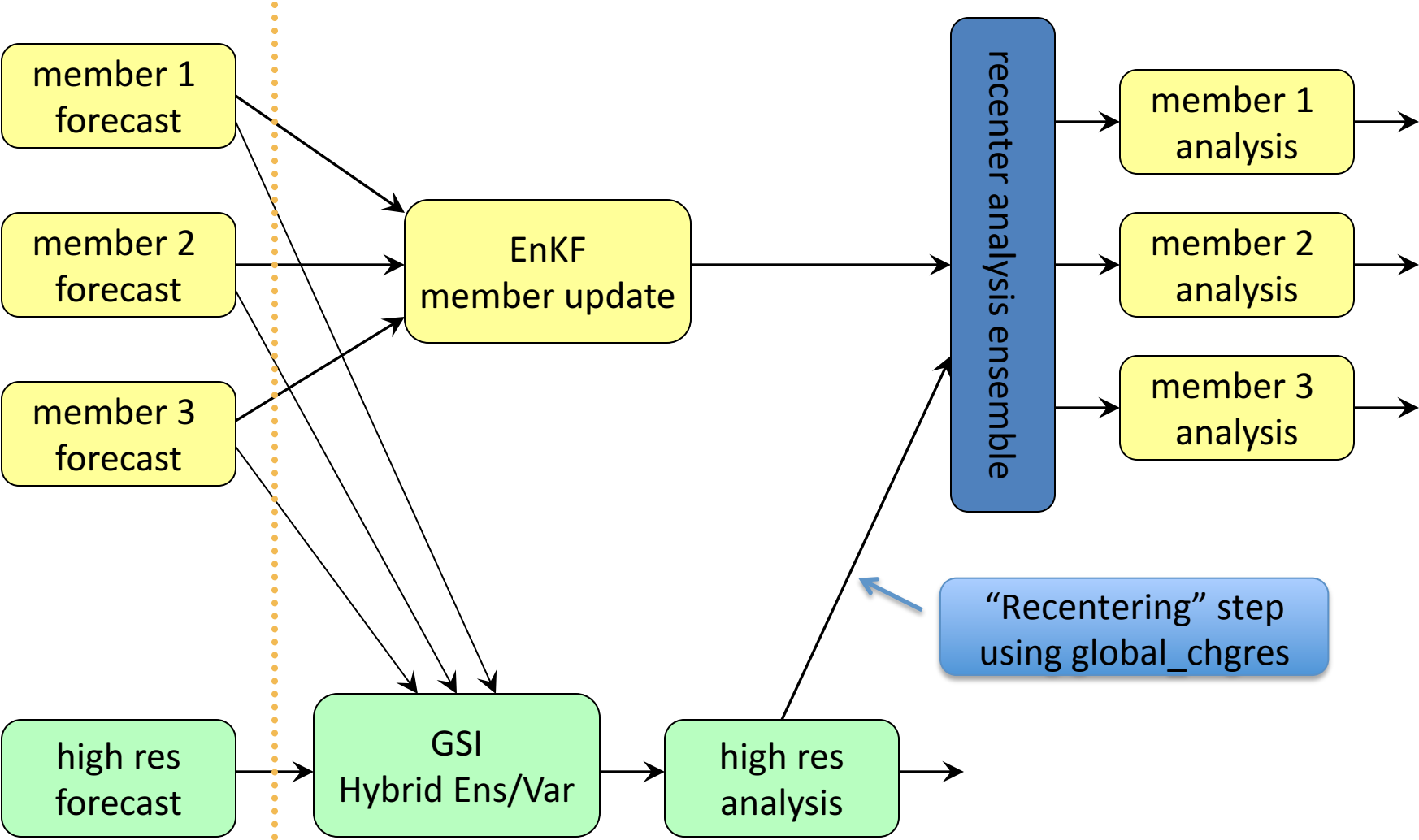


'Recentering' in the FV3 EnVar DA workflow

Jeff Whitaker with help from Phil,
