

2021-11-04

Yannick opened the meeting announcing that this week's meeting is a general roundtable update. Yannick also introduced two new members of JCSDA:

- Ben Ruston, who is the new OBS team lead
- Christian Sampson, who has joined the JEDI team and will be working on 4DVar

JEDI1

Steve H gave the following summary:



JEDI 1 Summary

Maryam:

- I have been helping with the SOCA release.
- I worked on implementing AWS CodeBuild for ops-um-jedi and also UFS on fv3-jedi repo.
- We are retiring Travis-CI and I am going to replace Travis-CI with CodeBuild for crtm, shallow water, and WRF-hydro repos.

Steve:

- Assisted with ioda converter code sprint last week
 - Reviewing converter updates
- Working on the new epoch style DateTime representation
 - ioda reader will accept the string DateTime representation for backward compatibility
 - The old representation using a "date_time" global attribute with a time offset will be obsoleted

Anna added this item later in the meeting:

On November 21-22 we ran a Parameters code sprint, co-organized by Wojciech Smigaj and Anna Shlyueva. During the code sprint 19 participants from JCSDA, Met Office, NASA, NOAA, NRL contributed to the improvement in JEDI user experience with configuration files across JEDI code.

During these two days we accomplished:

1. In Unified Forward Operators (UFO):

- 22/35 different nonlinear and linear obs operators were adapted to use Parameters classes; 3/35 are work in progress.

- 3/5 different QC filters adapted to use Parameters classes.

These include the "example" ObsOperator and QC filter generated by UFO tools that create sample code to simplify the process of creating new ObsOperators and QC filters.

2. 13/15 OOPS applications were adapted to use Parameters for high-level YAML options.

3. The following model interfaces were adapted to use Parameters for some of the classes (e.g. Geometry, Model, State): fv3, Ifric, neptune, roms, um, ops-um.

We merged more than 50 PRs in ufo, oops and model repositories as part of the sprint.

As Mark Miesch pointed out, this effort will have a nonlinear effect down the line: now that the majority of classes in ufo, ioda, and other repos have Parameters implemented, it will become the default option when people add new classes.

Thank you to all of the participants, to Wojciech for organizing and driving this effort, and to Mark Miesch and Kat Shanahan for the assistance with organizing this.

See link to the slides that Wojciech prepared for the code sprint with an excellent introduction to Parameters and descriptions on how to approach the tasks: <https://wiki.ucar.edu/display/JEDI/2021-10-19+Parameters+code+sprint+preparation>

JEDI2

Anna gave the following summary (notes are from Steve V):



JEDI 2 Summary

Jedi 2.1 - Improved interpolation (Dan, Francois H)

- Yannick mentioned that a consultant has been hired to speed up OOPS interpolation by making the MPI communication more efficient. Yannick estimates that the performance improvement will be on the order of 100X to 1000X.
- He said that the GetValues class will likely disappear or be refactored beyond recognition.
- He raised the question of whether the models would prefer to make this change as a series of small PR's or a single larger PR, but this didn't get discussed by the group.
- The group discussed whether it is better to perform the interpolation on the model side or on the Obs side. A few people spoke in favor of doing it on the model side so that grid information can be used, even though it may be more complex for the models. A concern of this approach is that satellite field of view may extend beyond the halo typically used by models.
- This change is expected before the end of the calendar year.

Jedi 2.2 - Generalized locations (Francois H, Emily)

- Francois has been continuing to work on the Field of View calculations.
- He mentioned that he discovered an omission in the interface between CRTM and the models that he is correcting. Currently, the models cannot pass the encoding method that they are using for surface type, so only the default method can be used.

Jedi 2.3 - Use of NUOPC driver with FV3-JEDI (Mark Potts)

- Mark has been discussing with Guillaume about extending the coupling to SOCA.

Jedi 2.4 - TLM and adjoint improvements (Dan, New hire)

- No updates

Jedi 2.5 - 4DVar testing (New hire)

- No updates

Jedi 2.6 - Ensemble DA validation (Cory, Sergey)

- Has been comparing two different solvers and examining the differences
- Would like to know the best way to organize a cross-organization group to work on this.

Jedi 2.7 - Background error model validation (Benjamin, Dan, Cathy, Ricardo)

- Benjamin has been doing some BUMP refactoring that will affect the BUMP section of YAML files. He plans to handle the required PR's for the models.
- Has also been doing BUMP changes related to [OOPS PR #1333](#)

Jedi 2.8 - Regional DA (Ting, Ming)

- Ting - no update due to other urgent priorities
- Ming - Testing HofX with regional data. (It's working with global data.)

Jedi 2.9 - MPAS general updates (JJ, BJ)

- No updates

Jedi 2.10 - LFRic general updates (Kristin, Steve S., Steve V.)

- No updates

Jedi 2.11 - UM general updates (Kristin, Steve S., Steve V.)

- Steve V. is working on the um-jedi changes required by [OOPS PR #1333](#)

Jedi 2.12 - Neptune general updates (Sarah, Nancy)

- Finishing up changes due to the Parameters code sprint last week.
- Preliminary work on surface pressure assimilation.

