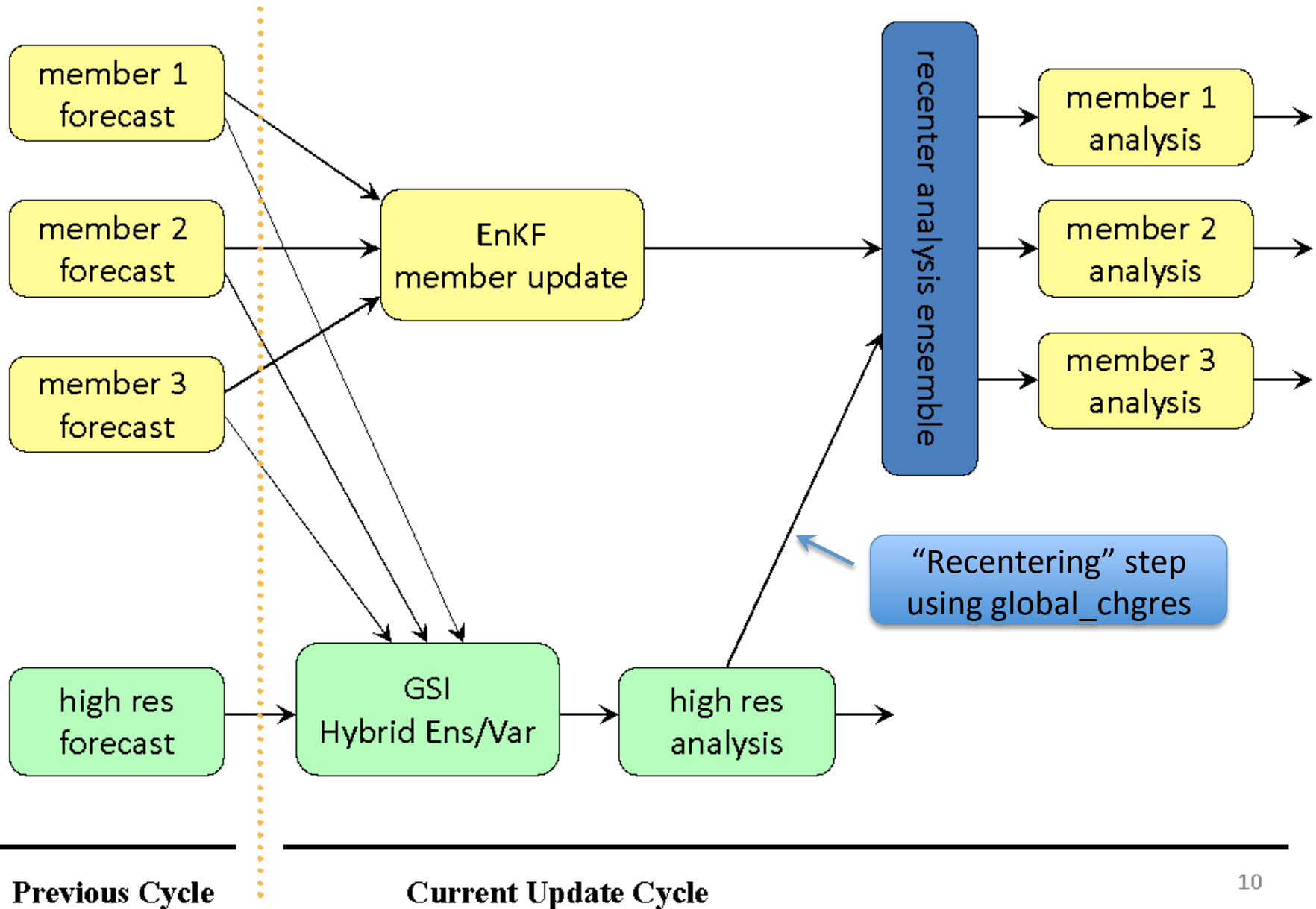# 'Recentering' in the FV3 EnVar DA workflow