Rahul, Daryl and Fanglin

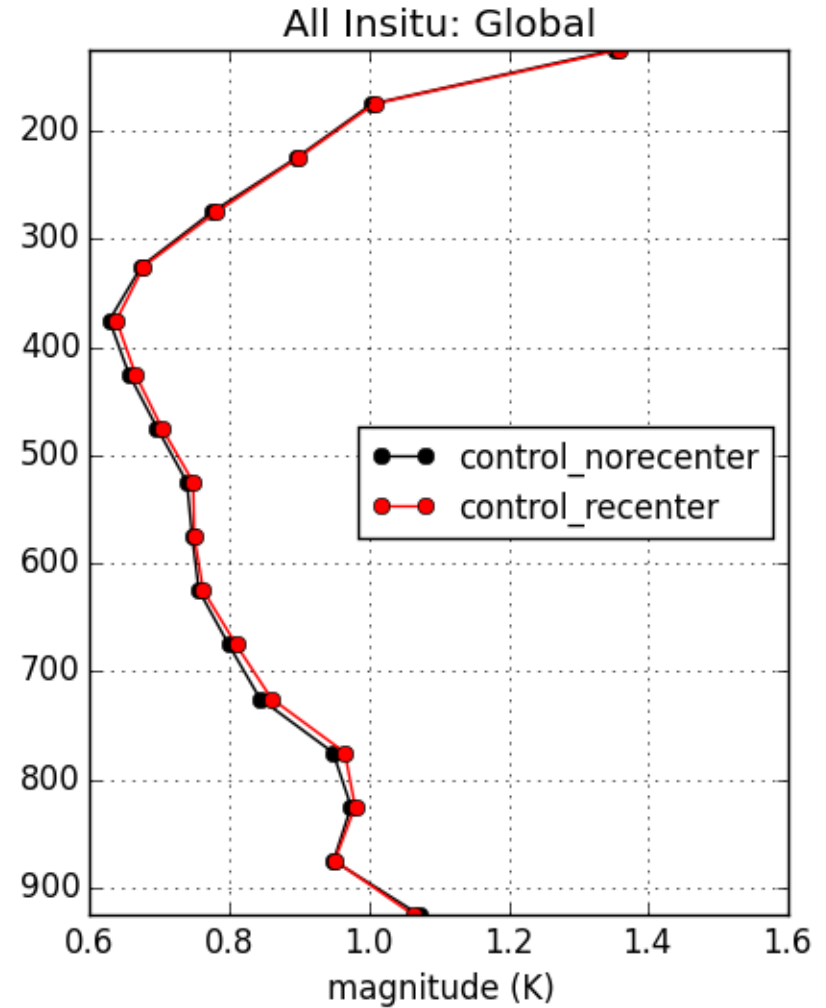
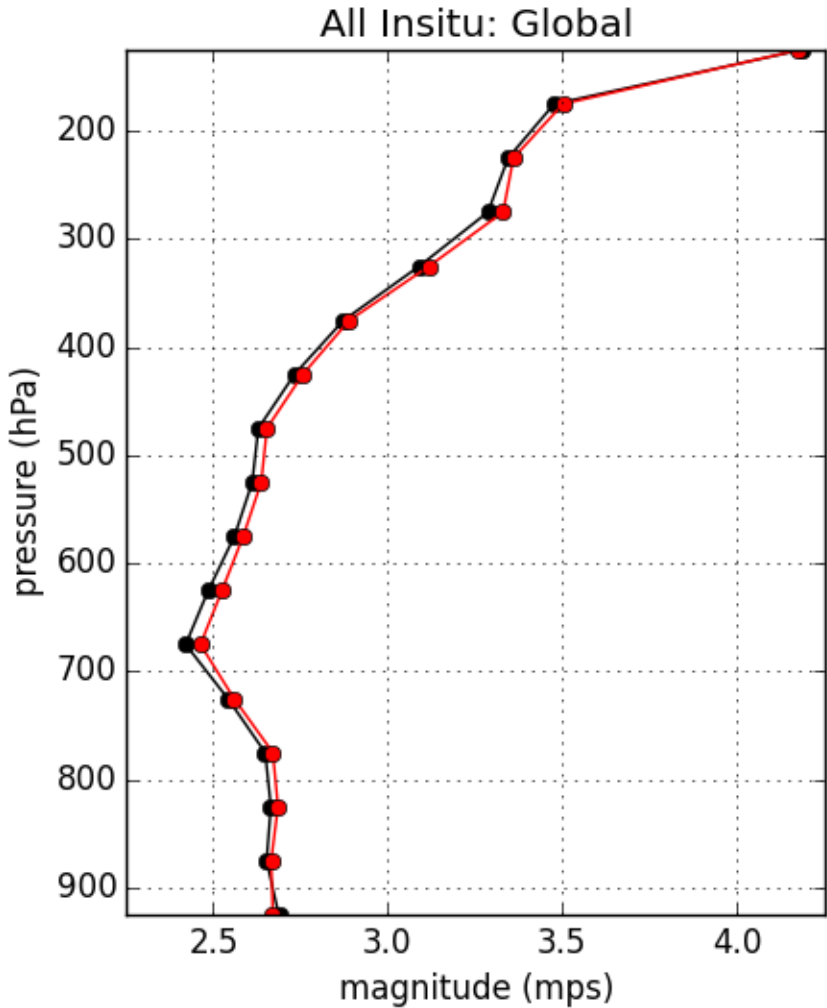
20160320 FV3 technical meeting