Jedi 2.13 - Shallow water model general updates (Chris)

- No updates (Chris not present at meeting.)

Jedi 2.14 - Cubed sphere grid into Atlas (Dan, Marek, Olly, Steve V)

- Olly currently has [Atlas PR #72](#) under review.

Jedi 2.15 - VADER (Steve V, Dan)

- Earlier work on VADER cannot be merged until [OOPS PR #1333](#) is.

Jedi 2.16 - Generalized variable naming conventions (EMC liaison)

- No updates

Jedi 2.17 - Ensemble TLM (New hire, Tim)

- No updates

Jedi 2.18 - Locations refactoring (Dan, Francois H)

- No updates

Jedi 2.19 - GeoVaLs refactoring (Anna, Ryan, Carwyn, Wojciech)

- No updates

Jedi 2.21 - FV3 interface (Dan)

- Doing some refactoring that will eliminate some "if" conditionals in the code. (e.g. if (geos))
- Parameters code sprint work
- Adaptations for [OOPS PR #1333](#)

In regard to JEDI2.1 (improved interpolation), Yannick added that the consensus was to do the interpolation on the model side. The team is still determining how to organize the code changes (a series of small PRs vs one large PR).

JEDI3

Anna gave the following summary:

JEDI 3 Summary

JEDI3.3 Variational bias correction.

Jo Waller issued a pull request adding preconditioning for VarBC for DR IPCG and DR PCG minimizers: [oops#1364](#)

JEDI3.5 EDA.

Wojciech Smigaj opened an issue and a PR for generating obs perturbations with zero mean. [oops#1506](#) and [oops#1512](#)

Also under discussion: general approach to random number generators in JEDI.

Wojciech proposes to initialise a few separate RNGs (or at least define the seeds these RNGs could be initialised with if they are ever needed) at the start of each oops application:

- one with a seed dependent on the rank of the calling process in the communicator passed to oops::Application and on the ensemble member index
- one with a seed dependent on the rank of the calling process in the communicator passed to oops::Application (but not on the ensemble member index)
- one with a seed dependent on the rank of the calling process in the time communicator (but not in the space communicator) and the ensemble member index
- etc.

and replace the seed and reset parameters currently passed to the constructors of oops::NormalDistribution<T> etc. with an enum indicating which of these RNGs to use.)

JJ Guerrette is running EDA experiments (as several Variational applications). He has also run experiments using block-Lanczos EDA with mpas-jedi, which were failing due to imaginary eigenvalues.

JEDI3.7 EnKFs:

Sergey Frolov reported that the main focus for the next 6 months - year would be using local volume solvers for coupled assimilation, and doing 3D LETKF. One of the tasks is connecting coupled ensembles to BUMP to diagnose coupled covariances.

JEDI3.11 & JEDI3.12 SABER:

Benjamin Menetrier has been working on adding Parameters to SABER and preparing SABER to handling B matrix options other than BUMP.

Marek Wlasak raised several questions:

- where should interpolation to the gaussian grid be for the spectral covariances
- should there be a general format for storing, processing and reading covariance statistics.
- would it be possible to mix and match various SABER pieces: e.g. use vertical regression from BUMP, and horizontal covariances from spectral covariances.

Benjamin: for BUMP parameter estimation the process estimates vertical regression, variances, and horizontal lengthscales separately. Ideally in SABER the Increment would be transformed to atlas fieldsets, then all the saber operators would be applied (on atlas pointers), and at the end we'd go back to Increment. The idea is that different SABER blocks can be applied on different resolutions/variables, and all the blocks would be specified in yaml explicitly, including the interpolations. This would improve maintainability and the user would see all the steps in the B matrix.

JEDI4

Yannick gave the following summary:

JEDI 4 Summary

Yannick mentioned that the work plans for JEDI4 are being modified due to the reduction in resources. This information will be available in the revised AOP once that is completed.

OBS

Ben R gave the following summary:

OBS

Ben expressed thanks to everyone that has been helping him get spun up in his first week with JCSDA. He is currently organizing the work with team members, and reaching out to partners for requirements and support needs.

OBS1

Hui gave the following summary:

OBS 1 Summary

OBS team are working on

- conventional obs error model for aircraft
- First set of yaml files for RFFS. Working on testing data
- FOV averaging work
- Working on generating static B for one of skylab experiment for RO studies
- bug fix for missing observation values in CLW and hydrometer check
- Testing radiance using new GDAS observations. This is the only data type left before we can update our obs data base for JEDI_GDAS.

PR in review: e.g.

- impact height check using obs profiles
- PM2.5 operator

Meetings in past couple of weeks:

- UFO constituent meeting (including Jerome)
- ZTD working session with UKMet and NRL

Upcoming meetings:

- UFO monthly meeting will be next Tuesday with all inkind for UFO invited

Chris S asked if the OBS database for JEDI GDAS was built out of GSI ncdiag files, or are there feeds from obs data providers in place. Currently it is primarily ncdiag data, but the next steps include enabling feeds from the providers.

