

HAFS Coupling Infrastructure Updates

August 18, 2021

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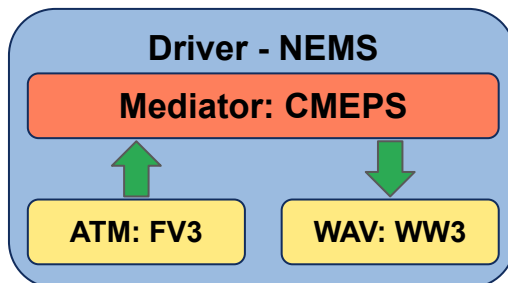
1) CIRES/GSL/ESMF

2) NCAR/CGD/ESMF

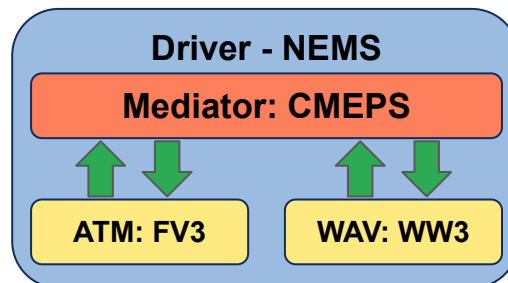
Collaboration with (in alphabetical order)

Lew Gramer, Andrew Hazelton, Evan Kalina, Hyun-Sook Kim,
Bin Liu, Jessica Meixner, Samuel Trahan

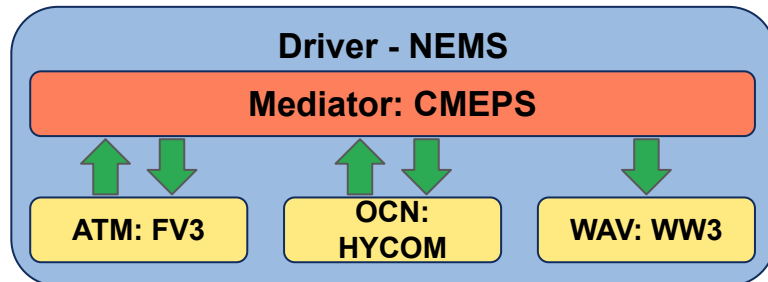
Wave Coupling in HAFS: supported configurations



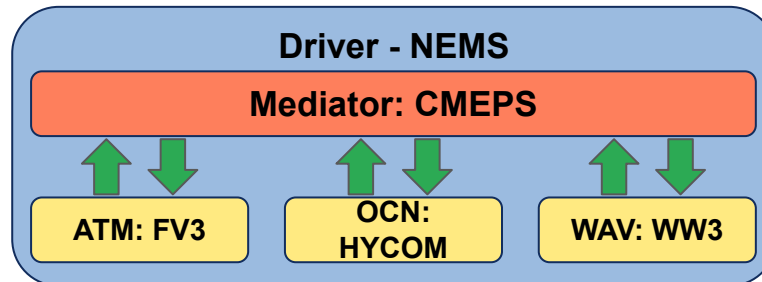
(a) One-way interaction: ATM \rightarrow WAV