Dual-Res Coupled Ensemble 3DVar



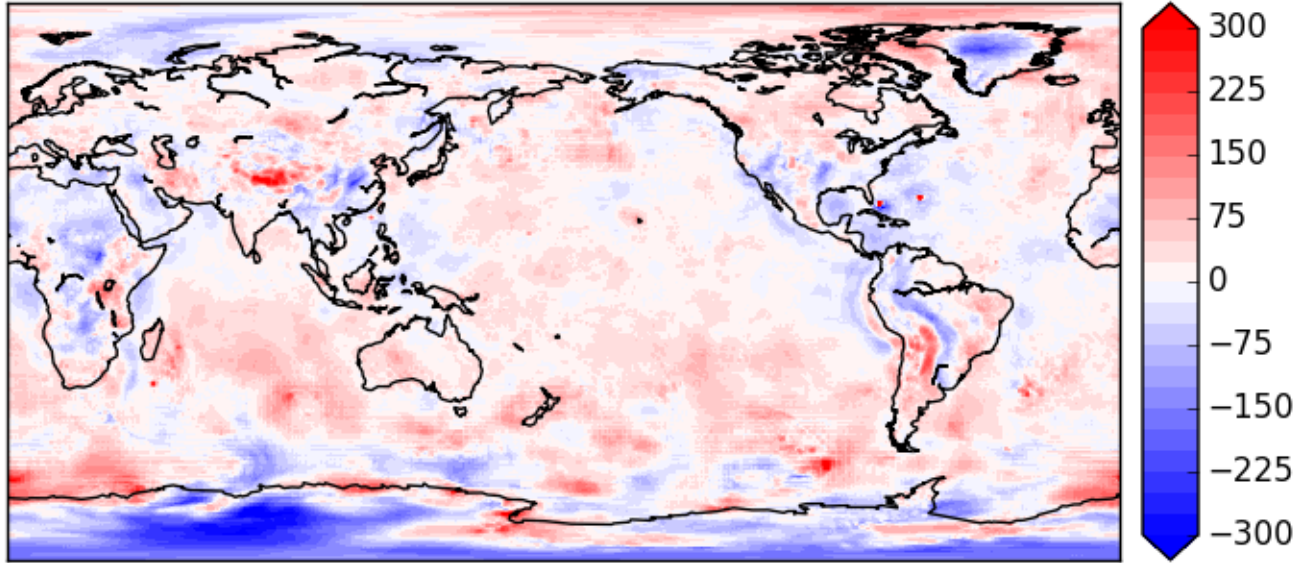
Initial experiments with/without recentering

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

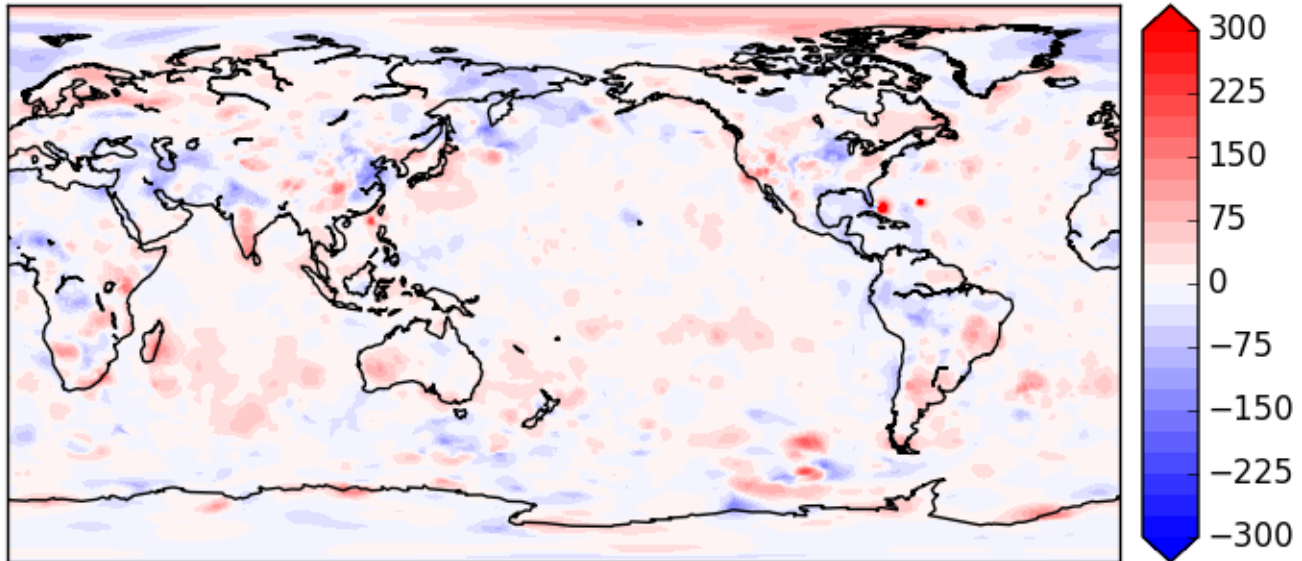


Recentering and DA increments

recentering increment (surface pressure)

