What is new in community GSI release version 3.1

The following lists some of the new functions and changes included in the release version 3.1 of the GSI versus version 3.0:

1. Development new data assimilation techniques
   - Addition of 4d capability for ensembles to allow several flavors of 4dvar using ensembles
   - Enhancement of Global hybrid function and implementation. Development of hybrid capability for NAM and HWRF. Addition of dual resolution capability for regional hybrid ensemble applications
   - Addition of cloudy radiance assimilation
   - Addition of the NCEP 4dvar perturbation model as a tool in utility directory
   - Incorporation of hybrid capability to sqrt(B) option

2. Improvement to general data analysis techniques:
   - Updated and enhanced the utility Radiance Monitoring package for easily installation and better monitoring radiance observations
   - Improved the use of the significant levels in radiosonde observation
   - Extended FGAT capability to NAM and ARW NetCDF interface
   - Added GSI Metguess bundle
   - Added the Bi-Conjugate Gradient minimization option
   - Added radiance bias correction spin-up of new instruments: the new channels are assigned as passive channels and monitored before they are used in the data assimilation. While they are passive, bias correction will be performed
   - Improved the GSD cloud analysis scheme
   - Improved surface data analysis for RAP applications

3. Improvement of the use of observations and addition of new observations
   - Enhanced assimilation of GPS-RO data
   - Added climatological monthly zonal mean CO2 fields and allow these fields to impact the CRTM's radiance computation
   - Inclusion of ATMS. Added a new fixed file for the ATMS filtering
   - Added capability to do chemical data assimilation, including aerosol, PM2.5, and MODIS AOD.
   - Allow assimilation of Doppler wind Lidar data
   - Improved data quality control process for avhrr, AMSU-A channel 5
   - Modification of the specification of TCVITL surface pressure observational errors
   - Added the capability to assimilate MLS ozone BUFR data. Added an option to revert ozone analysis to uni-variate above specified level in hybrid.
   - Additional quality control for satellite winds.
   - Inclusion of JMA water vapor cloud (type 250) winds.
   - Inclusion of the ability to use SEVIRI data.

- Improvement of radar radial wind data analysis:
  - Added observation subtype to discriminate between level-2, level-2.5, and level-3 observations.
  - Turned off the use of level-2.5 radial winds in the CONUS domain but kept the level-2.5 data for Alaska.
  - Increased the observation error for level-3 data in the CONUS domain.
- Enhancements to RTMA
  - Added the analysis of: (i) 10-m wind gust; (ii) visibility; and (iii) planetary boundary layer height
  - Included the new report types (192-195, 292-295) that were created for surface observations missing a surface pressure report.
  - Added the Hilbert Curve-based cross-validation

Please note due to the version update, some diagnostic files and static information ("fixed") files have been changed as well.