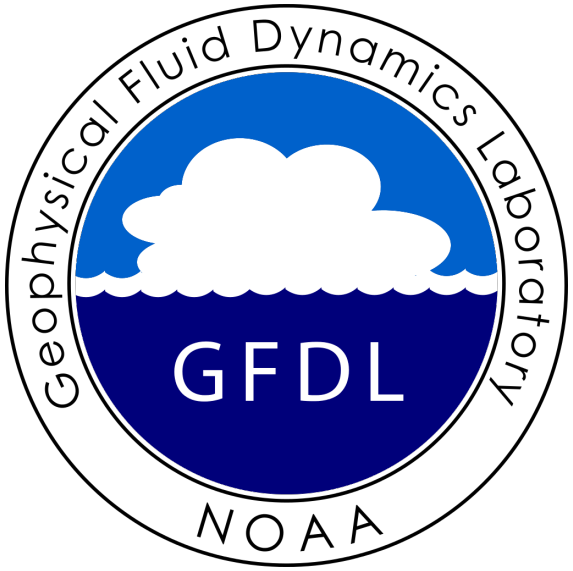
Physics Driver v4.0 Update



14 November, 2016

NUOPC becomes IPD

IPD_typdefs.F90

container definitions

IPD_driver.F90*

code needed to integrate physics

IPD_utilities.F90

SCM needs

(*) contains all necessary logic from gloopr/gloopb to ensure true interoperability

Containers

All containers underneath *IPD* supertype

IPD%control%*vars*
IPD%grid%*vars*
IPD%sfc_props%*vars*
IPD%cld_props%*vars*
IPD%rad_tend%*vars*
IPD%state_in%*vars*
IPD%state_out%*vars*
IPD%physics%*vars*

IPD%diag%*vars*
IPD%coupled%ocn%*vars*
IPD%coupled%chem%*vars*
IPD%coupled%nest%*vars*
IPD%coupled%wam%*vars*
IPD%coupled%ice%*vars*
IPD%coupled%land%*vars*
IPD%coupled%wave%*vars*

Interoperable Physics Workgroup proposes that all physical constants needed by physics come from *"model"* for consistency – thoughts?

Control Parameters

All GFS physics/radiation control parameters

- defined in one container
- given default values (unless derived from others)
- under namelist control
- will include integration variables (kdt, fhour, phour, etc)

Prognostic Coefficients

Ozone and water interpolation

Varies only with latitude

Output of *interpol is in (i,k,j) format

Gets transformed to (k,i,j) via a copy

For phase-2, ozinterp.f modified to
    read in baseline data
    output (k,i,j) format

h2ointerp.f will be similarly modified

Options For Removal?

Reduced gaussian grid logic - *hopefully*

can clean up gcycle

Sigma coordinates in radiation cloud initialization – *hopefully*

perhaps use pressure levels

Original Ferrier MP (2-species condensate) - *maybe*

Reduced radiation levels (levr) - *probably not*

Tracers

Who/What in NEMS is responsible for tracer names and indices?

Many component dependencies

- atmosphere side: *gocart, physics, dycore*
- surface exchange via NEMS: *dust, salt, etc*.

To further complicate things, different m−physics will have different numbers of condensate species

