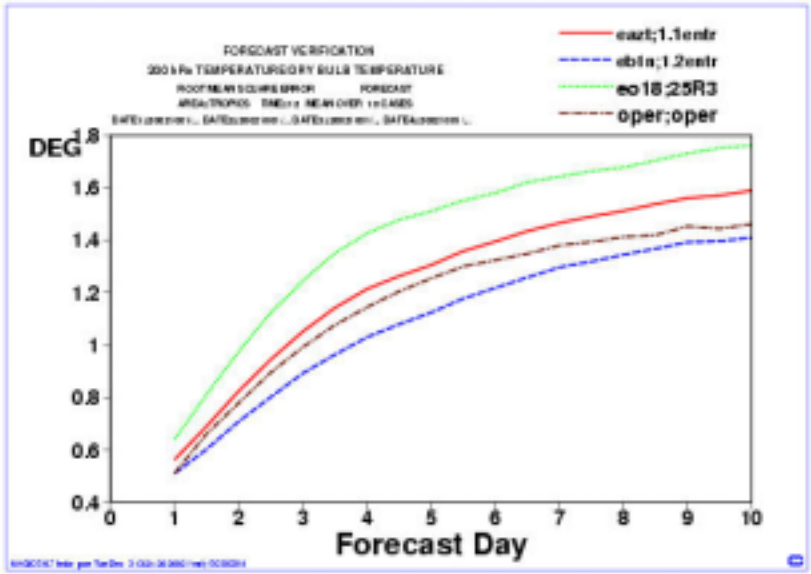
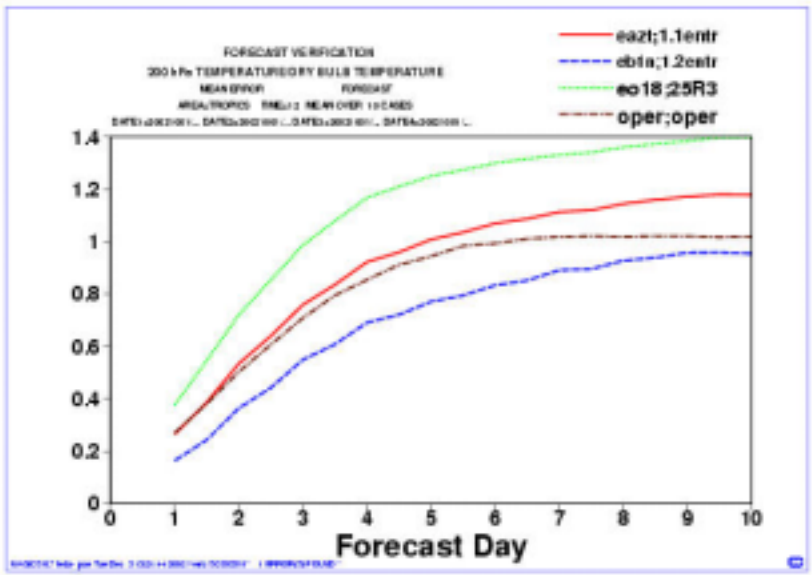
Some recent sensitivity experience to entrainment

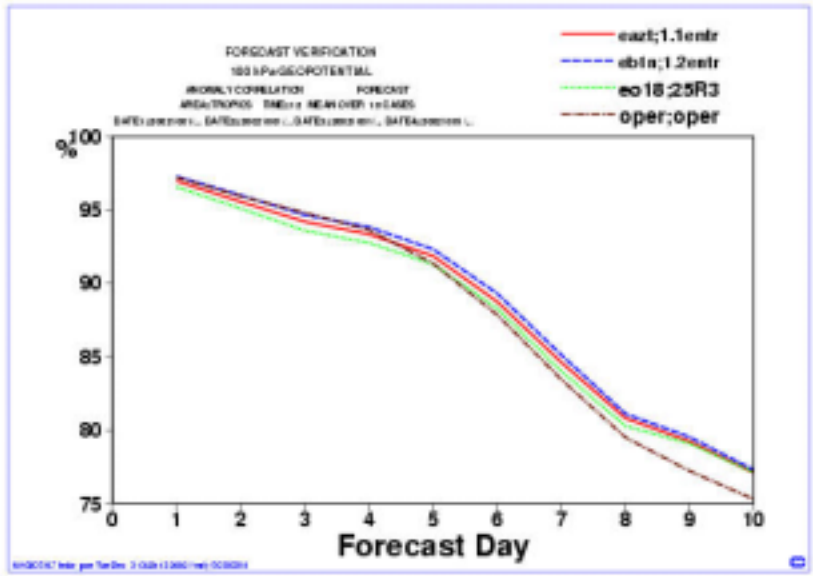
- Jean-Pierre already presented the changes in the convection scheme (starting from the code modifications by Pier and Christian) that were made to improve the (nighttime) convection over land problem ("American Problem" – see presentation Wednesday)
- Like always this required some retuning of the model to correct some biases as something will always degrade (short range – and mean climate), partly because of cloud radiation interaction but also because of momentum transport
  - Modify microphysics: either cloud water/precipitation conversion in convection scheme or ice crystal fall speed in explicit microphysics scheme
  - Entrainment rates