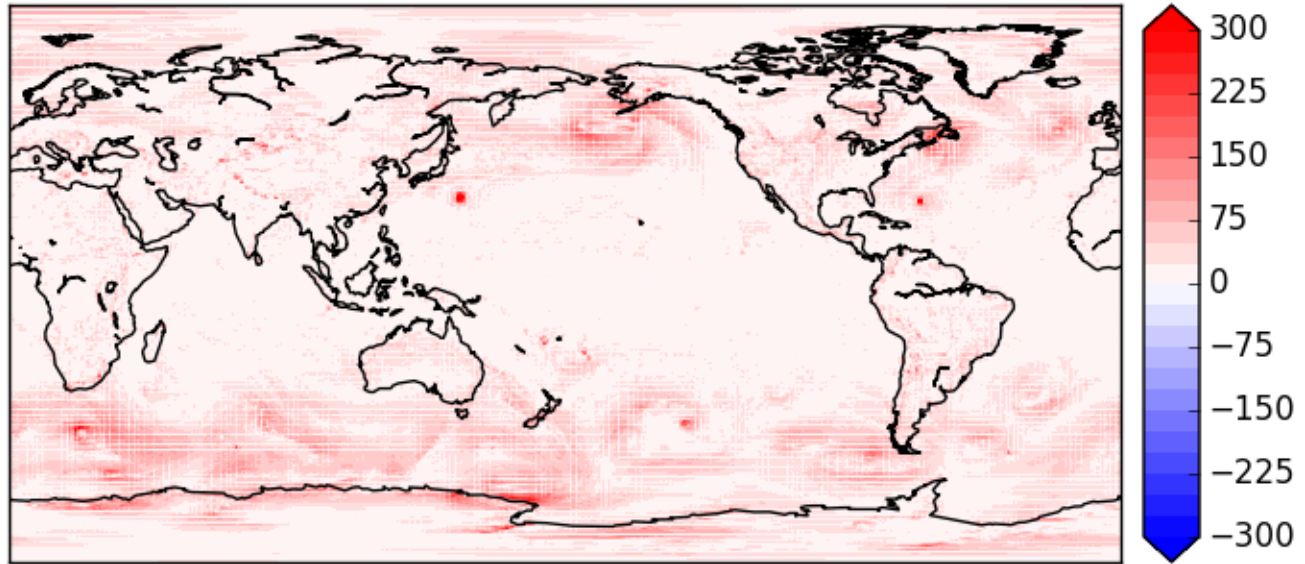


data assimilation increment (surface pressure)

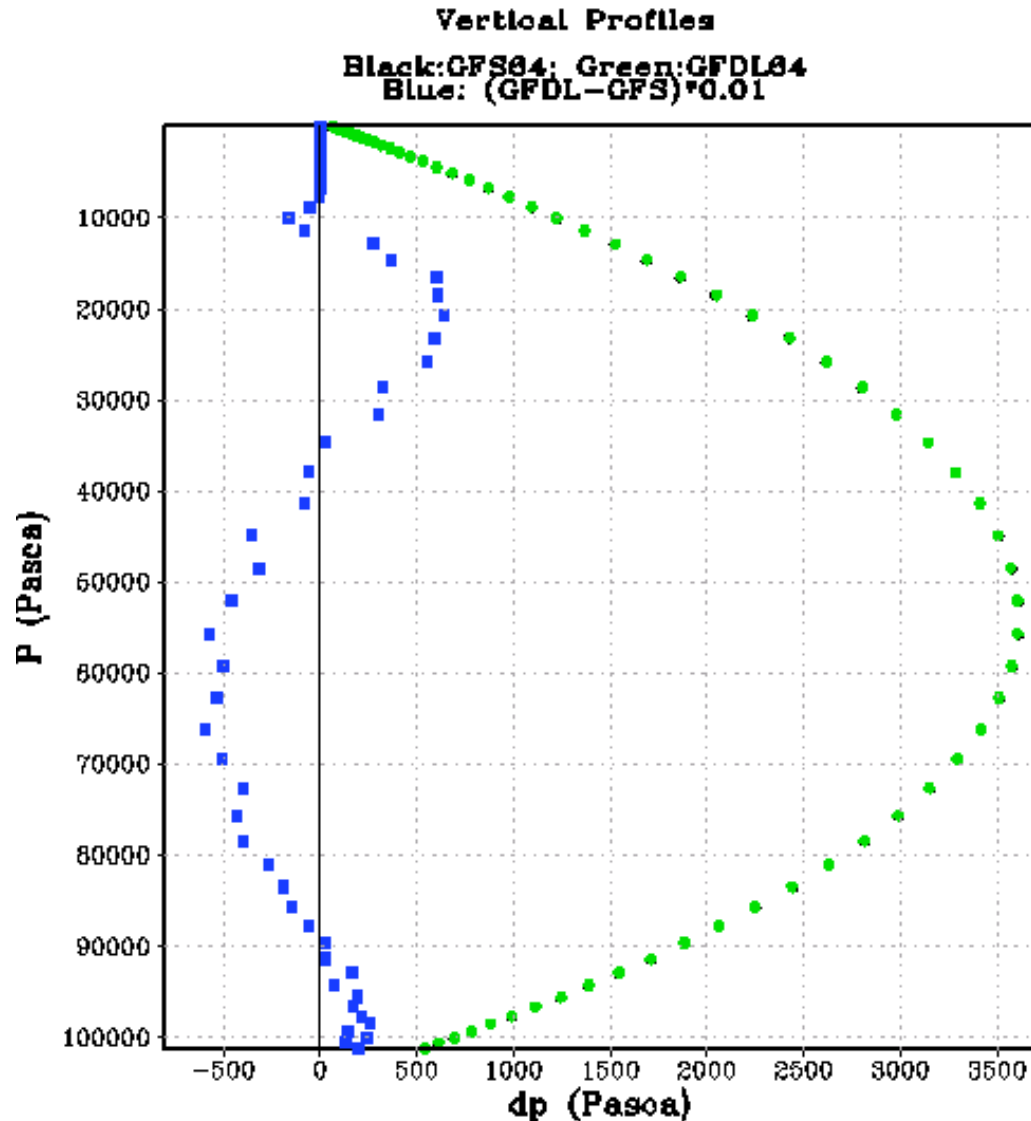


global_chgres round trip (C384 (T878)->C192 (T382)->C384)

data assimilation increment (surface pressure)