Jeff Whitaker with help from Phil, Rahul, Daryl and Fanglin
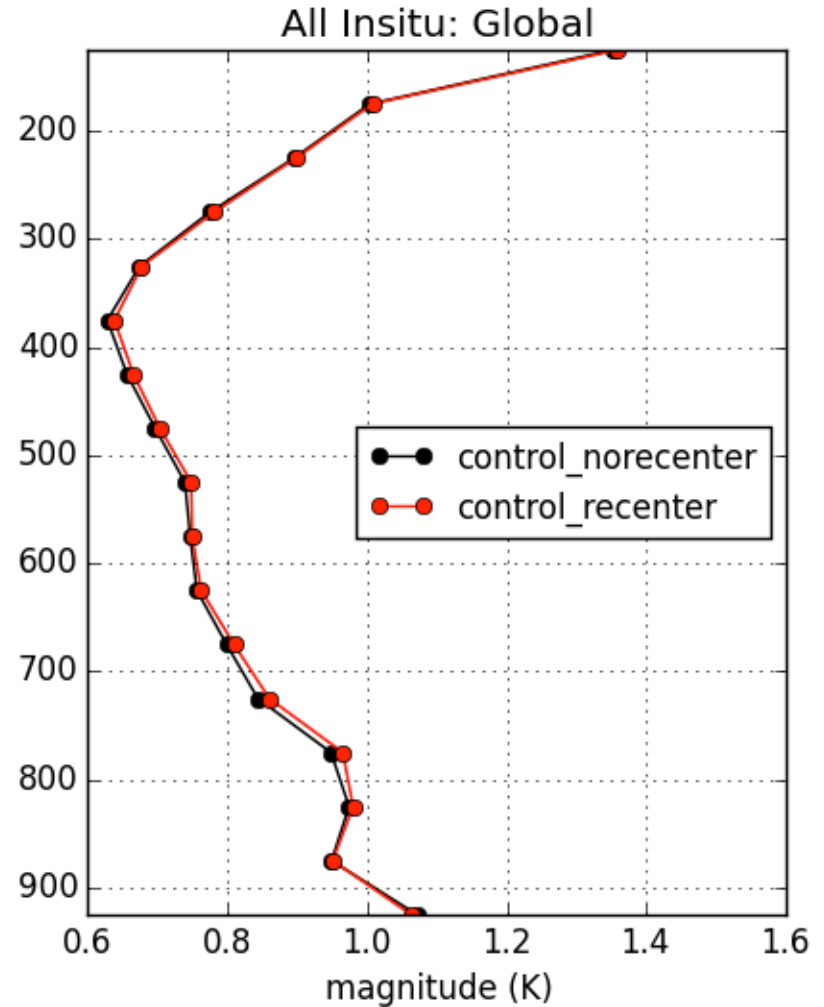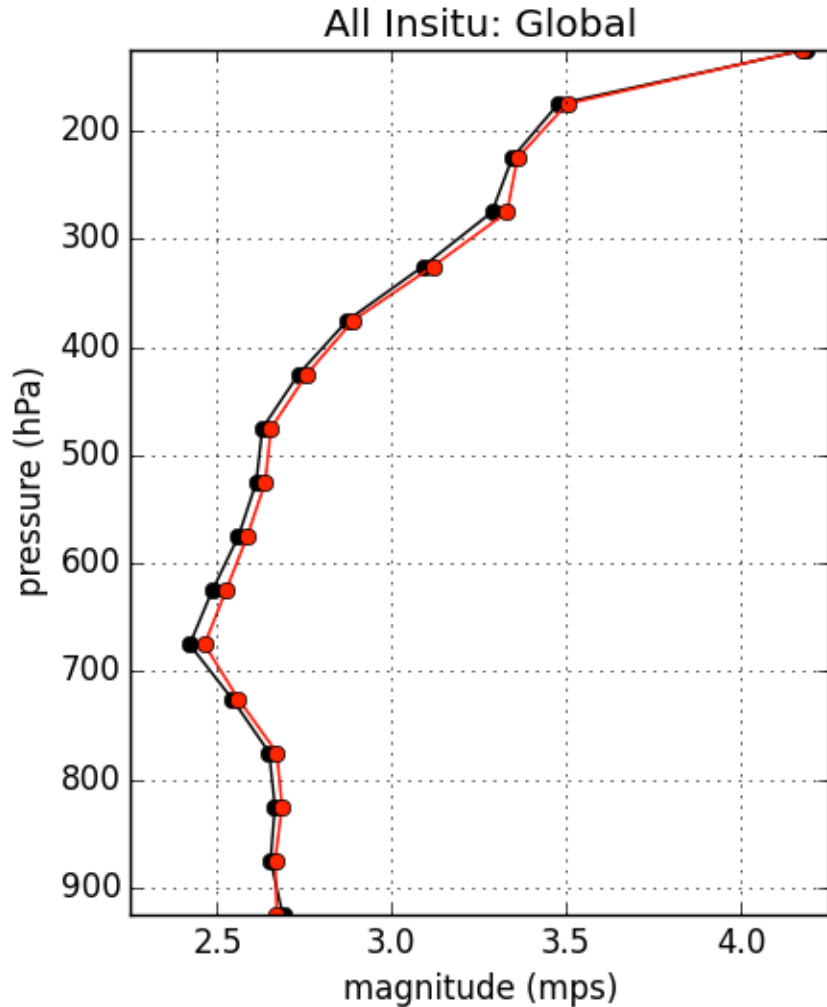
20160320 FV3 technical meeting