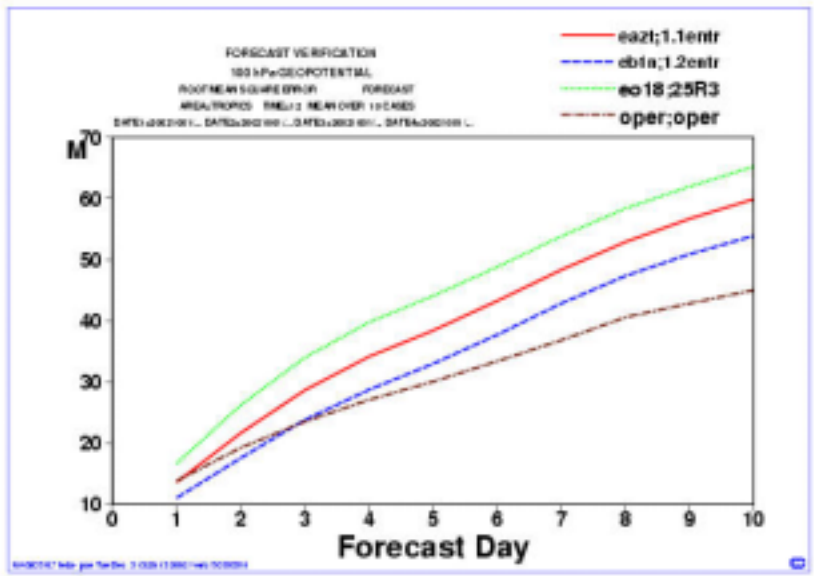
Tropical 200 hPa T errors (K) : RMS and Mean error
Ensemble of 10 10-day forecasts at T511





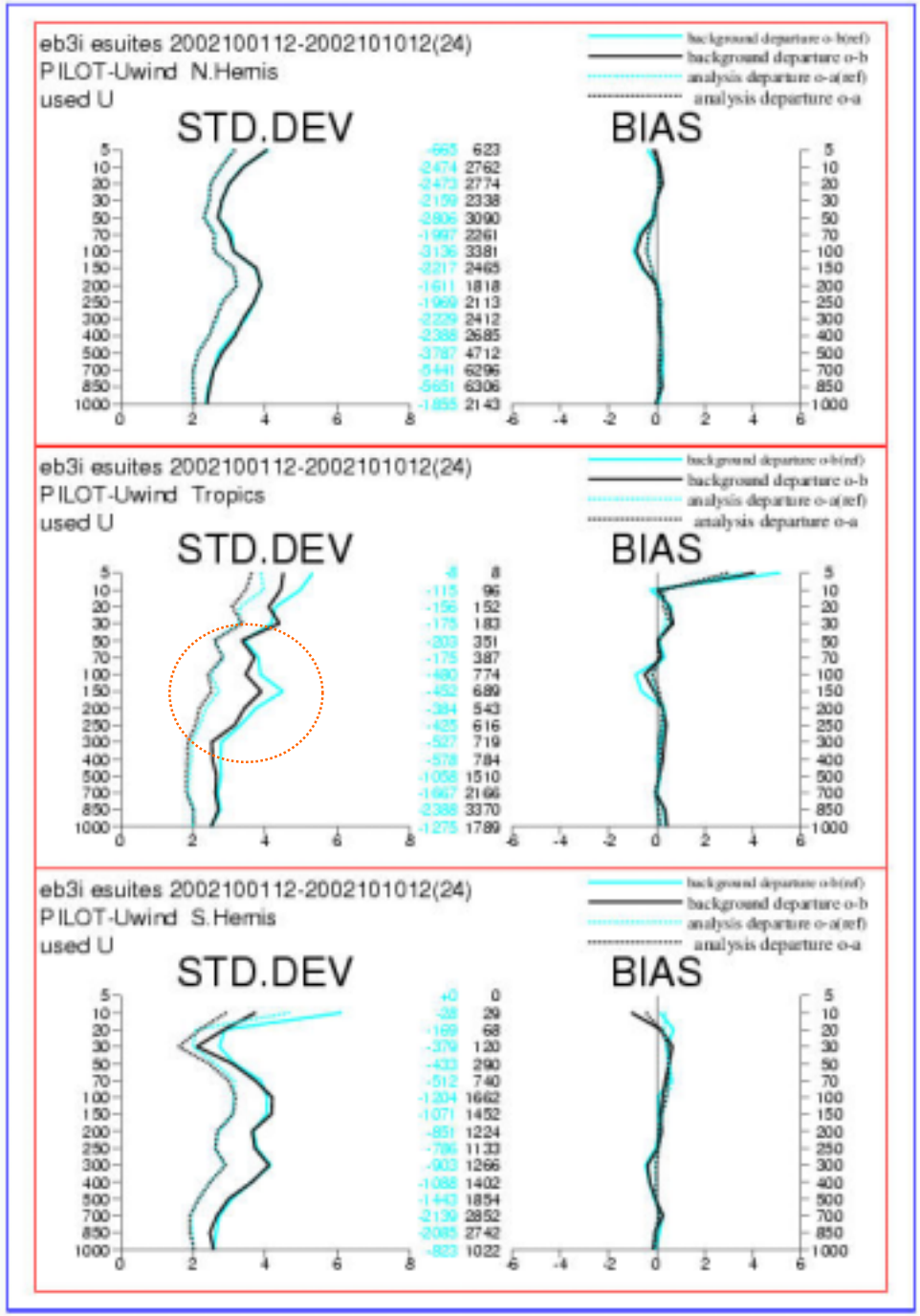
Tropical 200 hPa height errors (m) : RMS and Mean error
Ensemble of 10 10-day forecasts at T511





