

Interfacing MPAS

Questions:

1. Additional parts of MPAS-OOPS interface (other than interp) that need work?

GD: I spoke to Yannick and probably we should redo what was done before: calling directly subroutine of MPAS and the state of MPAS in maps_field.F90. I tested and we can call directly the module of MPAS inside the oops framework

2. How to test MPAS-interpolation-UFO workflow for correctness?

GD: A test will be implemented by Yannick. He is working on.

3. Are there formal tests that we need to implement? (Like regression tests, to check that changes elsewhere in OOPS don't break MPAS interfaces)
4. Default for distributing state across processors is to inherit domain decomposition from MPAS.
 - a. What is needed to implement beneath OOPS?
 - b. Can this be achieved without (or with minimal) copying of code from MPAS? (i.e. by using libraries from MPAS) If not, what changes to MPAS would be needed? (i.e. to encapsulate the necessary functionality)
5. What will be required to extend interfaces to work for regional MPAS? (Separate questions: what's needed to do "3D" DA, and what's needed to run the model) Best to work toward single set of interfaces applicable to both regional and global, or to have separate interfaces for each? (Or, easy in principle to handle both with appropriate polymorphism?)

Milestones:

1. Implement and test interpolation
 - a. 17 Nov 2017: NICAS interp is in place
 - b. BJ will implement MPAS/DART interp too, and compare.
 - c. Tests: i) Lat/lon of exact cell point can be used as location target observation. ii) For arbitrary observation point, analytic functions (e.g., spherical harmonics) can be passed through the model fields.
2. Updates and clean up on other parts of MPAS-OOPS interfaces. See (1) under "Questions" above.
3. ingest MPAS, compute forward operators via UFO
4. ingest MPAS, perform "dirac" test
5. ingest MPAS + ensemble, perform PSOT with EnVar (no UFO, exercise NICAS correlations)
6. EnVar SOT with e.g. AMSU-A or sonde (exercise UFO)
7. Single EnVar cycle
8. ?? implement interfaces for regional MPAS
9. ?? implement RTTOV in UFO