Dual-Res Coupled Ensemble 3DVar

member 1
forecast

member 2
forecast

member 3
forecast

EnKF
member update

recenter analysis ensemble

member 1
analysis

member 2
analysis

member 3
analysis

"Recentering" step
using global_chgres

high res
forecast

GSI
Hybrid Ens/Var

high res
analysis

Previous Cycle
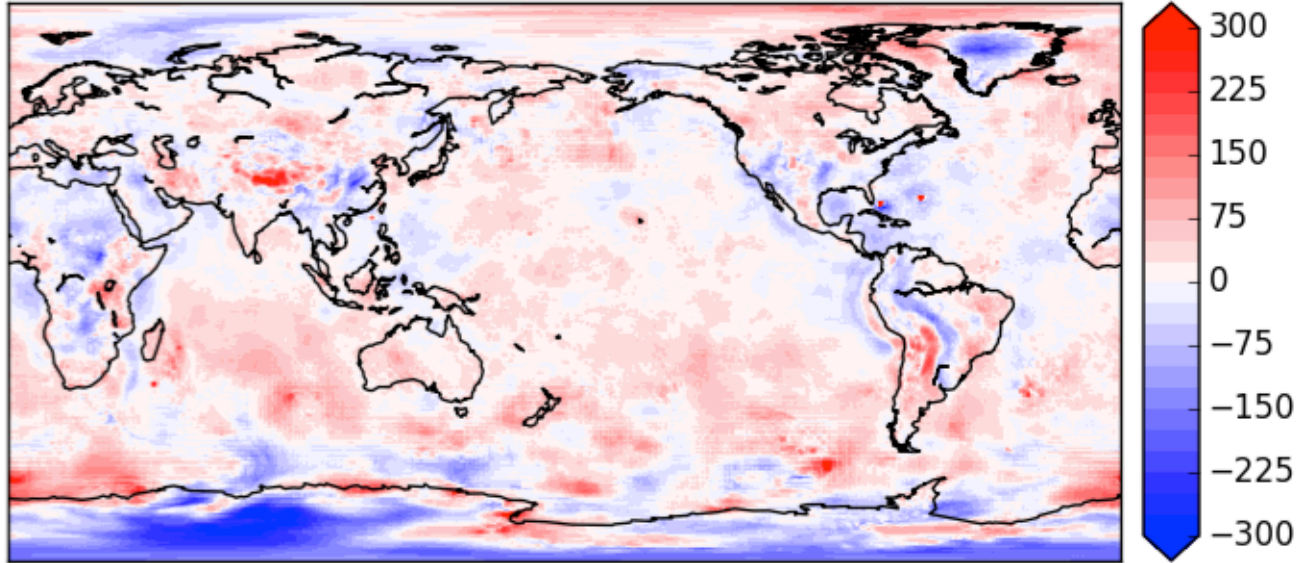
Current Update Cycle

10

Initial experiments with/without recentering

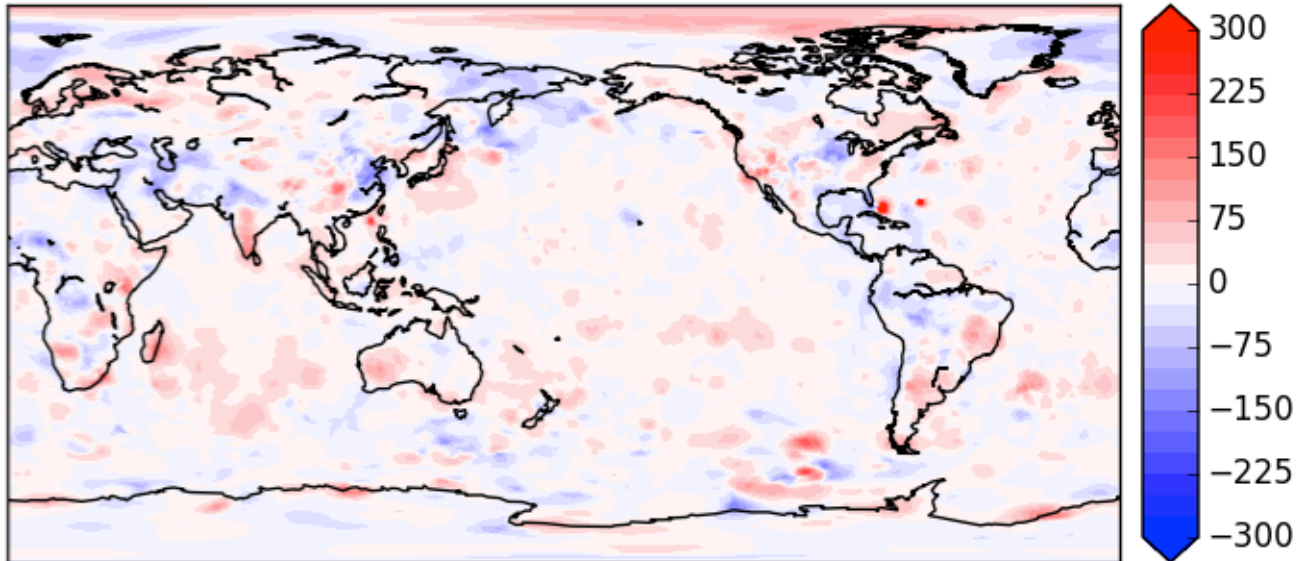Vector Wind (left) and Temp (right) O-F (2016100200-2016100700)

