

HAFS Developmental Update: NESII/ESMF



Daniel Rosen

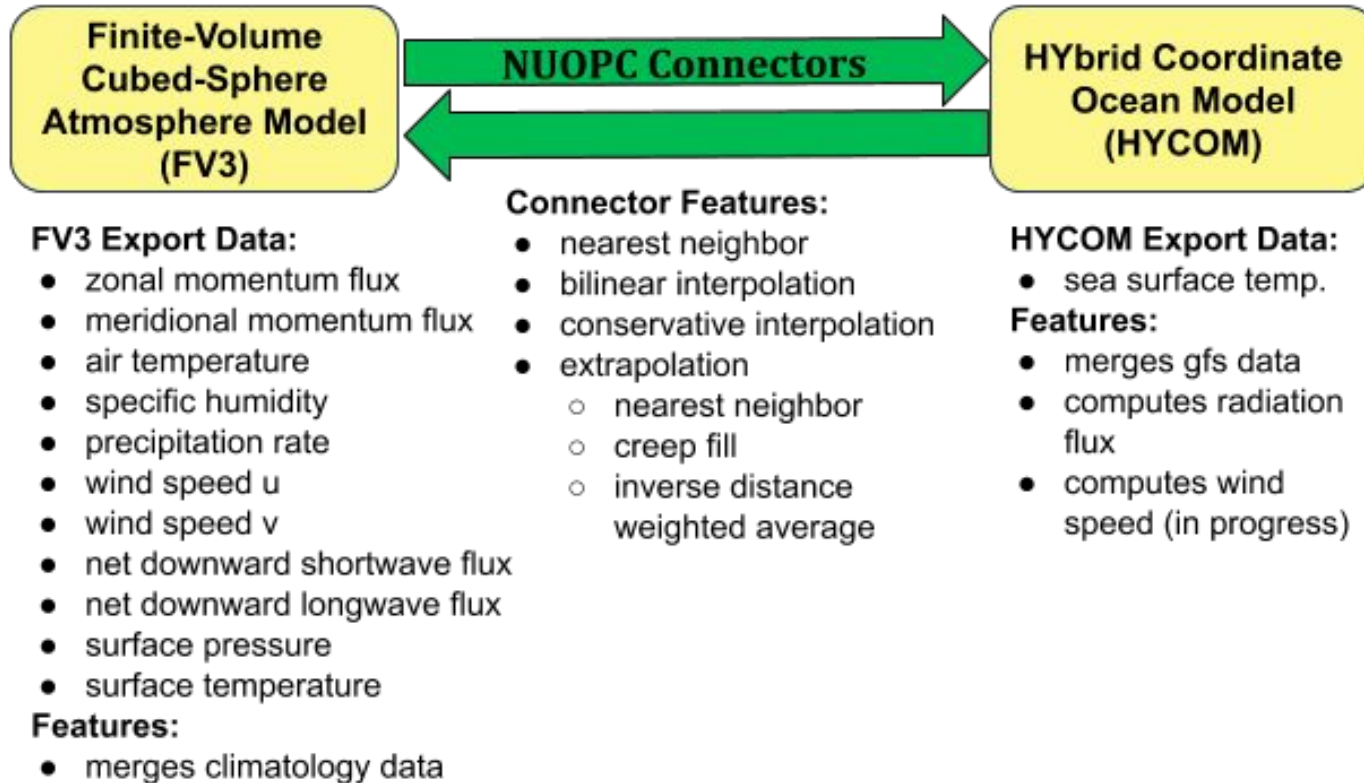
HAFS Coordination Meeting

June 3rd, 2020

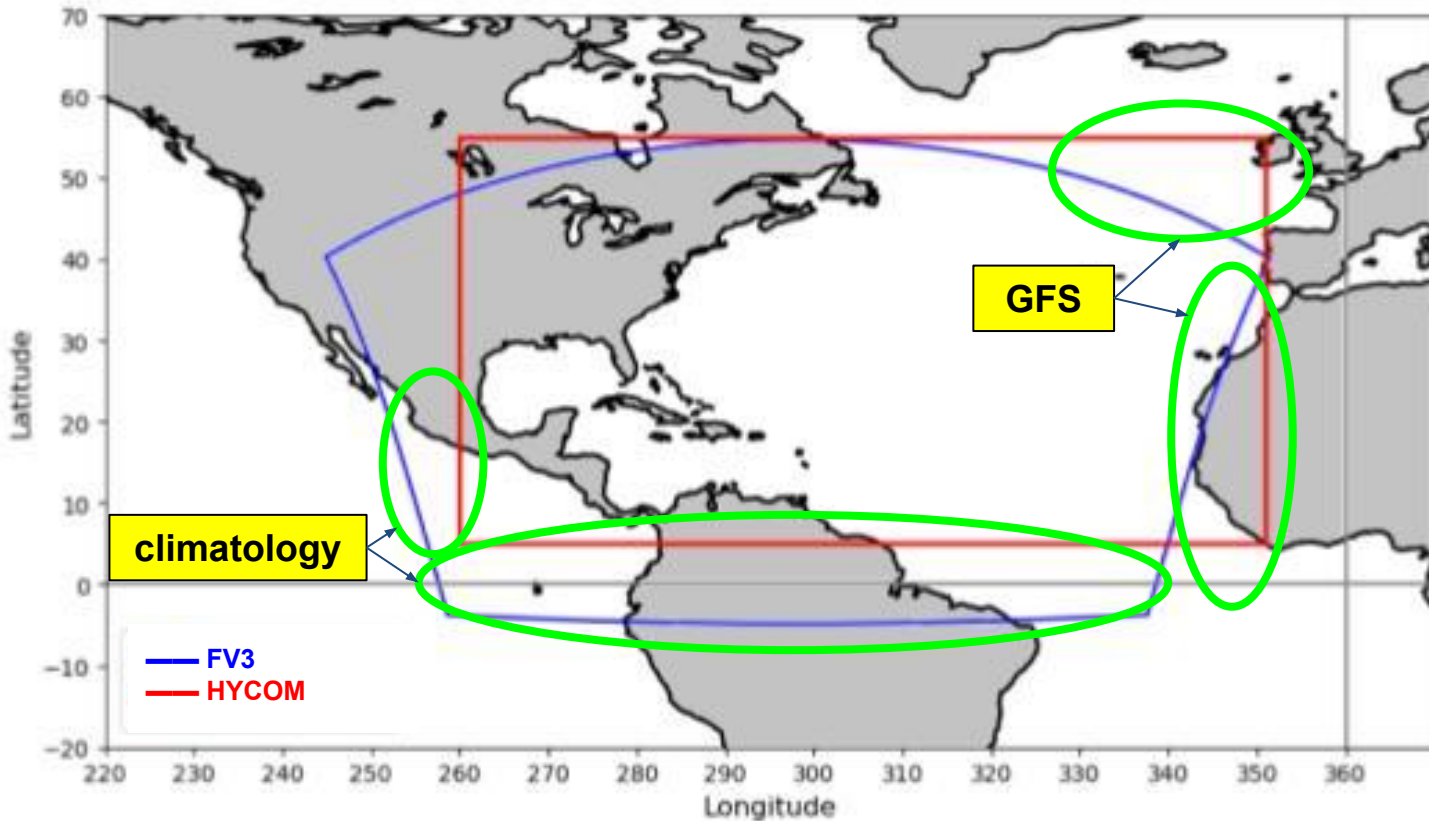
HAFS FV3-HYCOM Coupling

- Finite-Volume Cubed-Sphere Atmosphere Model (FV3)
 - Standalone Region North Atlantic Basin
- Hybrid Coordinate Ocean Model (HYCOM)
 - Standalone Region North Atlantic Basin