(b) Two-way interaction: ATM \leftrightarrow WAV



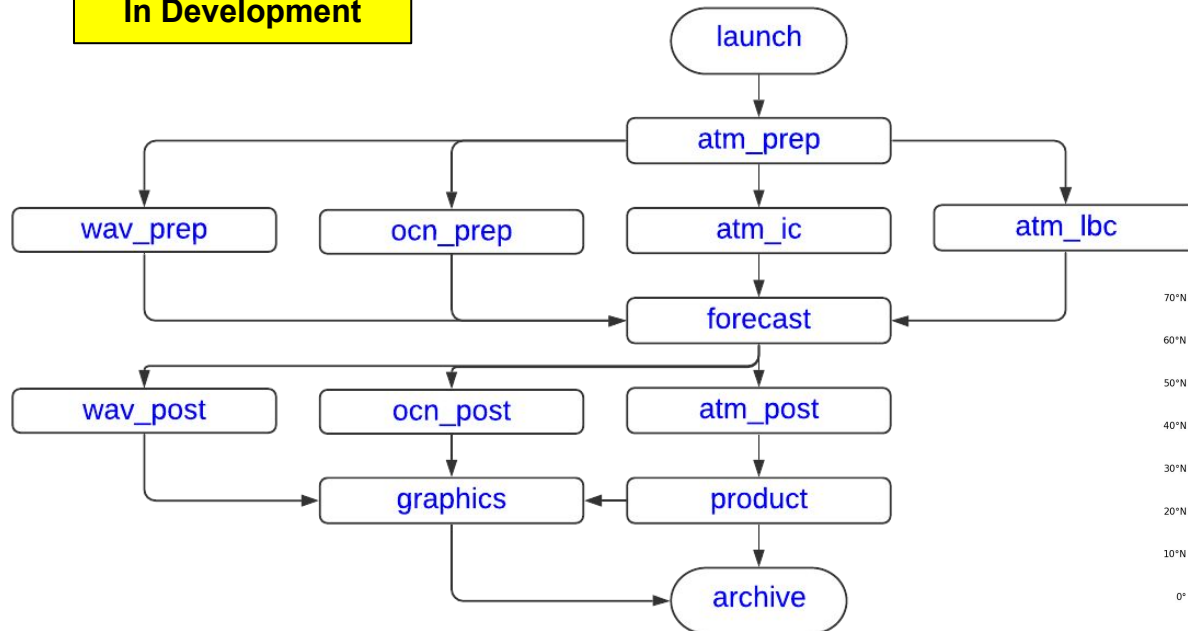
(c) Two-way interaction: ATM \leftrightarrow OCN and one-way interaction: ATM \rightarrow WAV



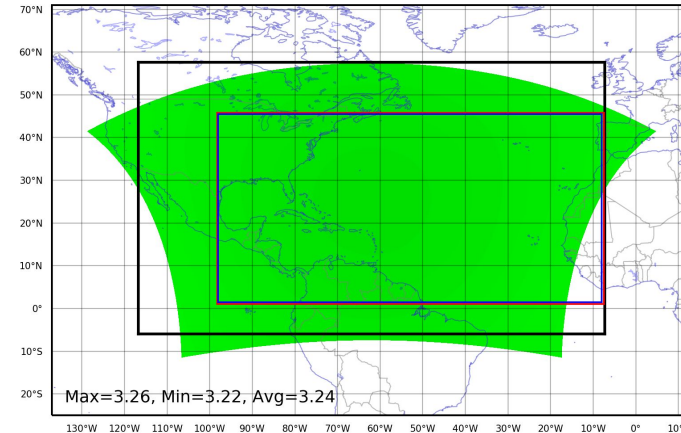
(d) Two-way interaction: ATM \leftrightarrow OCN and ATM \leftrightarrow WAV