Recentering and DA increments
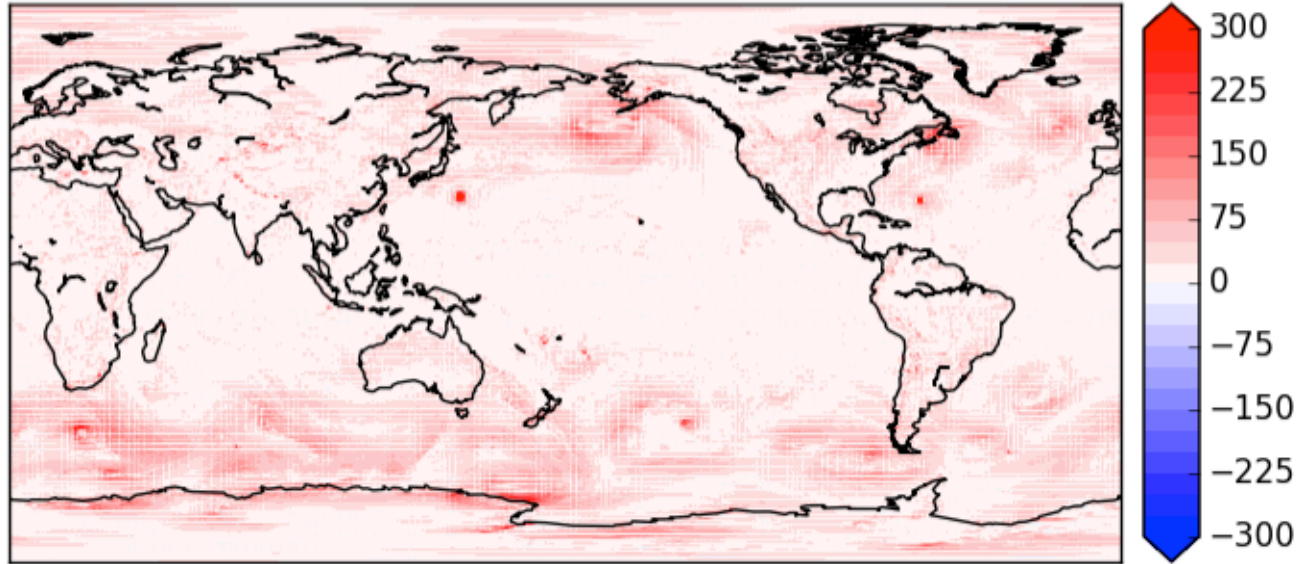

recentering increment (surface pressure)

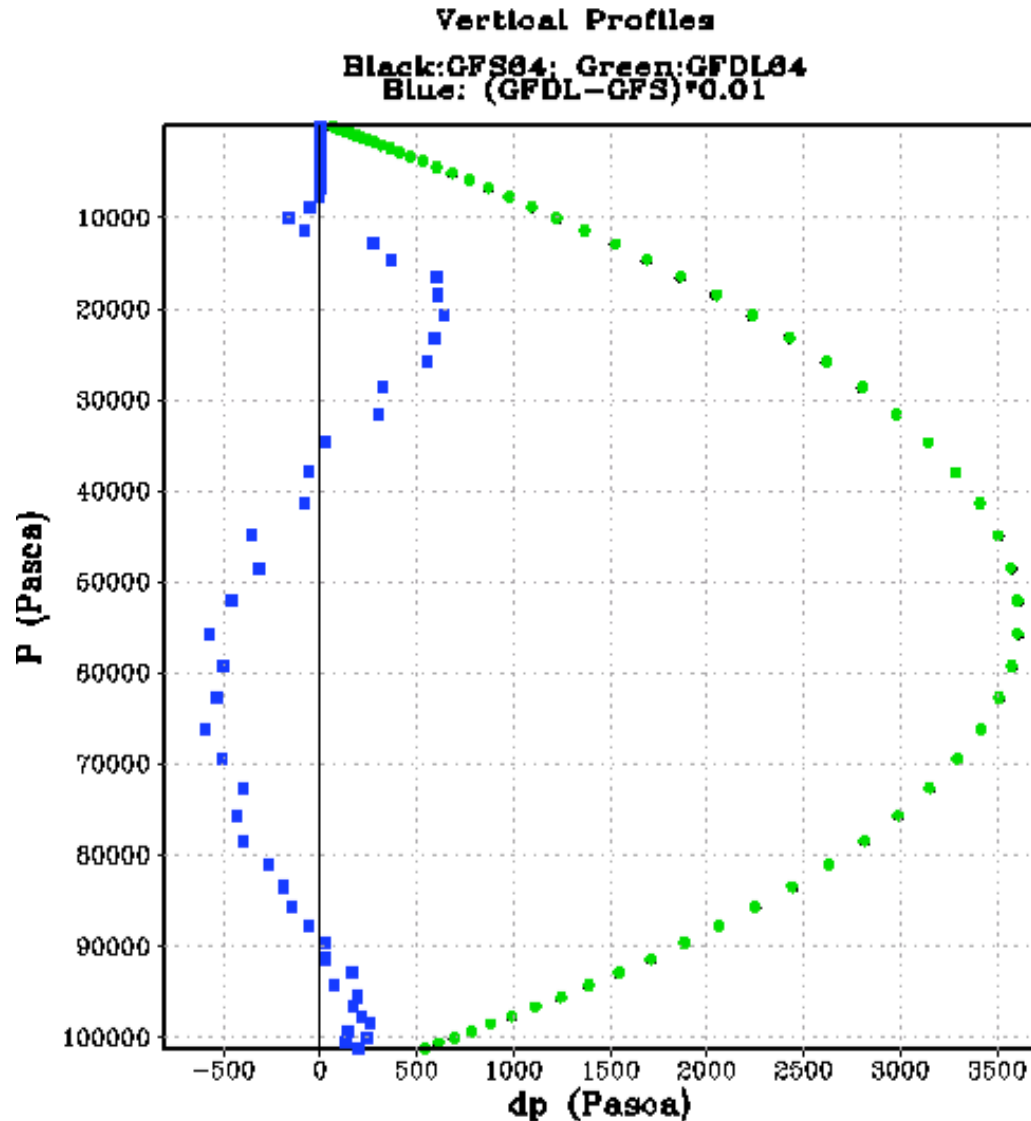data assimilation increment (surface pressure)

global_chgres round trip
(C384 (*T878*)->C192 (*T382*)->C384)

