

# DA with FV<sup>3</sup>

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*for*  
DA groups at EMC and ESRL



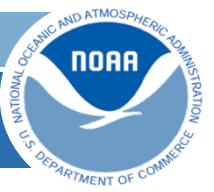
# Outline

- FV<sup>3</sup> model grid to NEMSIO lat-lon and vice-versa
- Stochastic Physics in NEMS + FV<sup>3</sup>
- Static Background Error Covariance
- Adapting the FV<sup>3</sup> vertical coordinate to the GSI
- Scripting and Workflow
- Update to *global\_cycle*
- IAU functionality in FV<sup>3</sup> + NEMS
- Re-tuning of the hybrid DA system



# FV<sup>3</sup> to NEMSIO and vice-versa

- Offline
  - ***regrid\_nemsio***: FV<sup>3</sup> tile files converted to NEMSIO for GSI (and downstream jobs)
  - ***calc\_increment***: compute increment on Gaussian grid to be ingested into the model during warm-start
  - ***global\_chgres***: Used for cold-start
- Online
  - NEMS + FV<sup>3</sup> using ESMF (or other toolkit for interpolation)



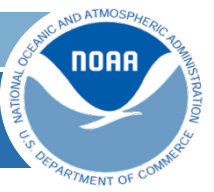
# Stochastic Physics (ESRL)

- ESRL (Phil Pegion and Jeff Whitaker) gave an update at the last meeting.
  - Development in *fv3gfs*; being moved to *fv3*
  - Random pattern generator (spectral space), Intermediate interpolations is in place.
  - SHUM and SPPT are ready for use
  - SKEB is being deliberated on the best way to implement



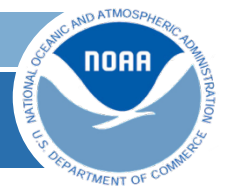
# Static Background Error Covariance

- **NCAR GEN-BE** has been ported, built, tested and run locally with WRF output.
- Next steps:
  - F24, F48 lagged forecast pairs database for FV<sup>3</sup>
  - Adapt GEN-BE I/O interface for NEMS+FV<sup>3</sup> (NEMSIO or NetCDF?)
    - FV<sup>3</sup> tiles → NEMSIO → NetCDF (GEN-BE)
  - Once cycling ability is achieved, EnKF members will be used to validate.



# FV<sup>3</sup> vertical coordinate

- GFS uses 64 layers, FV<sup>3</sup> uses 63 with a lower effective model top interface pressure.
- Discussions ongoing between GFDL and EMC/ESRL on adding/using additional interface pressure with GFS levels.
- Implications on *recentering* the low-resolution ensemble about a high-resolution analysis. Investigation ongoing.



# Scripting and Workflow

- `exglobal_fcst_fv3gfs.sh.ecf`:
  - adapted to have a warm-start capability with/without increment
  - generic, can be used for ensemble forecasts (no separate script)
- `exglobal_analysis_fv3gfs.sh.ecf`:
  - updated for FV<sup>3</sup> output converted to NEMSIO input
- Next steps:
  - EnKF scripts.