

June 30, 2021

GEOS-FPIT users,

We wanted to update you on the status and timeline of the GEOS-IT system, which is now in a testing phase. We have been involved in configuration, testing, and preparation of an updated input observation archive to support GEOS-IT, as well as the future GEOS-R21C reanalysis. We have also been working on updates to the file specification, filenames, and associated testing. We are happy to report that the sample data production for the year 2018 is now underway and we expect to deliver preliminary data before the end of July.

This note provides some details on significant developments in our plans for the GEOS-IT system, concerning the schedule, the GEOS system, the data grids, and the file name conventions.

Thank you for your patience as we prepare the GEOS-IT system for production. If you have any comments, questions, or concerns prior to the release of sample data, please share them with us. We want to do whatever we can to help facilitate this transition from GEOS-FPIT to GEOS-IT in your applications. More information will be coming with the release of the sample data next month.

Sincerely,

Rob Lucchesi
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Global Modeling and Assimilation Office

Schedule for GEOS-IT release

After several false starts, the 2018 sample data is now being generated. These data should be ready for release to the GEOS-IT users by the end of July. We are presently coordinating with the GES DISC about the best way to get that data out to interested users. These data are being evaluated and monitored by GMAO staff, but we will continue evaluating the results of this year of data in parallel with your evaluation of the data in your applications. Assuming that the sample data meets expectations of the users, we expect to begin produce the historic time periods in three different streams, each of which will be spun up for a year:

- Stream 1: 1998 -> 2007
- Stream 2: 2008 -> 2017
- Stream 3: 2018 -> near-real-time production

Our estimated timeline is:

- Mid-late July 2021: Release sample data and solicit feedback.
- September 2021: Begin production.
- January 2022: Initial data release of stream #3 at near real-time.
- Early 2022: Begin release of streams #1 and #2 as they progress.
- September 2022: All data produced and released up to real time.

Note that GEOS-FPIT will continue processing through this entire period and will not be shut down before late 2022.

GEOS system heritage

The GEOS-5.27.1 system is the present version running as GEOS-FP, where it is configured as a c720L72 “hybrid four-dimensional Ensemble-Variational” (hybrid 4DEnVar) system. The configuration for GEOS-IT is c180L72 model resolution using the three-dimensional variational (3D-Var) approach – this is comparable to GEOS-FPIT.

GEOS-IT Native Grid

Last year we stated that changes to the file specification were going to be minimal with the release of GEOS-IT. Since that time our thinking has evolved. We view GEOS-IT as an opportunity to provide our users direct access to the data on the native, cubed-sphere model grid on which it is produced, which can improve accuracy for some applications, as well as slightly reducing the file sizes. More specific details:

- Pressure-level datasets from GEOS-IT will continue to be provided solely on a latitude-longitude grid.
- We anticipate the 2D products will be provided on both the cubed-sphere and the latitude-longitude grids.

- The “native” grid data products, on the 72 model levels, are targeted for the cube-sphere grid distribution.
- Use of the cubed-sphere grid can enhance accuracy in interpolating GEOS-IT fields to observation locations, because it eliminates any artifacts caused by interpolation to the intermediate latitude-longitude grid used in our GEOS-FPIT products.
- A parallel output stream, with these 72-layer fields on the latitude-longitude grid used for GEOS-FPIT, will also be provided for the sample dataset. While our goal is to discontinue this interpolated dataset in the official GEOS-IT product suite, our top priority is to continue supporting your applications with GEOS-IT. If the transition to the new grid is particularly troublesome for your production system, do not hesitate to contact us so we can discuss your situation.
- Specific details about the GEOS native cubed-sphere grid will be provided with the sample data.
- GMAO staff are adapting in-house tools for use with the cubed-sphere grid into a configuration that can be distributed to data users. During the testing phase, we will interact with users to ensure that essential functionality is provided to the users.
- We understand that transitioning operational data production systems can take time and we are planning a lengthy overlap of GEOS-FPIT with GEOS-IT (one year).

Filenames

In order to support the release of GEOS-IT products (and other future GEOS products) on varying grids, it was necessary to revamp the filename convention used for the products, particularly the collection identifier. In addition, we have taken this opportunity to introduce an ISO-compliant timestamp (date and time) into the filenames. When the sample data are released, we will provide a summary document that explains the filename changes. Of course, a full file specification document will be released later. We will also provide a summary of minor changes to variable content from the GEOS-FPIT collections.