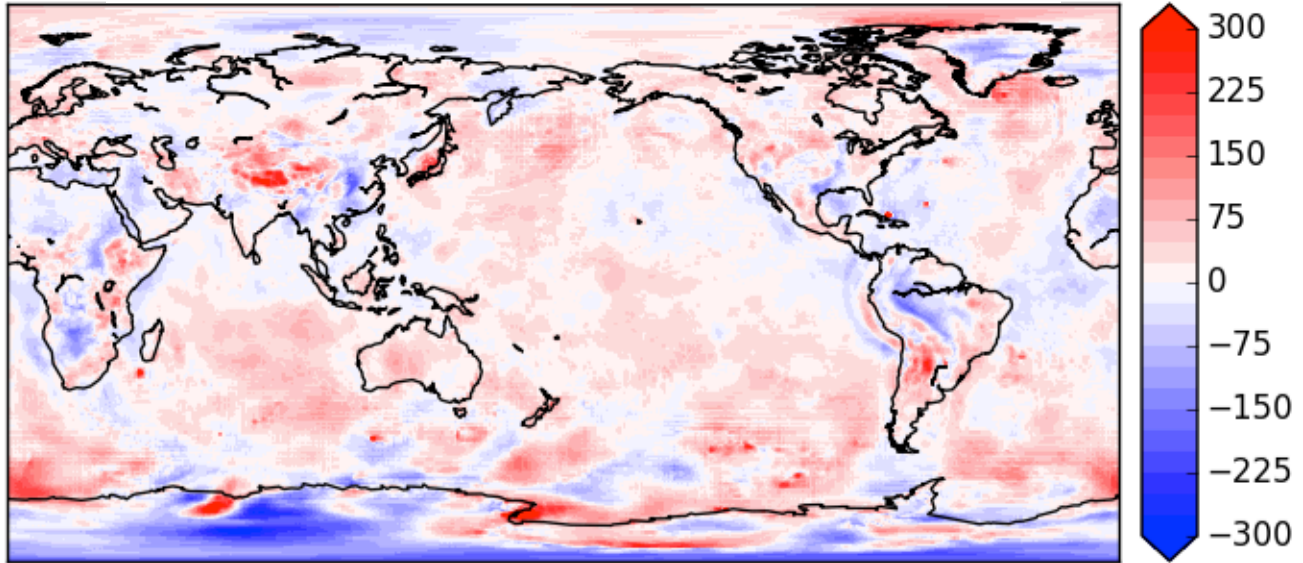data assimilation increment (surface pressure)

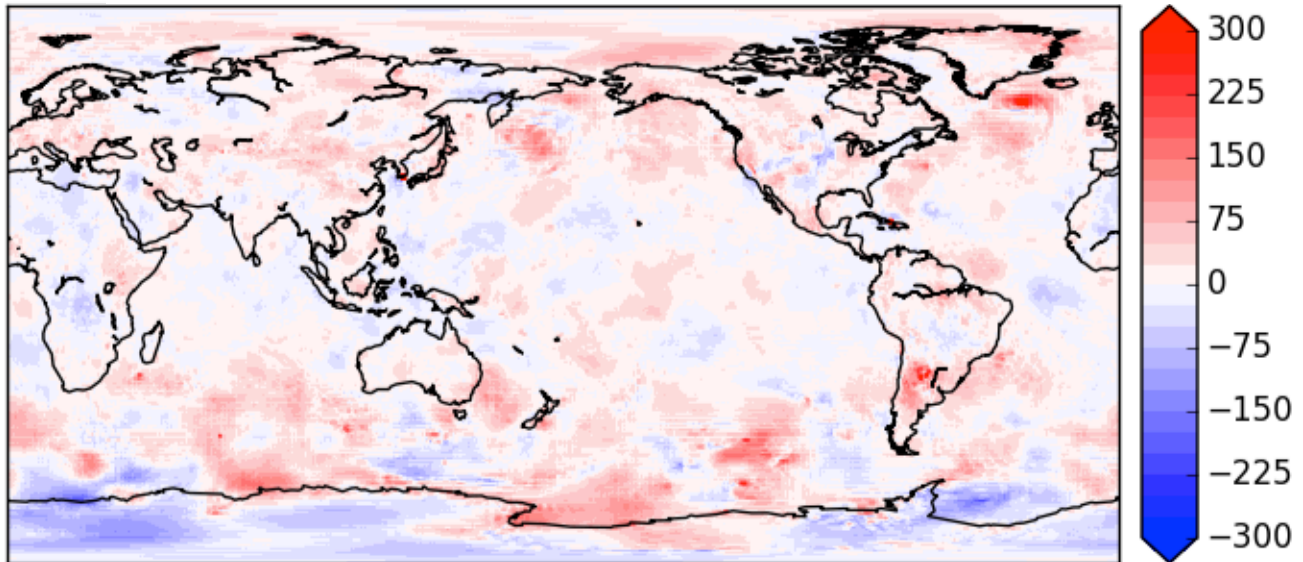# Difference between vertical levels when ncep_plevs=T and F (courtesy of Fanglin)