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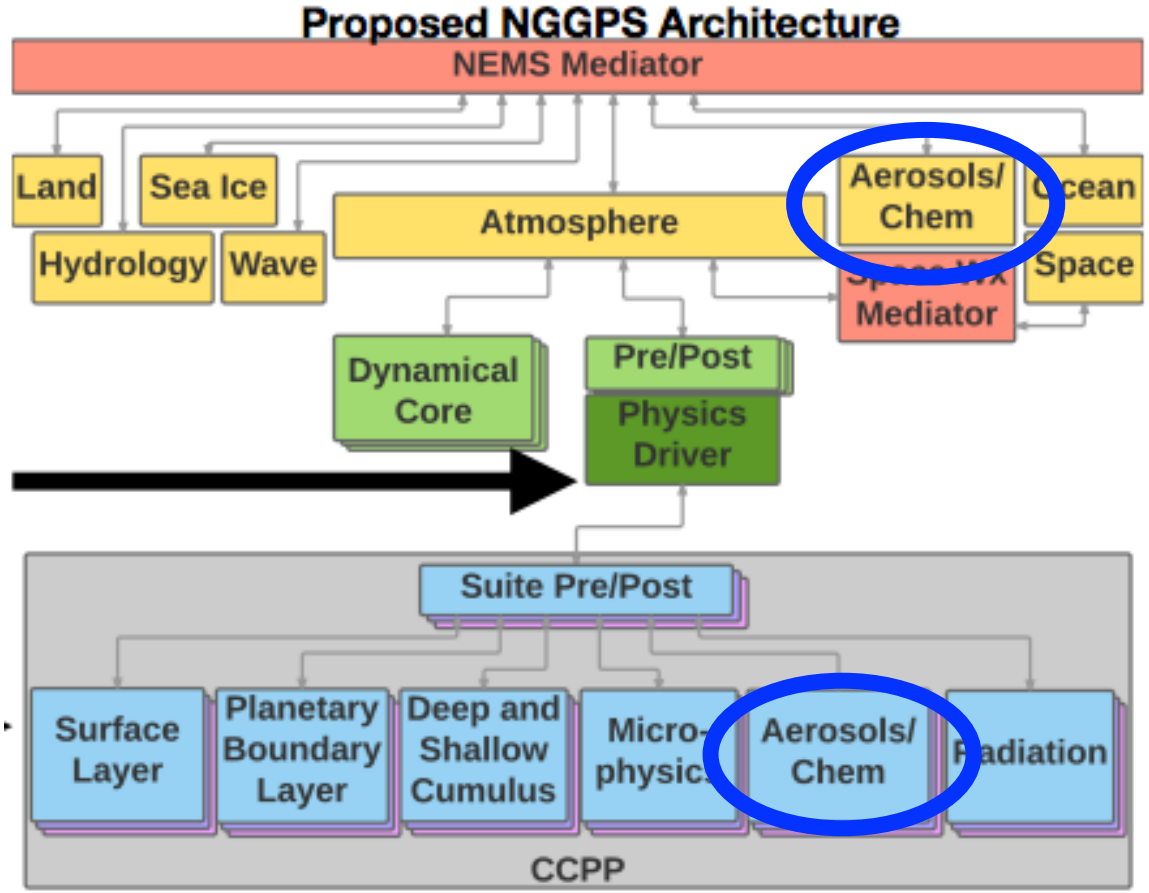
Better to design a solution now, rather than brute-force it with a retrofit to be implemented later.

Atmospheric Chemistry

Images pushed forth by those working on NEMS and CCPP are confusing as they have it as both a NEMS component and a physics component



Atmospheric Chemistry

NEMS component:

1. tracer management requires decision on ruling authority for indexing

   recommend dycore as it needs to understand both condensate and chemistry for proper advection

2. restart data may be split between two components
3. allow for different grids between atmosphere and chemistry components *(conservation??)*

Internal physics component:

1 and 2 above still the same

will need to use the dycore grid

Implications of Recent Workshop

Held 8th-9th November

Community effort to determine readiness of focus areas for improvement

Recommendations for immediate inclusion

radiation:	RRTMGP
m-physics:	multiple schemes ready
land:	NOAH-MP *or* NOAHv3.8

*These new schemes **will** necessitate changes to variables in many of the data containers. The more we plan for now - the better.*

Diagnostic Control Container

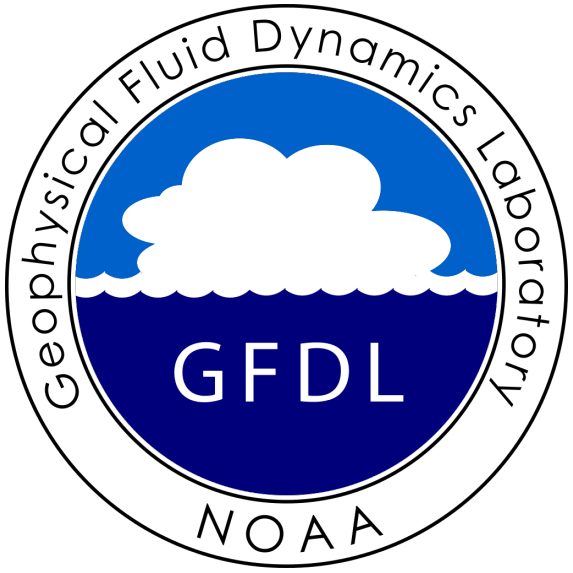
Should there be a container that holds the following information for each available diagnostic?

1. long description
2. units
3. component (radiation vs physics)
4. time average (logical)
5. mask (logical)

Can be used by an I/O package for metadata

Diagnostic Control Container

IPD%diag_ctl%u10m%desc =
’10m horizontal windspeed’
IPD%diag_ctl%u10m%unit = ‘m/s’
IPD%diag_ctl%u10m%component = ’physics’
IPD%diag_ctl%u10m%time_avg = ‘.false.’
IPD%diag_ctl%u10m%mask = ‘.false.’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