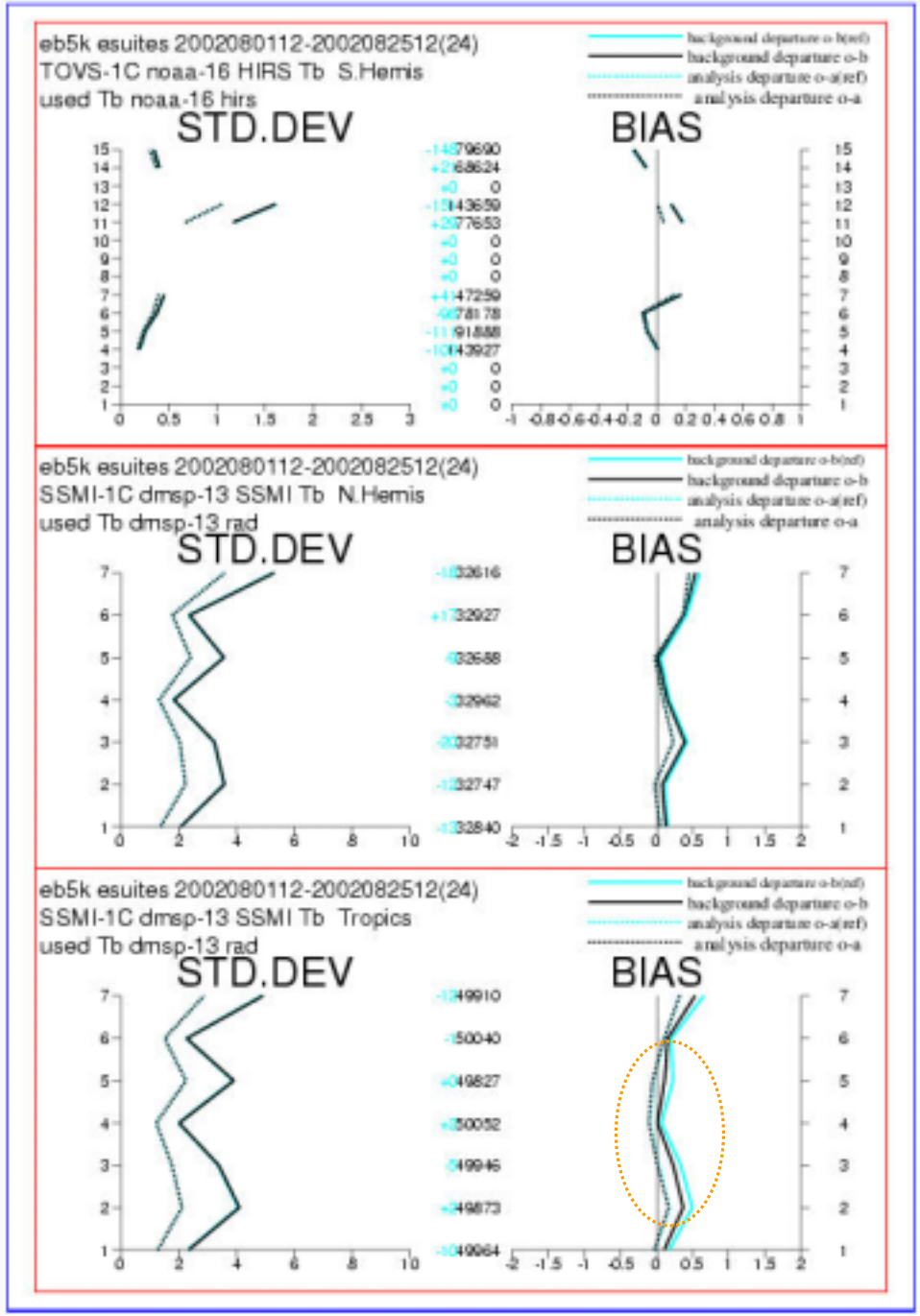
Analysis statistics with Temps

Standard: blue
Incr. Entrainm: black



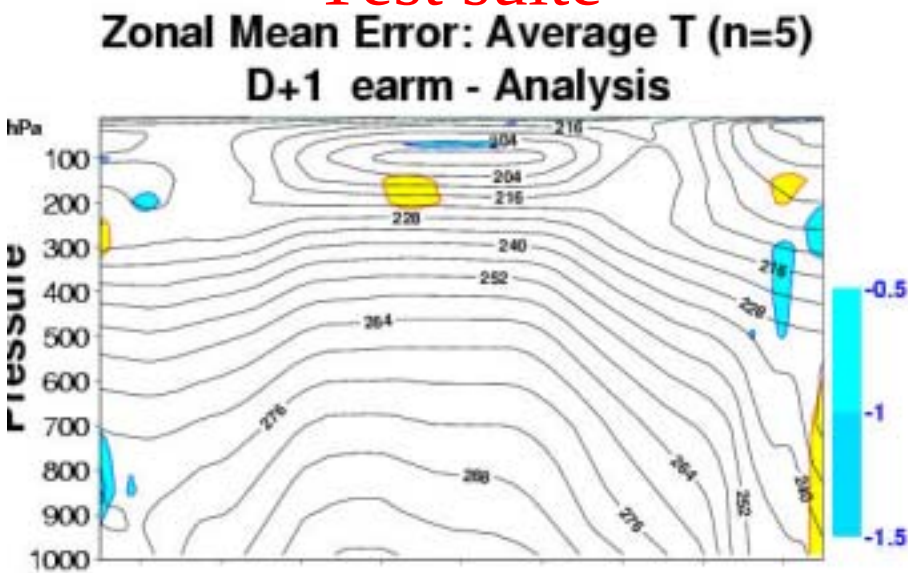
Analysis statistics
with Satellite: SSMI