HAFS Workflow with WW3 and HYCOM Coupling

In Development

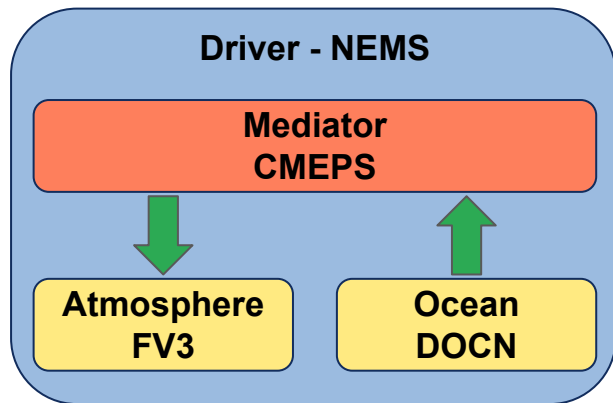


FV3ATM model domain
 FV3ATM output domain
 HYCOM ocean domain
 WW3 wave domain

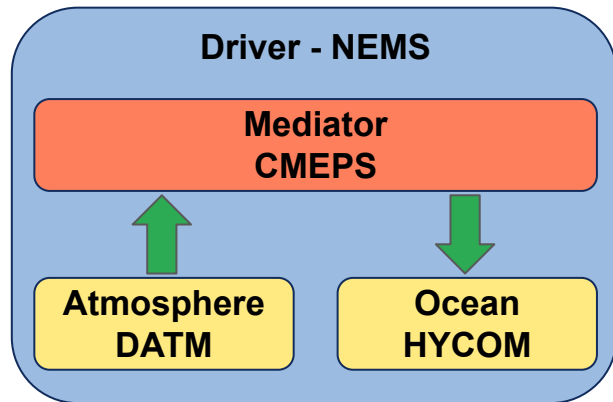


Support various configurable one-way or two-way atmosphere-ocean and atmosphere-wave coupling

CDEPS in HAFS: workflow integration



(a) CDEPS data ocean configuration



(b) CDEPS data atmosphere configuration

Data ocean: now available

- OISST, Optimal Interpolation SST - (global, daily)
- MOM6 - (regional, 3-hourly)
- GHRSSST - subsetted to reduce data memory footprint (daily)
- ~~RTOFS - currently not supported due to issue in the global~~
- ~~HYCOM 1/12 tri-polar grid~~

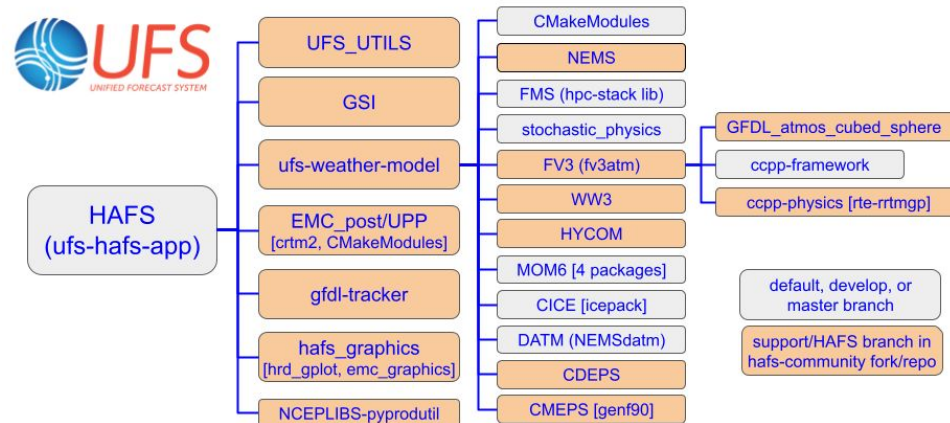
Data atmosphere: ERA5 updated to use same fields as fully-coupled configuration

- ECMWF, ERA5 reanalysis - (global, hourly)
- GEFS & CFSR - CDEPS implementation does not support publicly available datasets

All supported data configurations are integrated with the workflow (thanks to Evan and Sam). Testing is still ongoing.

UFS Community Sync (Aug 5, 2021)

- HAFS Community developments have been merged into UFS Community
- HAFS Regression Tests are now part of UFS development testing
 - hafs_regional_atm, hafs_regional_atm_ocn, hafs_regional_docn, hafs_regional_docn_oisst, hafs_regional_datm_cdeps



HAFS Coupling - Work In Progress

HYCOM Authoritative Model (NRL) Sync

- HAFS Community HYCOM developments have diverged from NRL repository

UFSATM Global-Nest Coupling

- Current UFSATM Global-Nest coupling to HYCOM is limited to UFSATM regional nest coupling
- Support for global coupling within the UFSATM Global-Nest configuration is in progress

