

RELEASE NOTES: enkf.v2.0.1

(https://docs.google.com/a/noaa.gov/document/d/1snf1PKK9Ilfo0zbxndkVhjSzu4daWGBusaoQ656IF_s/edit?usp=sharing)

v2.0.1 - released July 18, 2014

SVN HISTORY

- [r43135](#) - 7/18/2014 - initial delivery to NCO
- [r43215](#) - 7/21/2014 - clean up JGDAS_ENKF_FCST (more readable), set "MP_USE_BLUK_XFER=no" as recommend by IBM
- [r43217](#) - 7/21/2014 - add SVN history to release notes
- [r43935](#) - 8/7/2014 - update snogrib filename

CODE CHANGES

- convert GFS EnKF to vertical structure
- updated codes:
 - adderrspec_nmcmeth_spec.fd
 - update build to use versioned libraries
 - enkf_update.fd
 - code optimization (improved computational efficiency, reduced memory usage)
 - increase horizontal resolution of ensemble from T254 to T574
 - add ability to process files from enhanced radiance bias correction assimilate new radiances
 - update build to use versioned libraries
 - recentersigp.fd
 - update build to use versioned libraries
- new codes
 - getsfcensmeanp.fd
 - parallel (mpi) version of current operational /nwprod/sorc/getsfcensmean.fd
 - update build to use versioned libraries
 - getsigensmeanp_smooth_ncep.fd
 - parallel (mpi) version of current operational /nwprod/sorc/getsigensmean_smooth_ncep.fd
 - update build to use versioned libraries

JOB CHANGES

- The GFS EnKF is run via six (6) JGDAS_ENKF jobs in /nwprod/jobs. Each of these jobs is modified as part of the T1534 GFS upgrade. Below are the six jobs which have been modified
 - JGDAS_ENKF_FCST

- JGDAS_ENKF_INFLATE_RECENTER
- JGDAS_ENKF_INNOVATE_OBS
- JGDAS_ENKF_POST
- JGDAS_ENKF_SELECT_OBS
- JGDAS_ENKF_UPDATE
- The following common changes have been made to each of these six JGDAS_ENKF* jobs:
 - update to vertical structure with references to the following packages
 - enkf_ver = v2.0.1
 - gsm_ver = v12.0.0
 - gsi_ver = v5.0.0
 - crtm_ver = v2.1.3
 - increase resolution of ensemble to T574 (1152 x 576 grid)
- Job specific changes are as follows:
 - JGDAS_ENKF_FCST
 - switch to semi-Lagrangian version of global forecast model
 - turn on stochastic physics in ensemble forecast
 - JGDAS_ENKF_INFLATE_RECENTER
 - increase default number of global_chgres threads from 16 to 32
 - JGDAS_ENKF_INNOVATE_OBS
 - add \$GETGESSE calls for biascr_pc and radstat. Need to update getges.sh. Since getges.sh is a shared util/ush script, it is not part of enkv.v2.0.1.
 - remove GSATANG and SATANGL (obsolete)
 - JGDAS_ENKF_POST
 - change GETATMENSMEANEXEC and GETSFCENSMEANEXEC defaults to parallel (mpi) versions
 - JGDAS_ENKF_SELECT_OBS
 - add ABIASe - new output file for enhanced radiance bias correction scheme. ABIASe is input in JGDAS_ENKF_UPDATE
 - add \$GETGESSE calls for biascr_pc and radstat. Need to update getges.sh. Since getges.sh is a shared util/ush script, it is not part of enkv.v2.0.1.
 - remove GSATANG and SATANGL (obsolete)
 - JGDAS_ENKF_UPDATE
 - add GBIASe - new input file for enhanced radiance bias correction scheme
 - remove GSATANG and SATANGL (obsolete)

SCRIPT CHANGES

- exglobal_enkf_fcst.sh.ecf
 - use version number for gsm
 - new variables: LONSPERLAT, SET_STP_SEED

- add FILESTYLE option
- exglobal_enkf_inflate_recenter.sh.ecf
 - use version numbers for enf and gsm
 - change SCALEFACT default from 32 to 05
 - add FILESTYLE='L' option
 - allow GETATMENSMEANEXEC and GETSFCENSMEANEXEC to run as parallel (mpi) codes
- exglobal_enkf_post.sh.ecf
 - use version numbers for gsi and enf
 - allow GETATMENSMEANEXEC and GETSFCENSMEANEXEC to run as parallel (mpi) codes
- exglobal_enkf_update.sh.ecf
 - use version numbers for enf and gsi
 - replace GSATANG with GBIASe
 - add option to use enhanced radiance bias correction scheme
 - add diagnostic and guess files to link section

RESOURCE INFORMATION

- JGDAS_ENKF_SELECT_OBS
 - compute resources
 - current operations: 32 tasks, 1 node, 2 threads/task
 - proposed package: 112 tasks, 7 nodes, 1 thread/task
 - run time
 - current operations: 4.5 minutes
 - proposed package: 4.0 minutes
- JGDAS_ENKF_INNOVATE_OBS
 - NOTE: run 10 concurrent copies of JGDAS_ENKF_INNOVATE_OBS. Each submission processes 10 ensemble members. Group 1 = EnKF members 001 to 008. Group 2 = EnKF members 009 to 016, ... Group 10 = EnKF members 073 to 080. Compute resources and run times below are for a single instance of the job.
 - compute resources
 - current operations: 32 tasks, 1 node, 1 thread/task
 - proposed package: 112 tasks, 7 nodes, 1 thread/task
 - run time
 - current operations: 20.5 minutes
 - proposed package: 21.0 minutes
- JGDAS_ENKF_UPDATE
 - compute resources
 - current operations: 112 tasks, 14 nodes, 2 threads/task
 - proposed package: 330 tasks, 55 nodes, 2 threads/task
 - run time
 - current operations: 14 minutes

