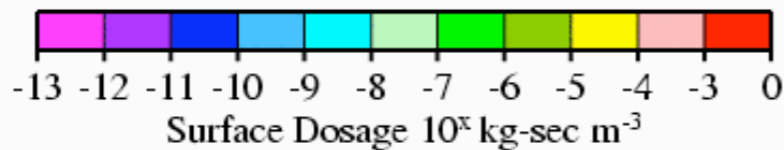
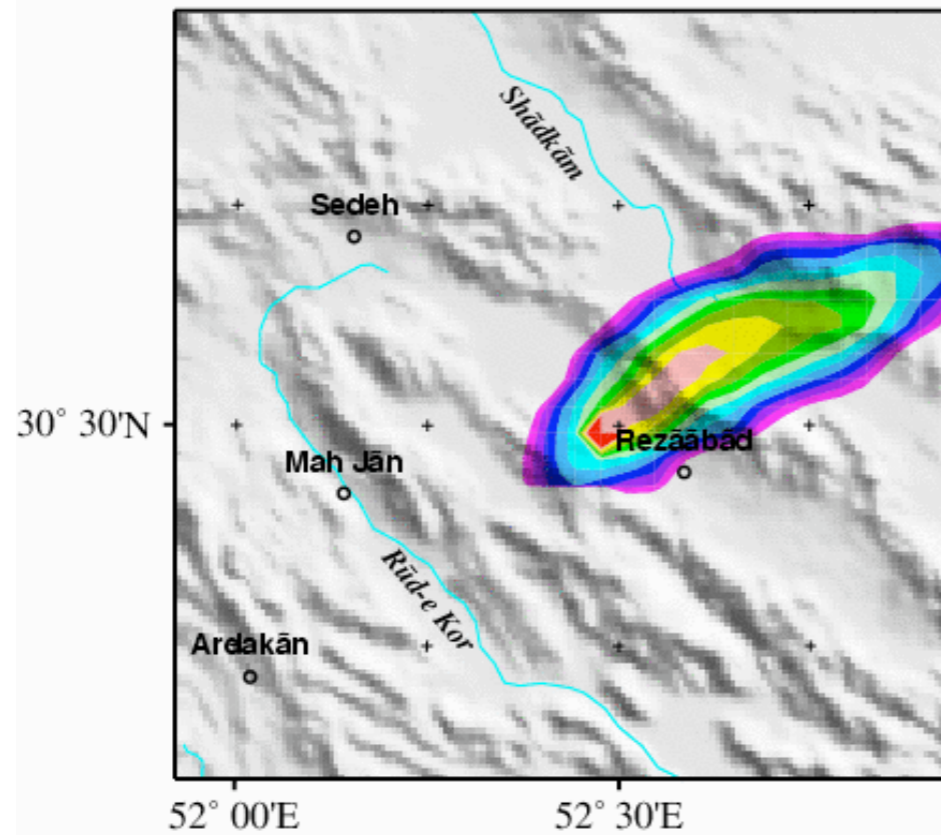
# MM5 Wind Climatology at ATC Jan-Feb



# Coupled models: SCIPUFF

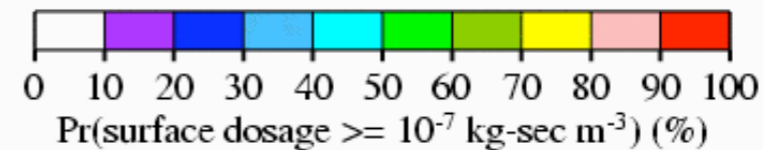
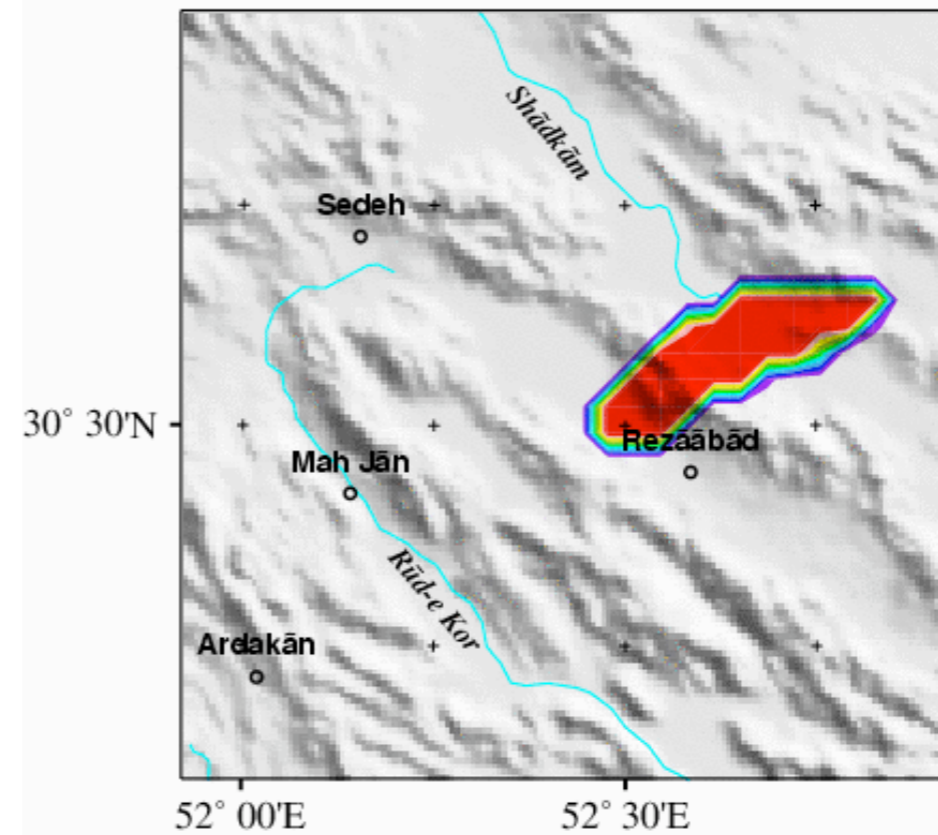
## Surface Dosage for Control Member

VX 12/04/2003 08:00 GMT



## Probability of Surface Dosage Exceeding a Threshold

VX 12/04/2003 08:00 GMT



MetVault demo...