Implementing WRF-based RTFDDA VLES/LES NWP system for supporting T&E at US Army test ranges

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 Many applications, especially ATEC T&E, require forecasts that are subgrid-scale, even for fine mesoscale NWP models









D1: DX = 8.1 km D2: DX = 2.7 km D3: DX = 900 m D4: DX = 300 m D5: DX = 100 m D6: DX = 33 m



Six nested domains 48-hr simulations



Morning Transition Period





D6 (DX = 33 m) W (m/s)

Animation from 14:50 – 17:50 UTC 4 May 2012 Every 2 minutes



Current Time: 445 Current bottom_top_stag: 2 Frame 1 in File wrfout_d06_2012-05-04_14:50:00

-0.5

0.5

n.





NCAR





NCAR



Winter Case







T at 2 m AGL

18 UTC 3 January to 00 UTC 4 January

Every 5 minutes



Simulated 37-m w at dx = 33 m

w at 37 m AGL

18 UTC 3 January to 00 UTC 4 January

Every 5 minutes



Simulated 2-m q_v at dx = 33 m

q_v at 2 m AGL

18 UTC 3 January to 00 UTC 4 January

Every 5 minutes



Banaa of OQ: 0 0006 to 0 000 ka ka t







kg/kg 0.0008 0.001 0.0012 0.0014 0.0016 0.0018 0.002

100 m

300 m











Conclusions (so far)



- VLES, running NWP at 100–300 m grid intervals, is sometimes valuable (not the same as completely realistic) when compared with LES simulations for complex terrain and complex coastal regions
- Ongoing research
 - Study dynamics of microscale flows and their interaction with mesoscale flows
 - Further assess practical value through interaction with operational users
 - Explore the realistic and unrealistic qualities of VLES
 - Data assimilation on VLES and LES grids