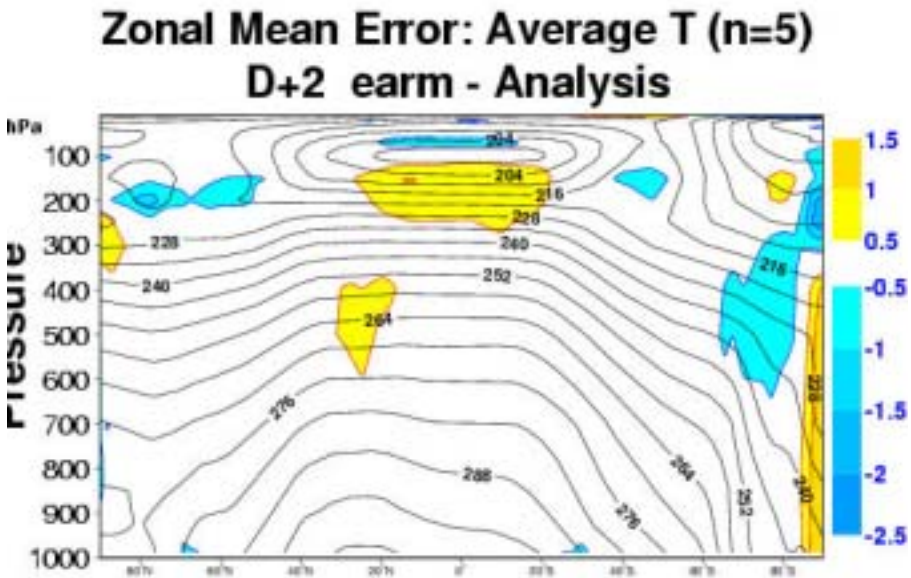
Standard: blue
Incr. Entrainm: black



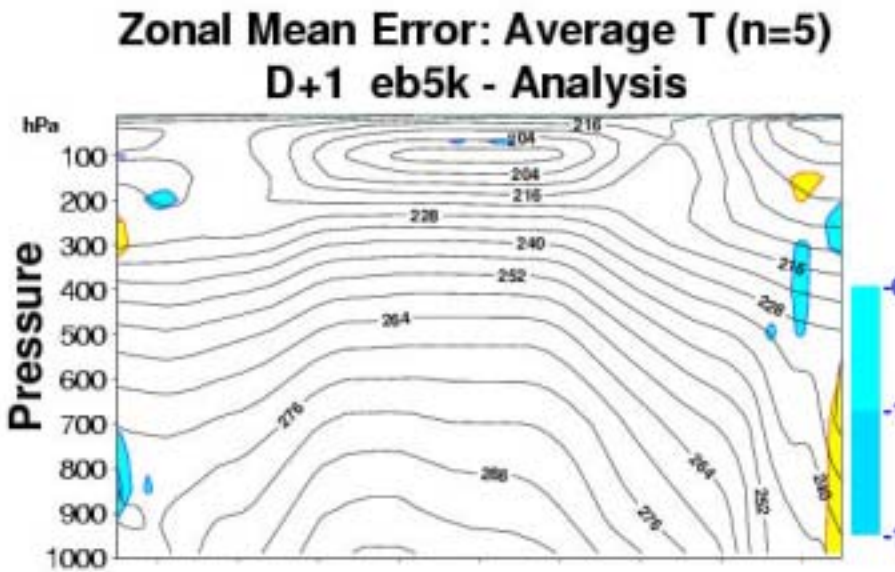
T verification against ERA40, august 2002