Results with ncep_plev=T
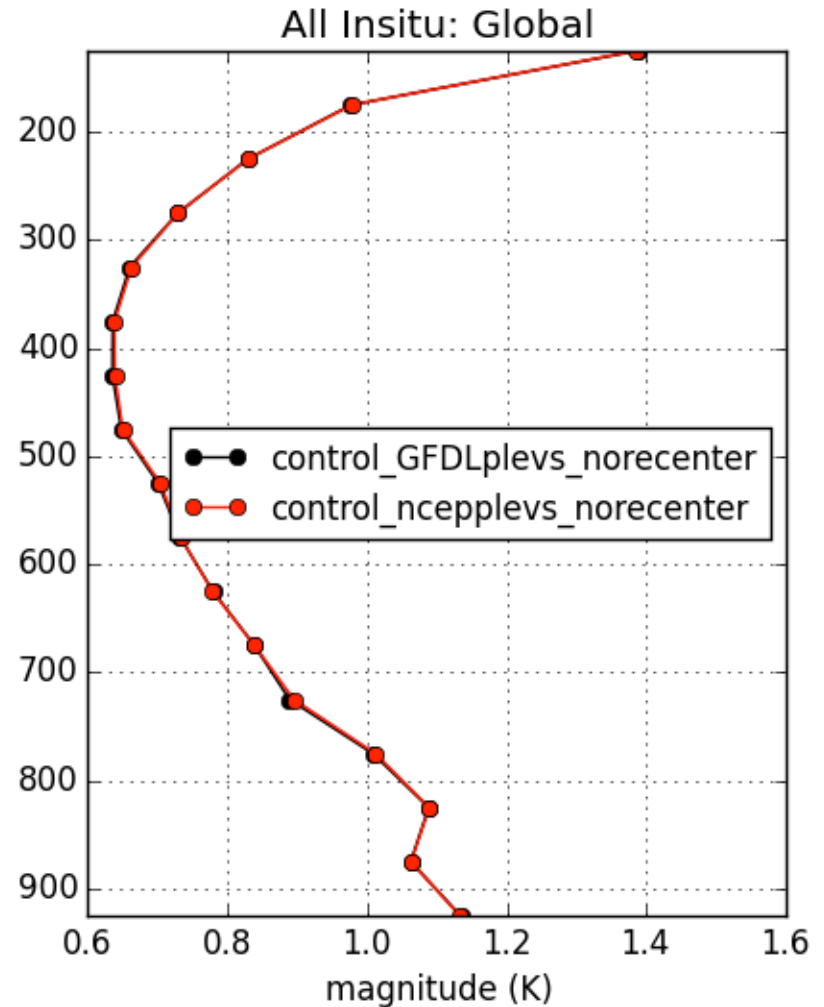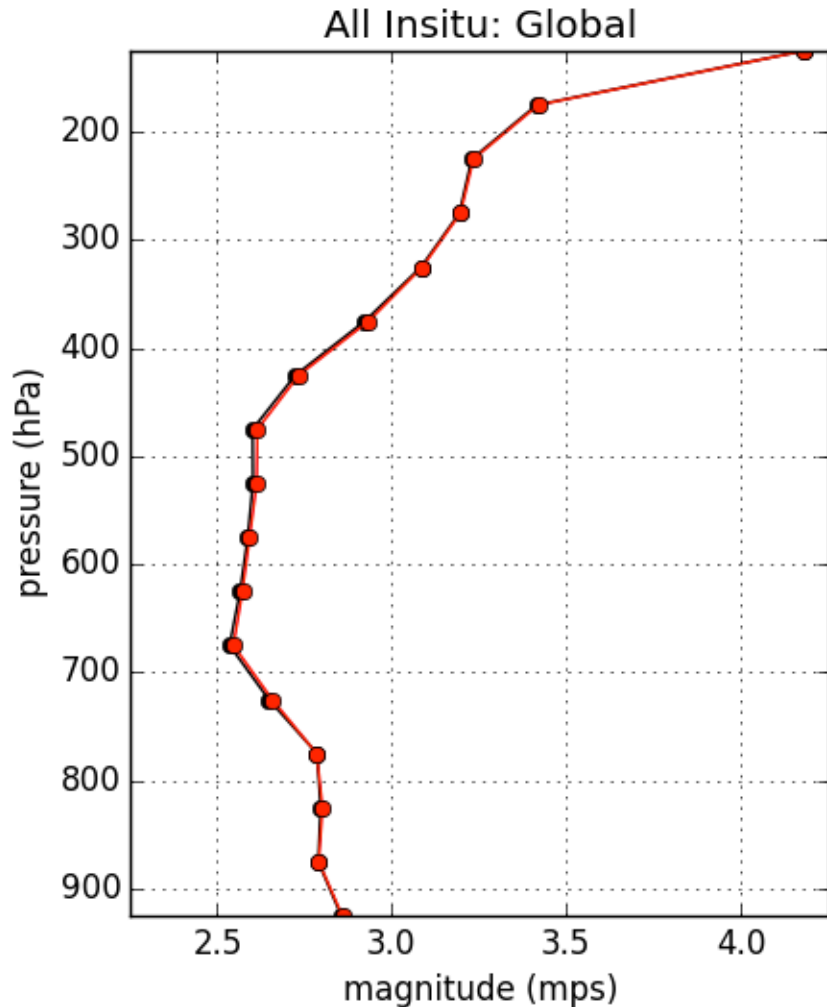
Recentering Increment (GFDL levels)