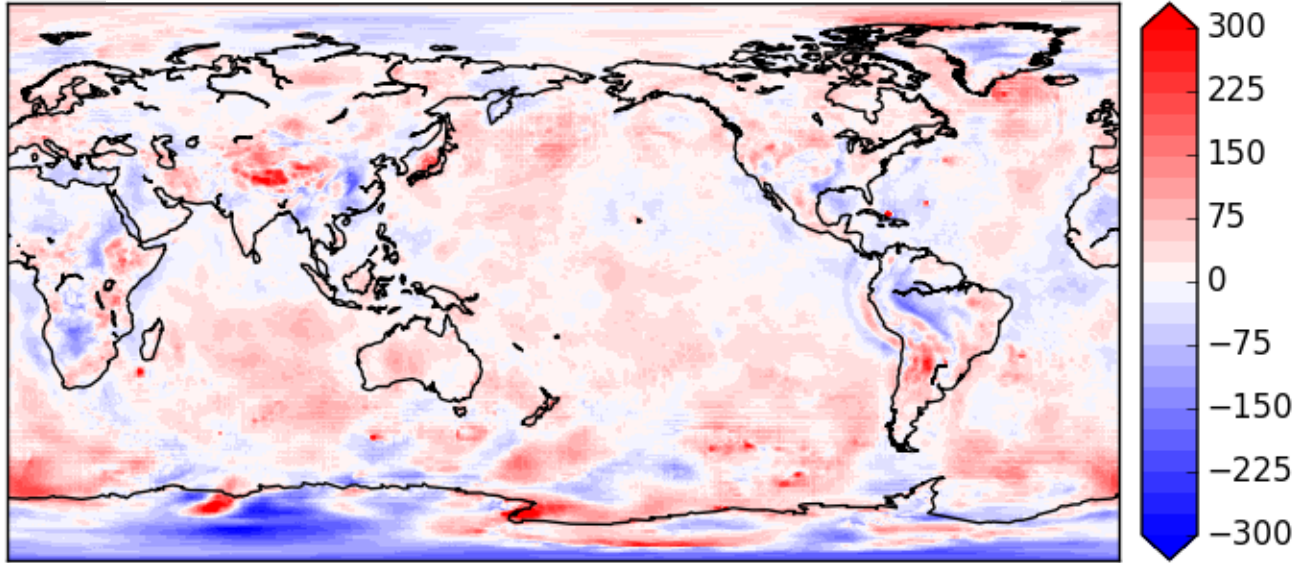


Difference between vertical levels when ncep_plevs=T and F (courtesy of Fanglin)

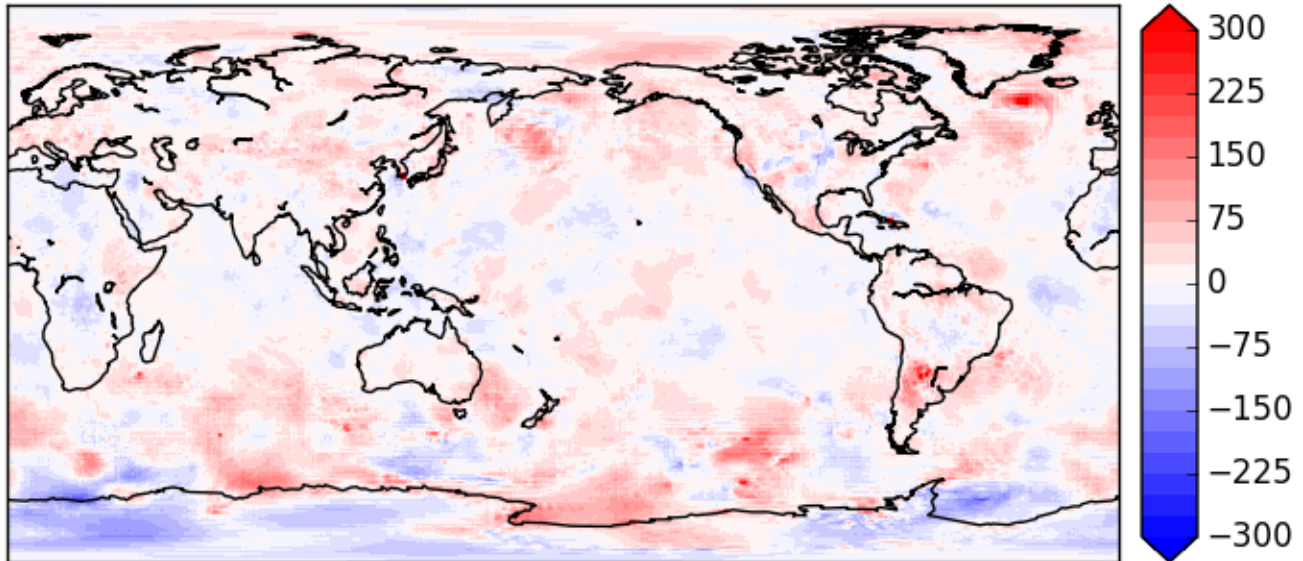


Results with ncep_plev=T

Recentering Increment (GFDL levels)