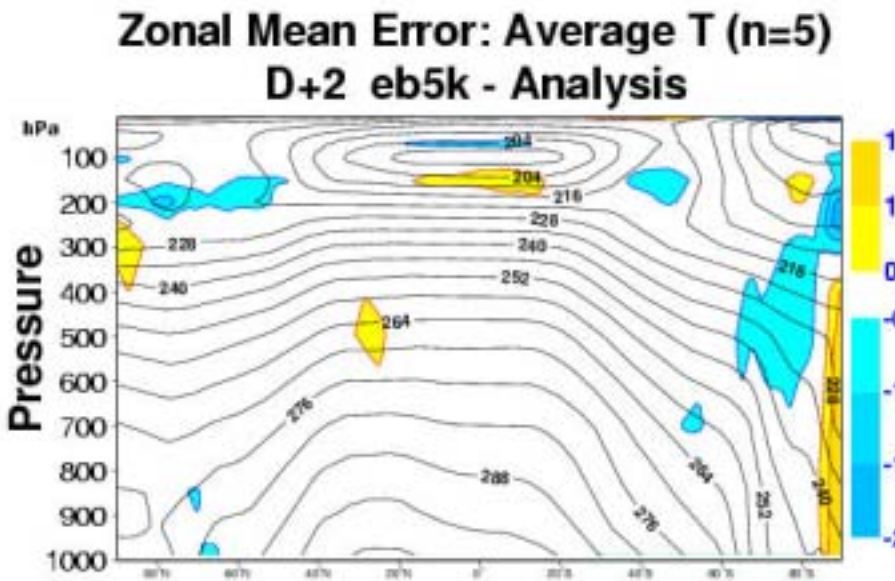
Test suite





Test suite incr.entr

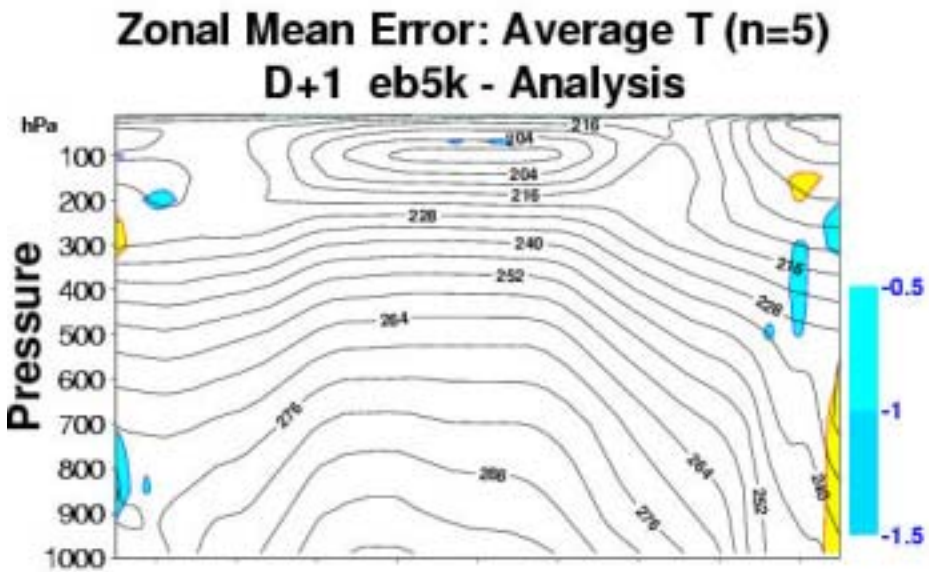


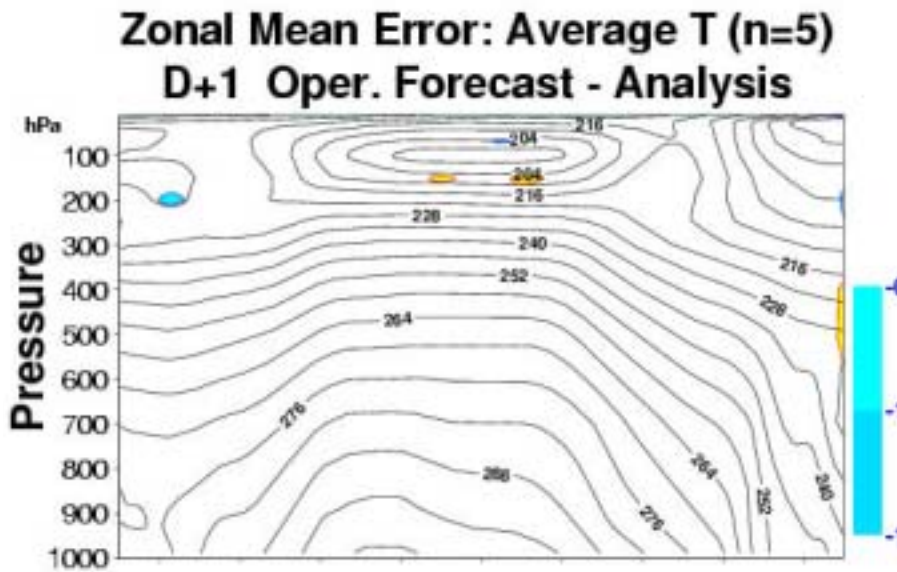


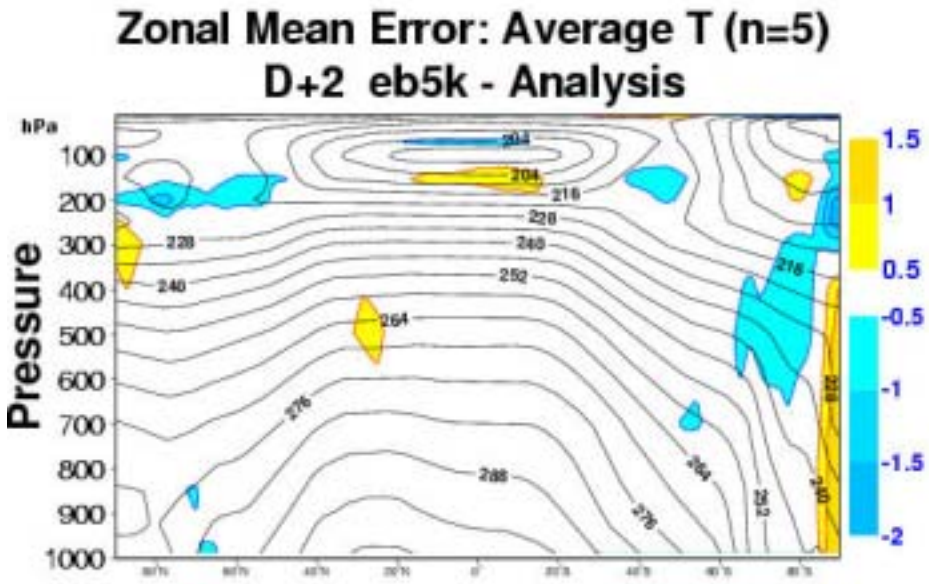
T verification against ERA40, august 2002