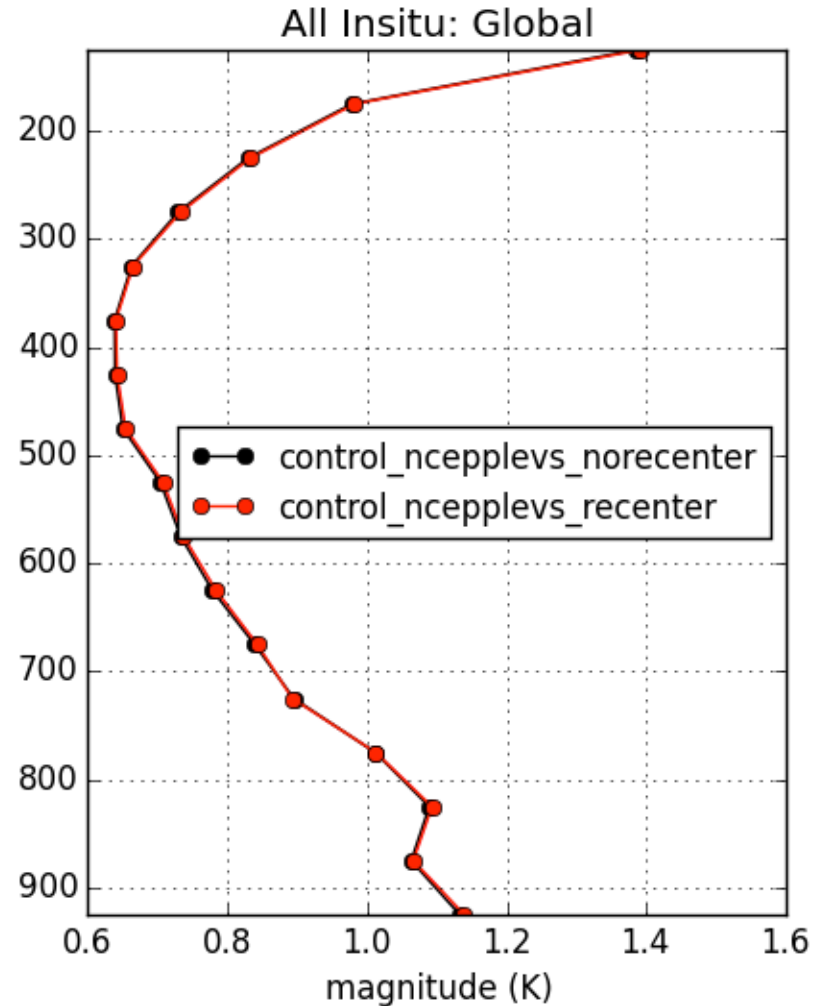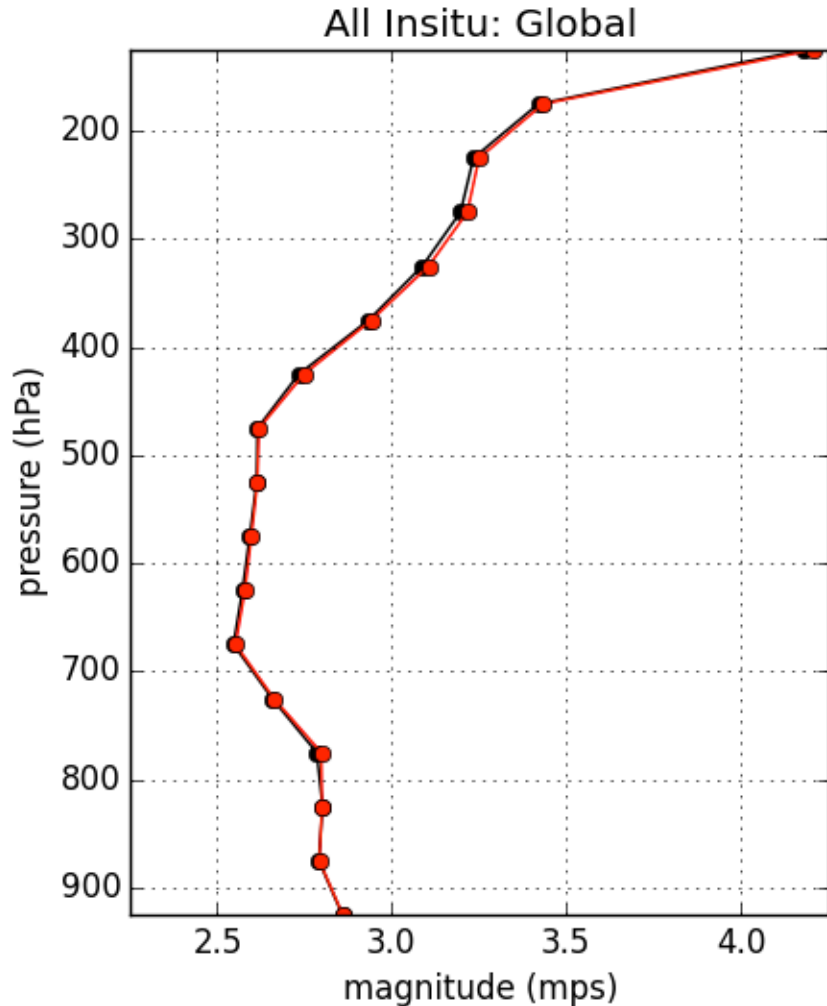Recentering Increment (NCEP levels (ncep_plevs=T)

NCEP levels vs GFDL levels (no recentering)