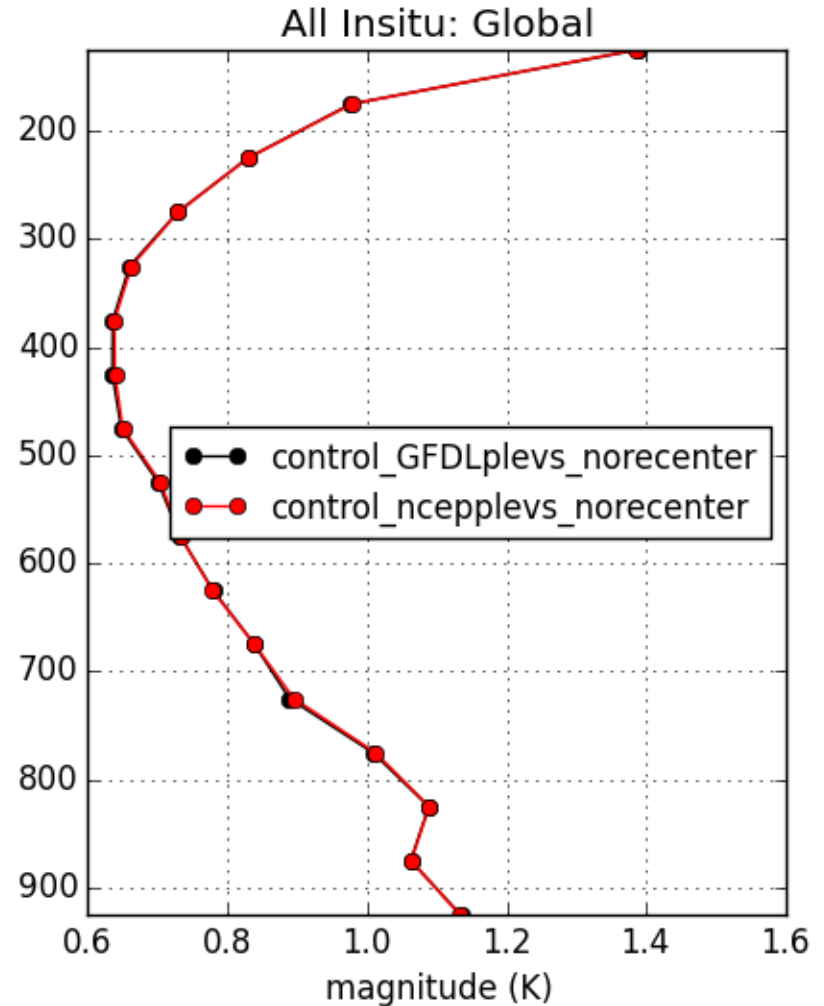
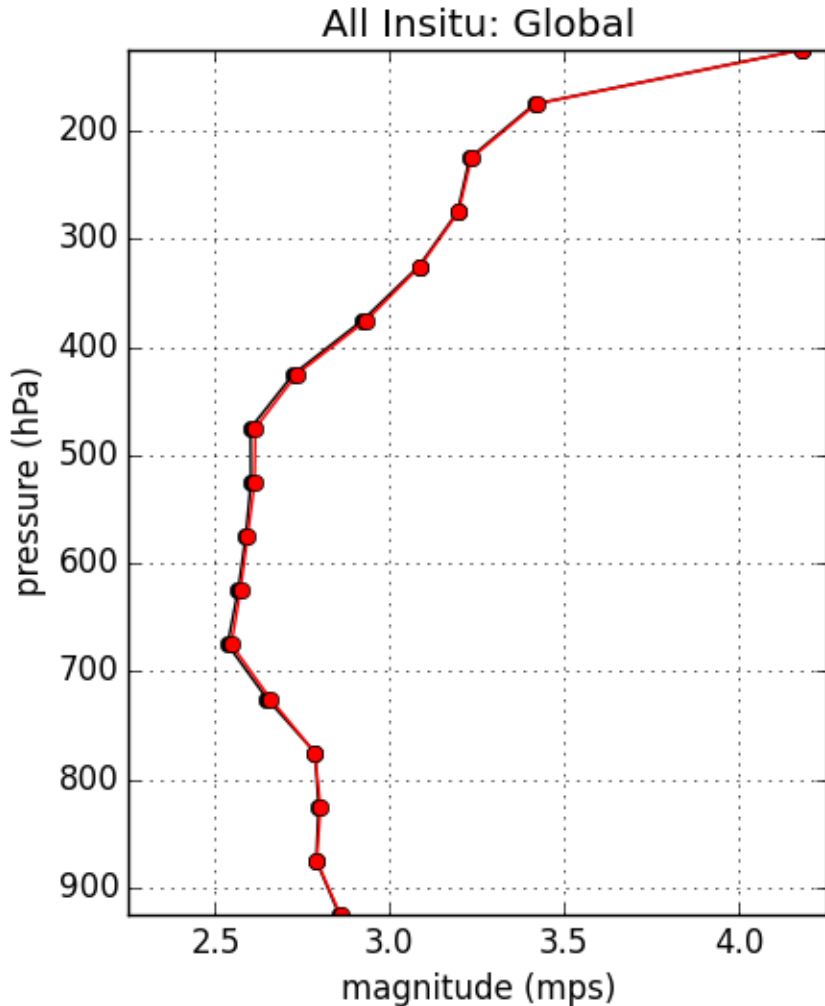


Recentering Increment (NCEP levels (ncep_plevs=T))