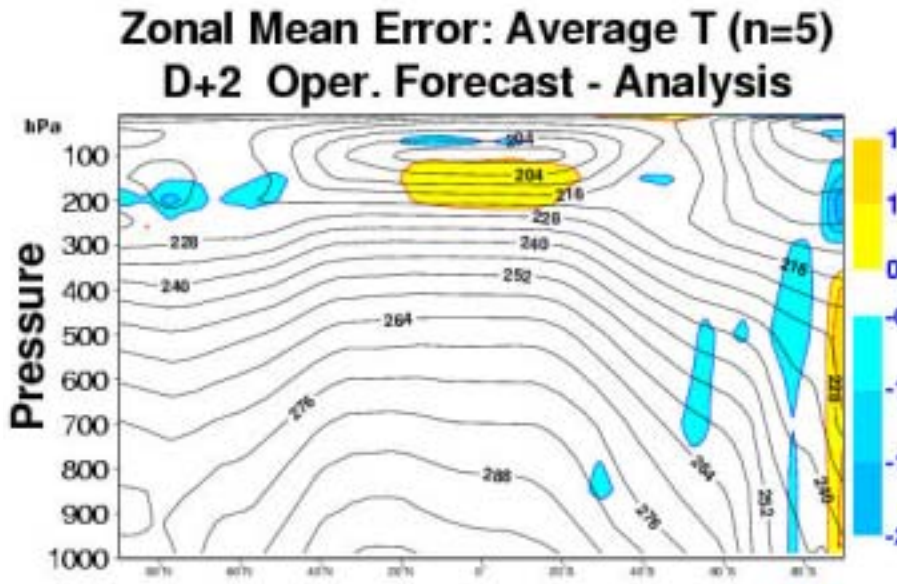
Test suite incr.entr

Oper



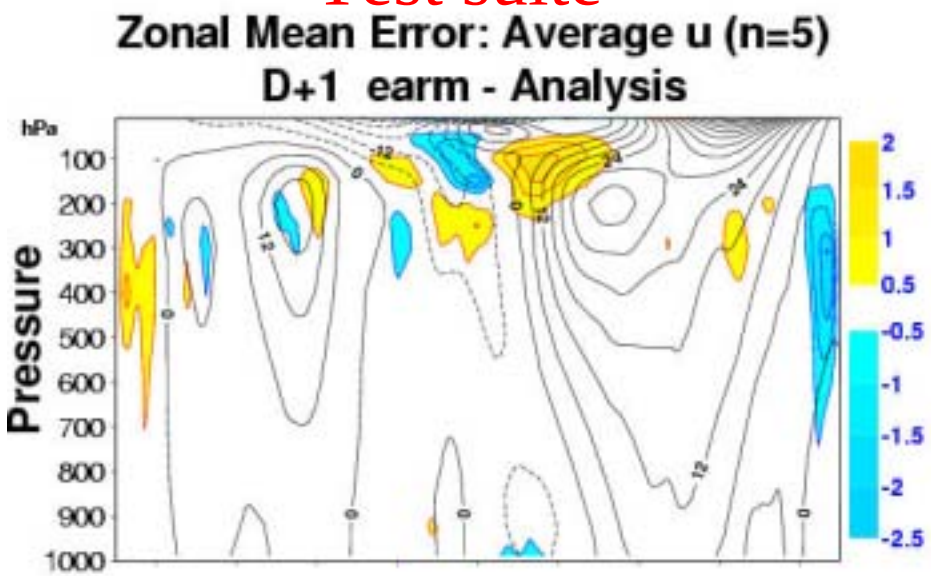


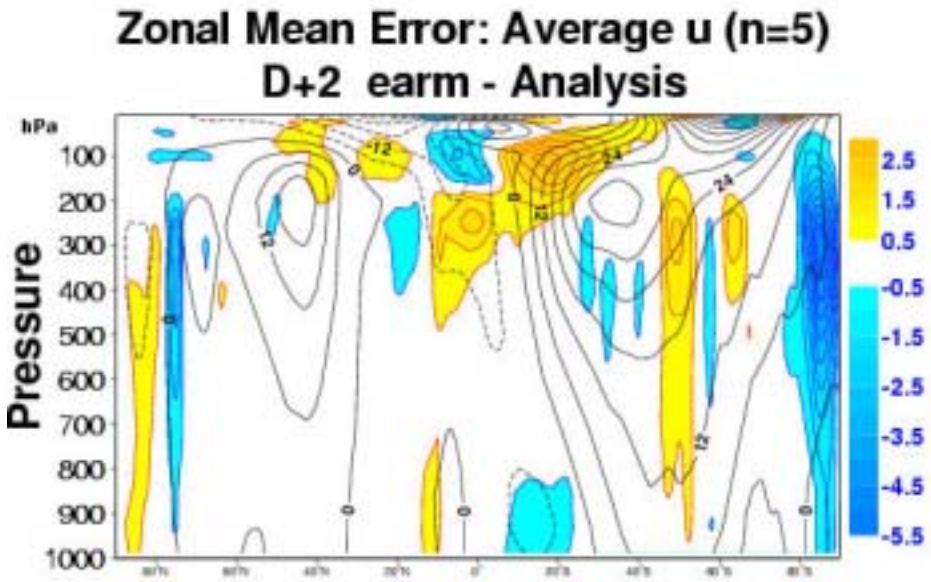




U verification against ERA40, august 2002

Test suite