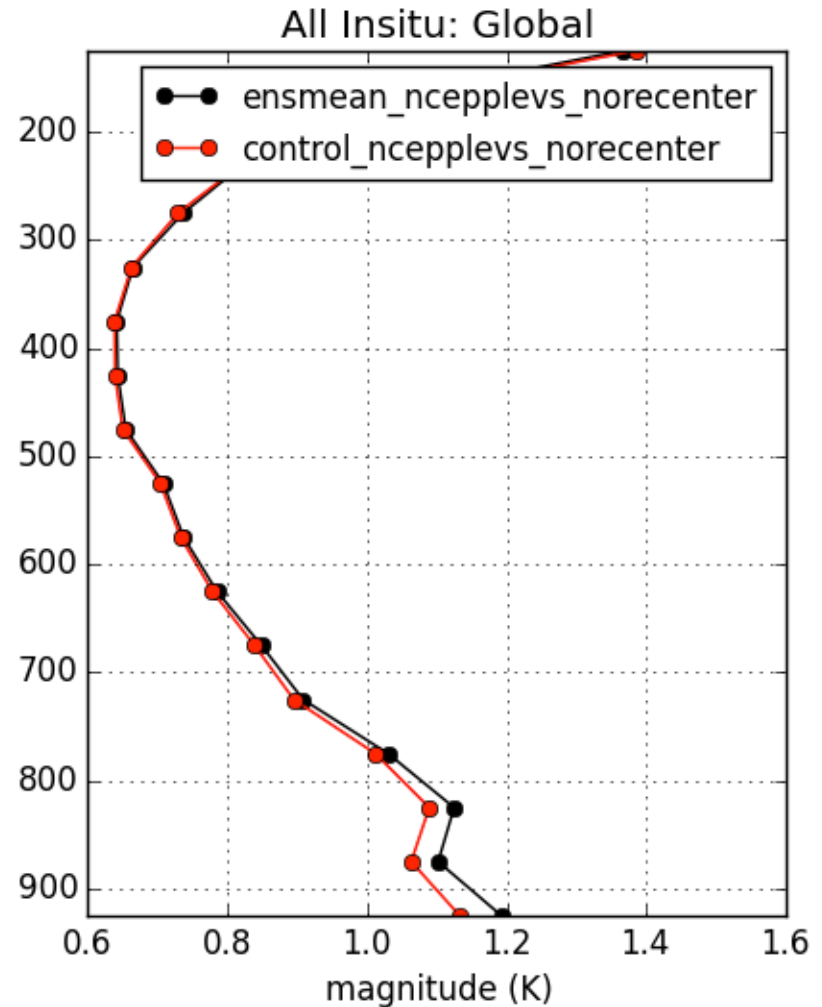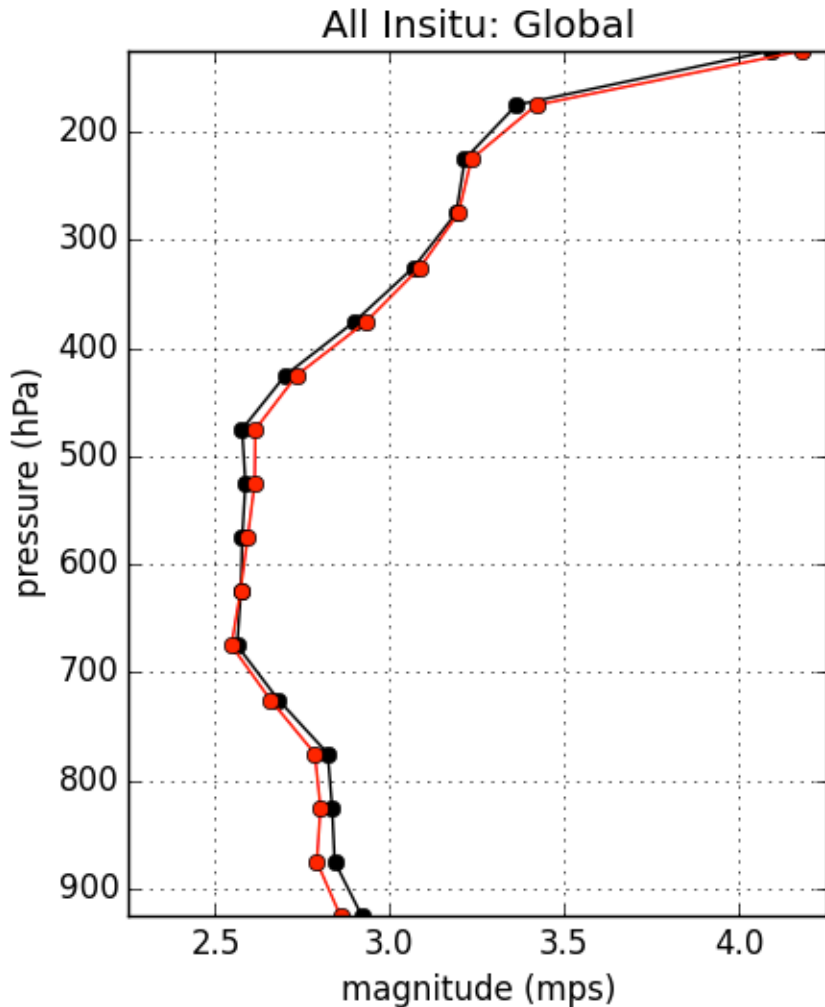Vector Wind (left) and Temp (right) O-F (2016100700-2016110700)

NCEP levels with/without recentering

Vector Wind (left) and Temp (right) O-F (2016100700-2016110700)

EnKF ensemble mean vs control forecast (no recentering)

Vector Wind (left) and Temp (right) O-F (2016100700-2016110700)

Conclusions

- ncep_plevs = T produces nearly identical results to using internally specified GFDL levels (ncep_plevs=F), and enables recentering via global_chgres.
  - Recommend using NCEP levels.
  - Remove hard-coded levels from code, ncep_plevs option to prevent confusion (model should not override levels specified in input file).
- Recentering has little impact, perhaps slightly negative.
  - Recommend turning off re-centering, provided longer experiments show that EnKF ensemble and control forecast do not drift apart.
- EnKF low-res ens mean forecast fits wind obs better above PBL, but single high-res control forecasts fits obs better in PBL.