- proposed package: 14 minutes
- JGDAS_ENKF_INFLATE_RECENTER
 - compute resources
 - current operations: 80 tasks, 5 nodes, 16 threads for global_chgres
 - proposed package: 80 tasks, 20 nodes, 32 threads for global_chgres
 - run time
 - current operations: 4.0 minutes
 - proposed package: 9.0 minutes
- JGDAS_ENKF_FCST
 - NOTE: run 10 concurrent copies of JGDAS_ENKF_FCST. Each submission processes 10 ensemble members. Group 1 = EnKF members 001 to 008. Group 2 = EnKF members 009 to 016, ... Group 10 = EnKF members 073 to 080. Compute resources and run times below are for a single instance of the job.
 - compute resources
 - current operations: 32 tasks, 4 nodes, 4 threads/task
 - proposed package: 160 tasks, 20 nodes, 2 tasks/thread
 - run time
 - current operations: 21 minutes
 - proposed package: 21 minutes
- JGDAS_ENKF_POST
 - compute resources
 - current operations: 6 tasks, 1 node, 1 thread/task
 - proposed package: 80 tasks, 5 nodes, 1 thread/task
 - run time
 - current operations: 3 minutes
 - proposed package: 2 minutes
- Disk space required per day
 - current operations: 378 Gb
 - proposed package: 1478 Gb
- Frequency of run
 - 6 hourly cycle (00, 06, 12, 18Z)
- Specify **all** versions of libs, compilers, shared code being used
 - libraries
 - NETCDF_VER = 3.6.3
 - SFCIO_VER = v1.0.0
 - SIGIO_VER = v1.0.1
 - SP_VER = v2.0.1
 - W3EMC_VER = v2.0.5
 - W3NCO_VER = v2.0.6
 - compiler (modules loaded during EnKF build / run)
 - ics/12.1

- ibmpe/1.3.0.7
 - lsf/9.1
- Data retention for files in /com and /nwges under prod/para/test environments
 - same as current operations

PRE-IMPLEMENTATION TESTING REQUIREMENTS

- which production jobs should be tested as part of this implementation?
 - EnKF v2.0.1 should be tested as part of the T1534 GFS package
 - NOTE: EnKF v2.0.1 requires T1534 GDAS and T574 EnKF ensemble guess files. If these guess files are not available from /nwges/\${envir}/ or /com/gfs/\${envir}/, they may be obtained from the EMC real-time parallel. It is necessary to prime (start) the NCO T1534 GFS parallel with files from the EMC parallel.
- does this change require a 30-day evaluation?
 - YES
- suggested evaluators
 - same as rest of T1534 GFS package

DISSEMINATION INFORMATION

- where should this output be sent?
 - same as current operational GFS EnKF
- who are the users?
 - same as current operational GFS EnKF
- which output files should be transferred from PROD WCOSS to DEV WCOSS?
 - same as current operational GFS EnKF

HPSS ARCHIVE

- retention length?
 - same as current operational GFS EnKF
- list which output files should be archived
 - same as current operational GFS EnKF

IMPLEMENTATION INSTRUCTIONS

- To implement enkf v2.0.1, please do the following:
 - mkdir enkf.v2.0.1 in appropriate /nw\${envir}
 - cd /nw\${envir}/enkf.v2.0.1
 - svn checkout <https://svnemc.ncep.noaa.gov/projects/enkf/branches/REL-2.0.1>
 - cd /nw\${envir}/enkf.v2.0.1/sorc
 - file README.build explains two ways to build and install enkf.v2.0.1 executables
 - all-in-one build and install
 - execute ./build.sh
 - one-at-a-time build and install
 - follow code instructions at top of README.build

- NOTE: The enkf.v2.0.1 executables are installed in /nw\${envir}/enkf.v.2.0.1/exec. The install step creates this directory if it does not exist.

JOB DEPENDENCIES & FLOW DIAGRAM

- The GFS EnKF jobs run in the following top-down sequential order.
 - JGDAS_ENKF_SELECT_OBS
 - JGDAS_ENKF_INNOVATE_OBS
 - JGDAS_ENKF_UPDATE
 - JGDAS_ENKF_INFLATE_RECENTER
 - JGDAS_ENKF_FCST
 - JGDAS_ENKF_POST
- Dependencies
 - NOTE: The T1534 GFS package does NOT alter existing GFS EnKF dependencies. The T1534 GFS package adds one new dependency at the start of the GFS EnKF as noted below. All other dependencies remain identical to dependencies in the current operational GFS EnKF.
 - JGDAS_ENKF_SELECT_OBS
 - can not start until JGDAS_PREP and JGDAS_EMCSFC_SFC_PREP both finish
 - NOTE: JGDAS_EMCSFC_SFC_PREP is a new job included as part of the T1534 GFS package
 - JGDAS_ENKF_UPDATE
 - can not start until all 10 realizations of JGDAS_ENKF_INNOVATE_OBS finish
 - JGDAS_ENKF_INFLATE_RECENTER
 - can not start until JGDAS_ENKF_UPDATE and JGDAS_ANALYSIS_HIGH finish
 - JGDAS_ENKF_POST
 - can not start until all 10 realization of JGDAS_ENKF_FCST finish
 - A graphical representation of these dependencies is found on the next page