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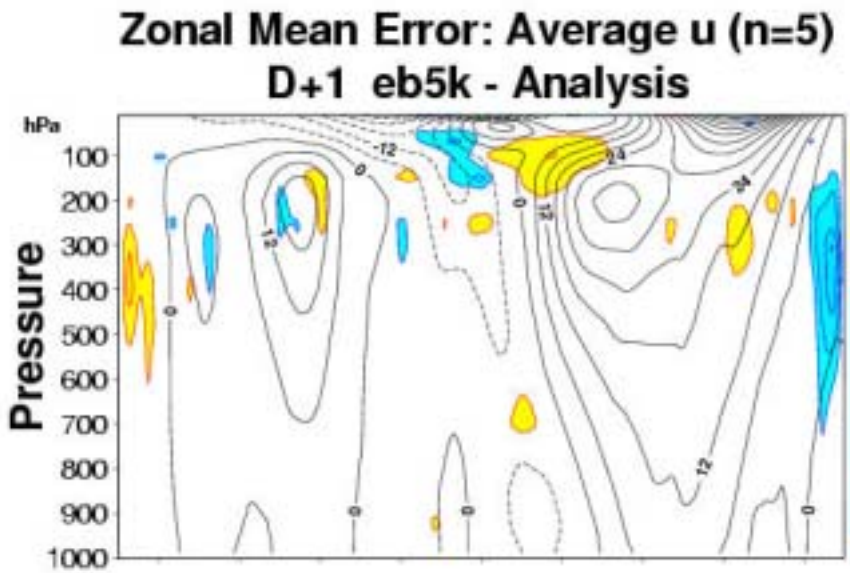
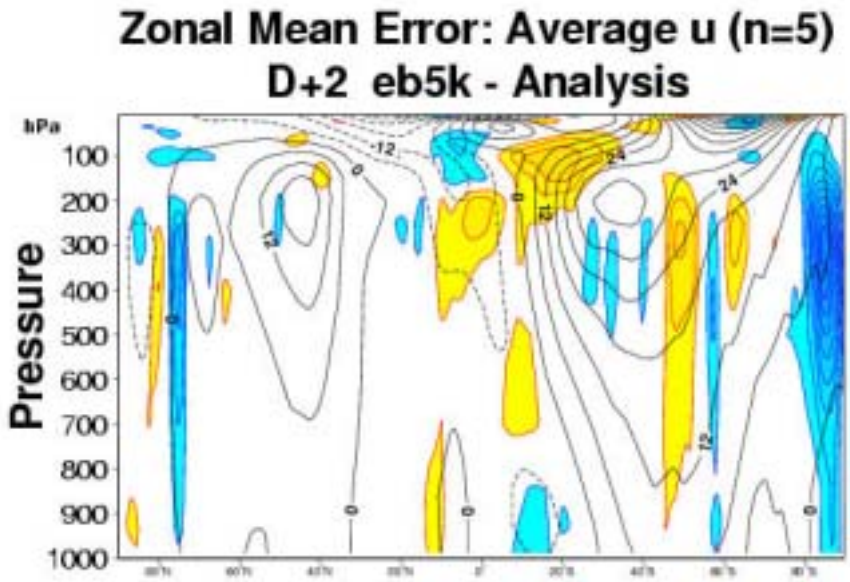
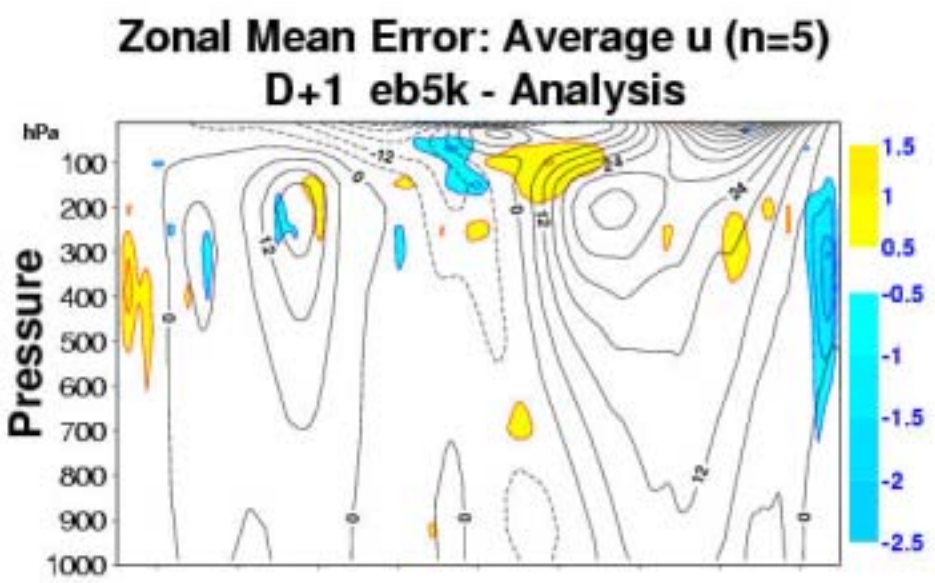
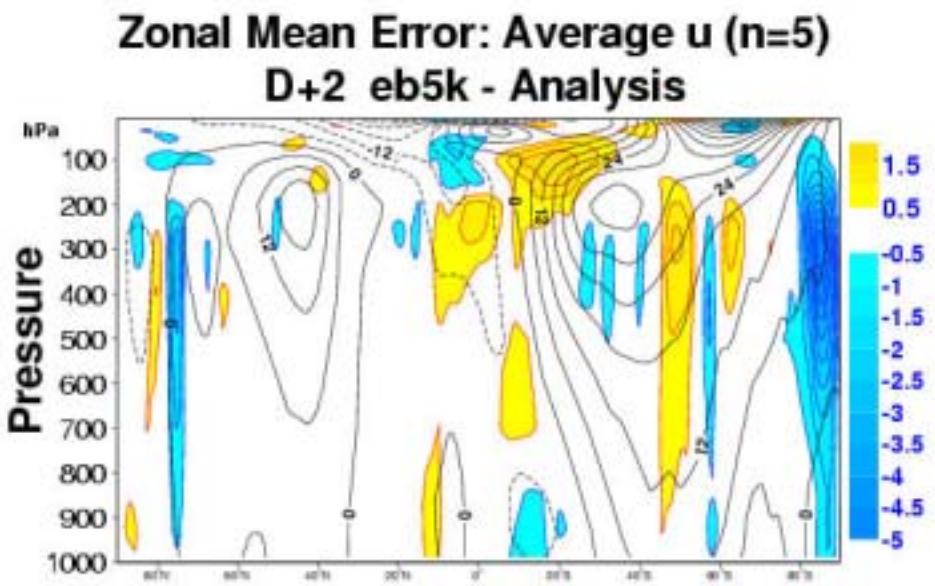