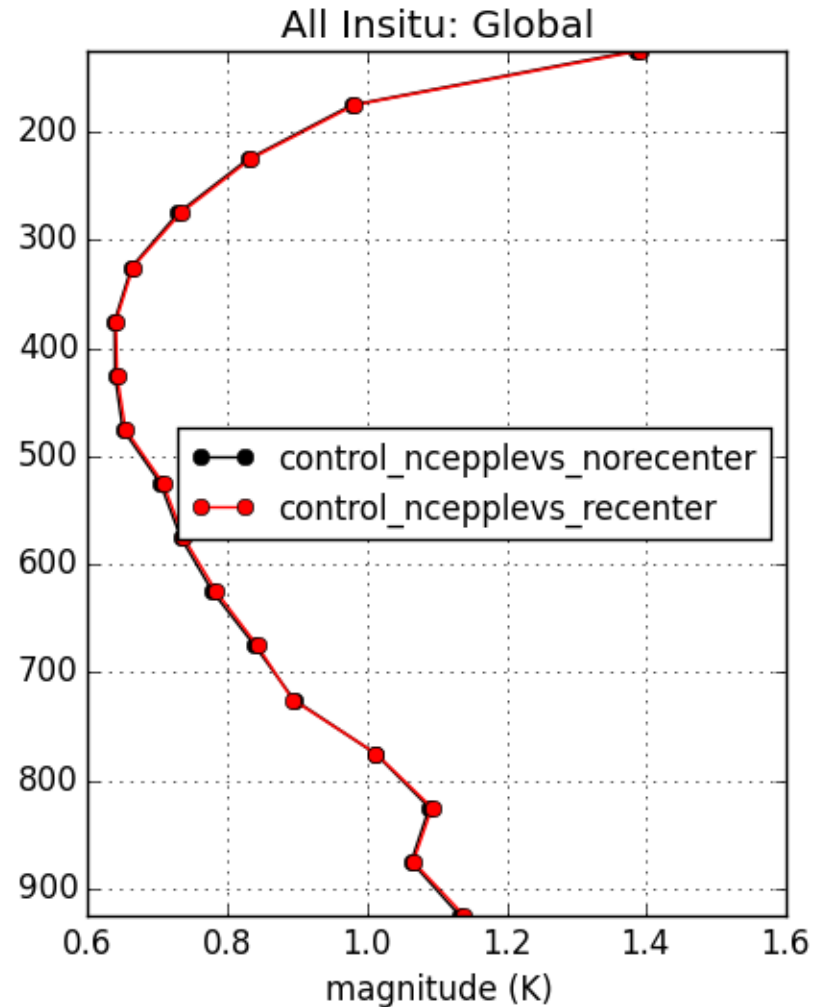
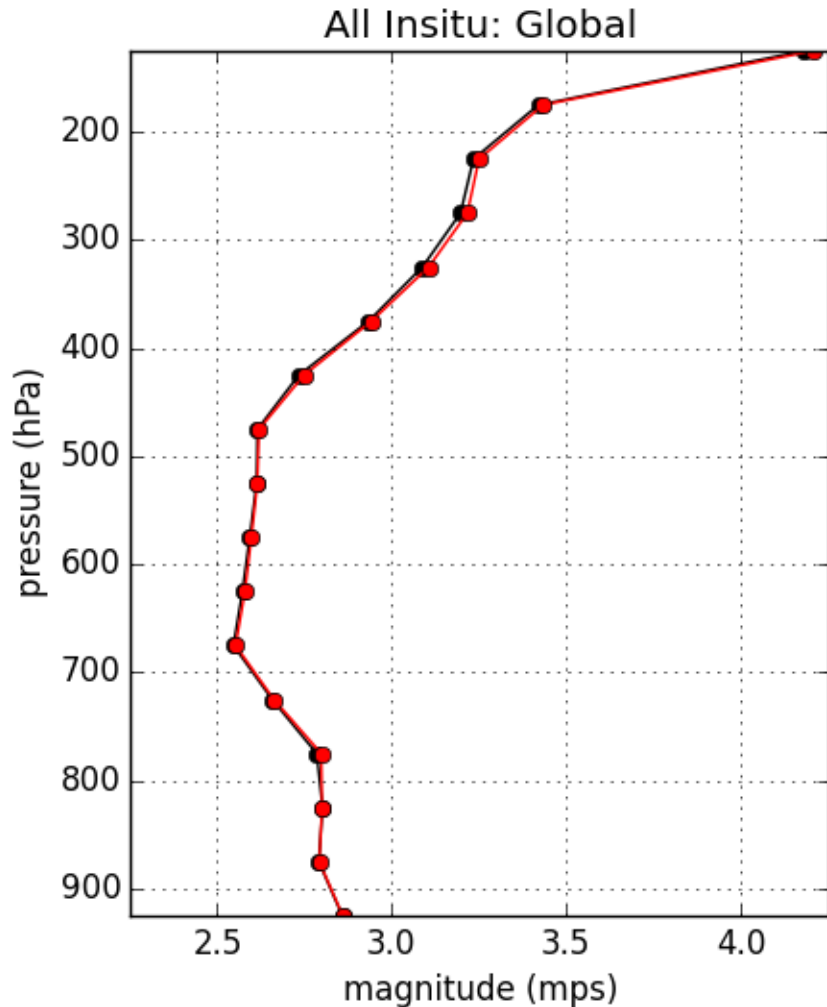
NCEP levels vs GFDL levels (no recentering)