OBS2

Francois gave the following summary:

OBS 2 Summary

- We reviewed several dashboarding software for the generation of web applications to display diagnostics. For the initial version of the website *oila* was chosen for its simplicity.
- The PR [#1407](#) (Adding the LinearForecast application) is under review.
- Working on the implementation of the 3-corner hat observation error estimate with the COSMIC project.

Sergey asked if there is a way to learn more about the dashboarding aspect of the diagnostics. This effort has just started and is being lead by Travis. Francois will ask Travis to invite Sergey to the discussions.

OBS3

Ryan gave the following summary:

OBS 3 Summary

Last week we hosted a ioda-converters sprint with the objective of switching all Python converters to write out ioda-v2 files natively using the ioda-python interface. Ten people attended the three-day sprint. We ran a bit short on time. A week would likely have been better, though we did accomplish a lot of work. Every converter has had a PR issued, and that PR is either still in review or has been merged.

There are still several converters that need work - these were outside the scope of the sprint. wrfda-ncdiag can be updated once the gsi-ncdiag converter has been updated. These two converters share a common development history. The GOES converter needs broader changes since it does not use ioda-python at all. Finally, we have two Fortran converters where we are waiting on the implementation of ioda's Fortran API.

Besides the sprint, we merged the first major Diagnostic Flags pull requests into UFO and IODA (#1558). This makes it possible to define, set and retrieve diagnostic flags, which are boolean variables belonging to the DiagFlags group. These flags are customizable at runtime and they are set by QC filters. Thanks to Wojciech for this major contribution.

The next OBS3 meeting will occur on Wednesday, November 10.

SOCA

Guillaume gave the following summary:

SOCA Summary

- The SOCA release is delayed due to some unforeseen github issues. Maryam has fixed the issue so the release should occur by tomorrow. (Note: the JEDI SOCA release did occur later in the day on Nov 4th: <https://www.jcsda.org/news-blog/2021/11/4/jcsda-announces-the-first-public-release-of-soca>)
- Mark Potts is making good progress on the UFS jedi interface.
- The team has encountered an issue with BUMP with masking and Benjamin is helping to get this resolved.

CRTM

Patrick and Cheng gave the following summary:

CRTM Summary

- Updates by Patrick:
 - The implementation of the new parameter class for ObsRadianceCRTM in UFO is finished and the PR is under review right now.
 - For CRTM v3.0 Igor Polonsky is looking into adding a VLIDORT interface to the CRTM.
 - Francois H is working on surface parameterization and classification. See the link in the chat room notes below for more details. Check out the corresponding article in the summer 2021 JCSDA newsletter:
 - https://static1.squarespace.com/static/5bad1a12c2ff616821035c9f/t/6172d796cbda54782100e412/1634916251425/JCSDA_Quarterly_Newsletter_Summer_No.70.pdf
- Updates from Cheng:
 - Cheng has been looking into addressing the 2-stream scattering radiative transfer issue in the current CRTM v2.4.1 code.
 - The issue appears to be minor
 - It impacts small cloud droplets (~ 5 um)
 - Will fix this in an upcoming PR
 - Working on a solar solver for CRTM
 - She expects a PR next week that introduces TOA albedo simulations for the major channels
 - Working on comparison between CRTM and RTTOV
 - Looking into the handling of RTTOV aerosol coefficients due to some differences they are seeing

LAND

Andy gave the following summary:



LAND Summary

Land updates:

- Jedi PR1424 - move change of var TL/AD out of LinearGetValues - working on sorting out this - having to implement Linear variable change
- Jedi-data PR20 - couple of files related to us that need to go
- Thanks for everyone who's been providing feedback to Youlong's PRs for the land converters updates
- Saw note from Maryam re: switching from Travis-CI, so let me know if I can help with that
- FV3-Jedi PR285 - 3 tests (unrelated to us) failing on one of the builds

CONSTITUENTS

Jerome gave the following summary:



CONSTITUENTS Summary

- . PR for PM2.5 Obs operator needs restructuring as it currently lacks genericity
- . Concept issues with some AOD operators
- . Plans to include/update new converters to IODA, for atmospheric composition satellites
- . Plans to update the averaging kernel operator to make it more general

Notes from the chat room:



Chat room notes

Sergey Frolov - NOAA Federal

9:06 AM

Maryam, is soca staying with travis-ci?

Maryam Abdi-Oskouei

9:06 AM

yes

public repos are free on Travis-CI

Guillaume Vernieres

9:06 AM

We re special

Anna Shlyaeva

9:08 AM

<https://wiki.ucar.edu/display/JEDI/2021-10-19+Parameters+code+sprint+preparation>

Jerome Barre

9:13 AM

It looks like I have missed meetings this week. It seems i don't receive invites to certain meetings. I would need to be added to some mailing lists.

Patrick Stegmann

9:15 AM

This is the discussion for the CRTM surface classification issue Francois is working on: <https://github.com/JCSDA-internal/ufo/issues/1591>

Greg Thompson

9:41 AM

Andy: I have exactly same happening

Dan H. said same thing also