U verification against ERA40, august 2002

Test suite incr.entr





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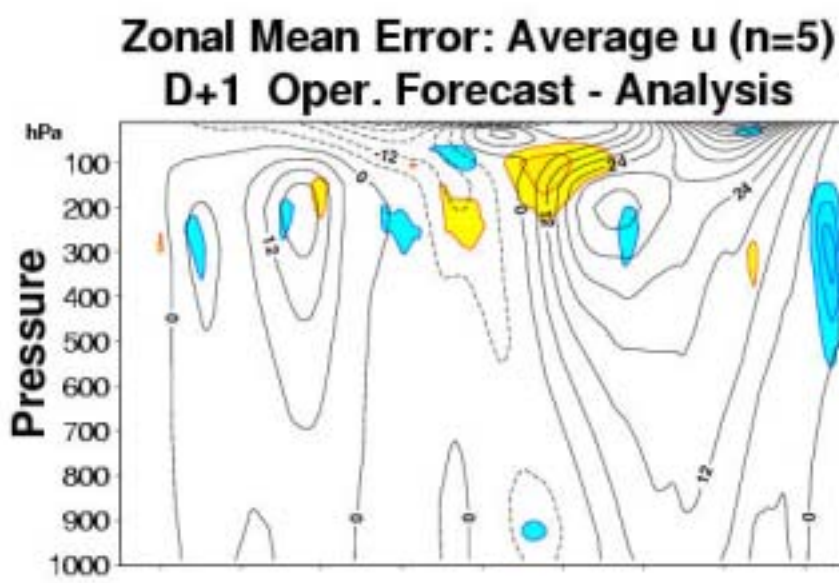
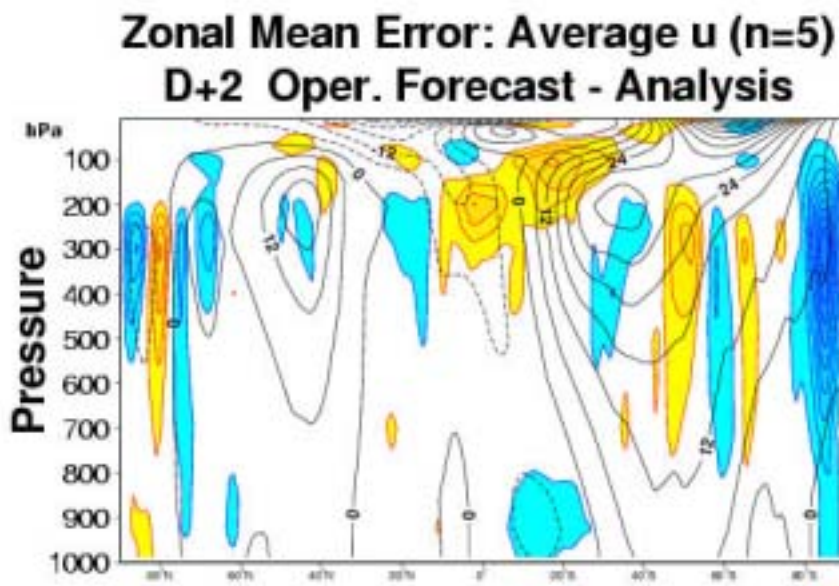
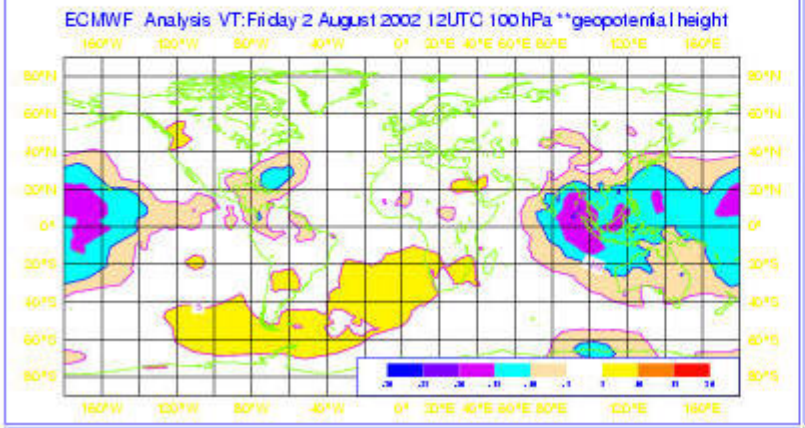


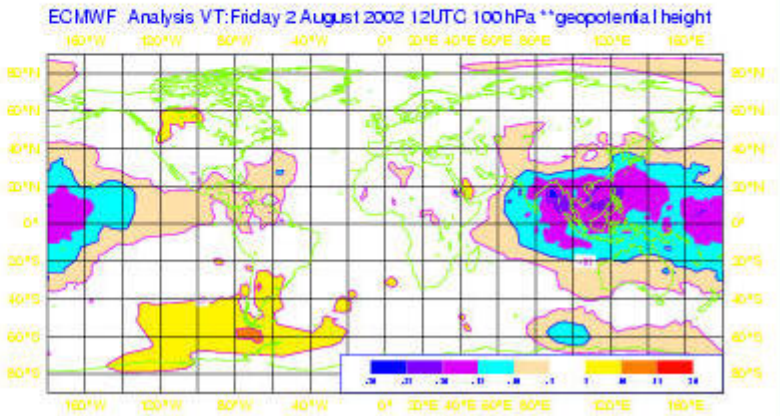


August 2002 average height increments (m): AN - FG

oper



esuite -mod



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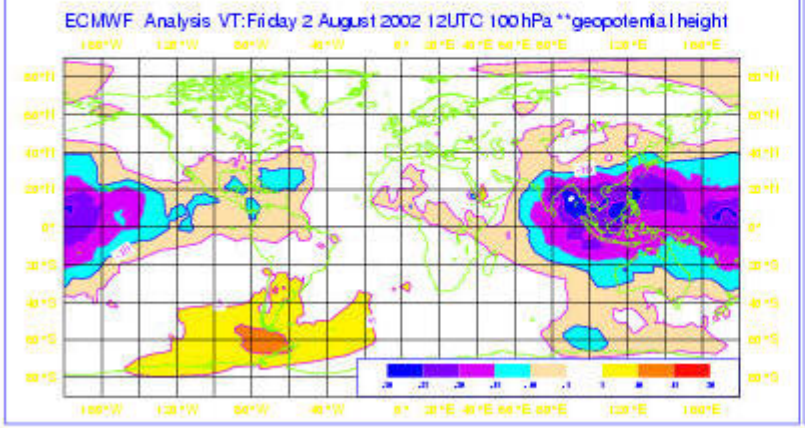

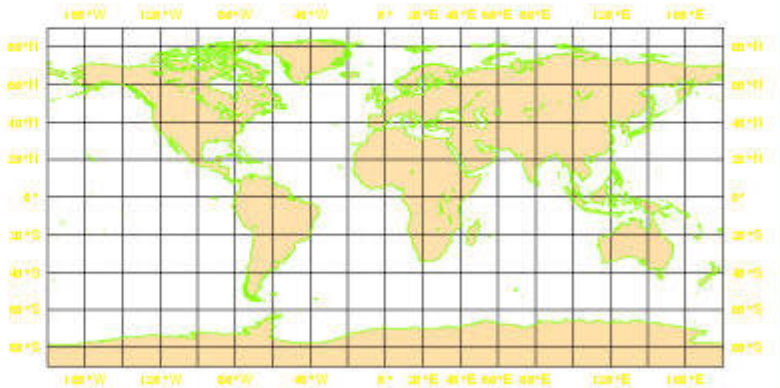

Resuming a few of Steve's intercomparions
Results for IFS and Meso-nh

- IFS showed good sensitivity for precipitation compared to Meso-nh

-> increased cloud base entrainment and CAPE closure based on full entraining ascent and not undilute ascent as in the latter

- However, cloud-radiation interaction and effects on momentum transport difficult to assess by 1D study, requires systematic verification/tuning with analysis and observations.