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



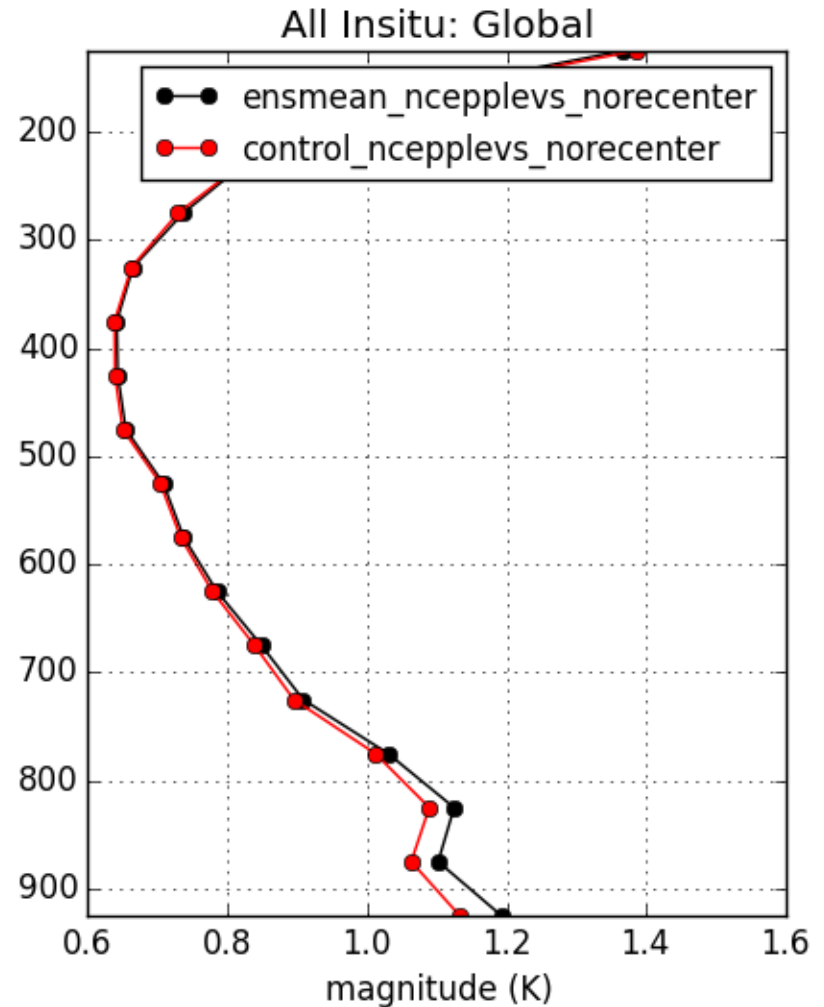
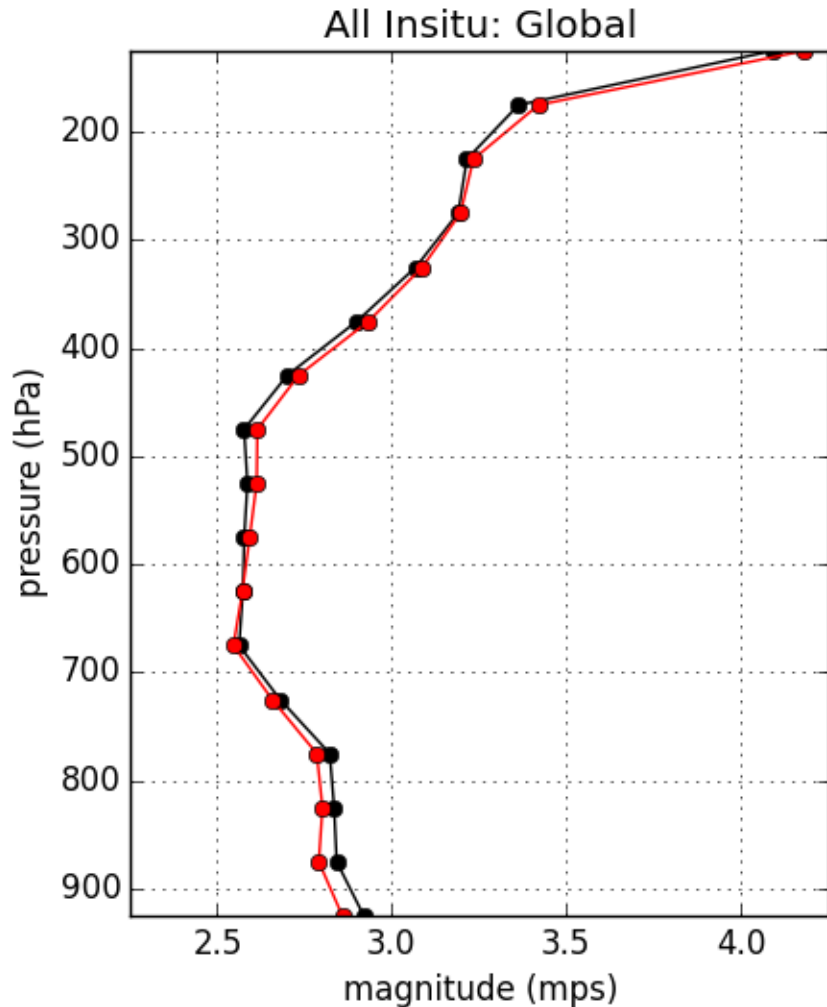
NCEP levels with/without recentering

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.