- Standalone regions are regridded through Earth System Modeling Framework (ESMF)
- Large areas of non-overlapping cells
- Community Mediator for Earth Prediction Systems (CMEPS)

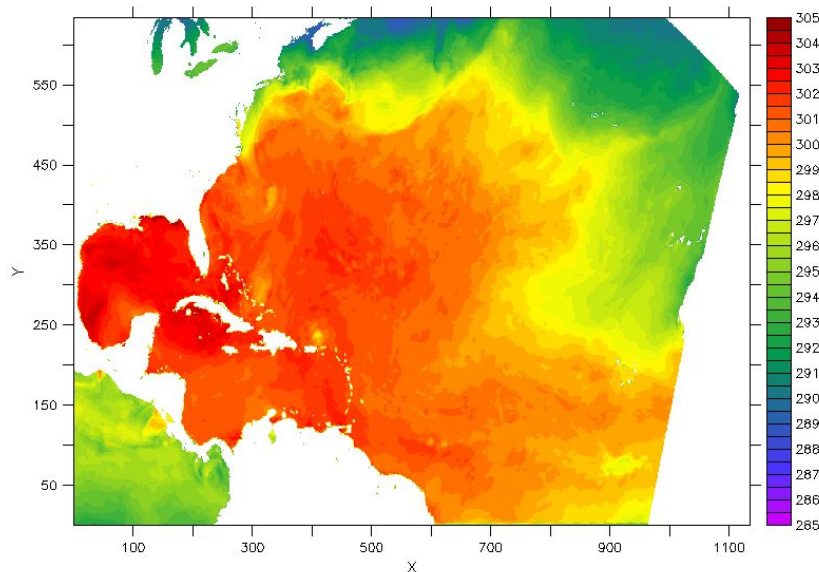
HAFS FV3-HYCOM Direct Coupling



NATL Non-Overlapping Regions

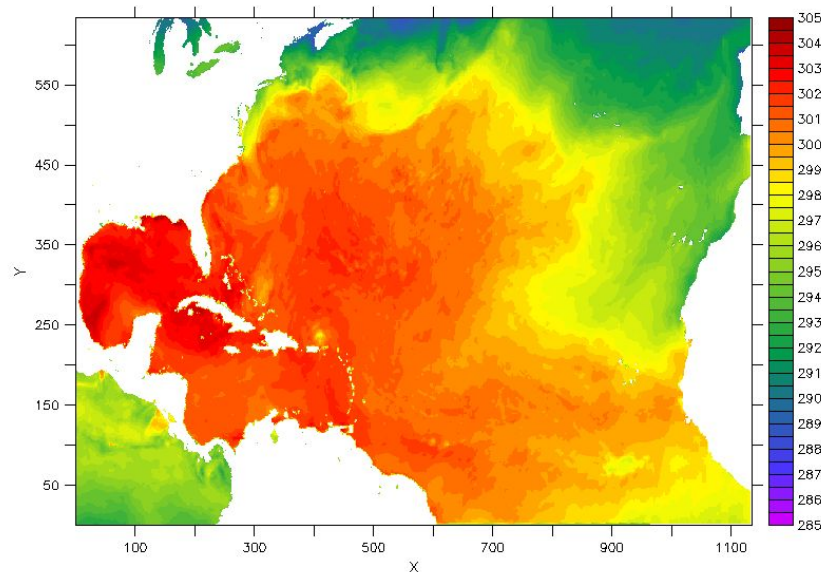


Merged GFS Data (HYCOM)



INST_TEMP_HEIGHT2M

Before Merge



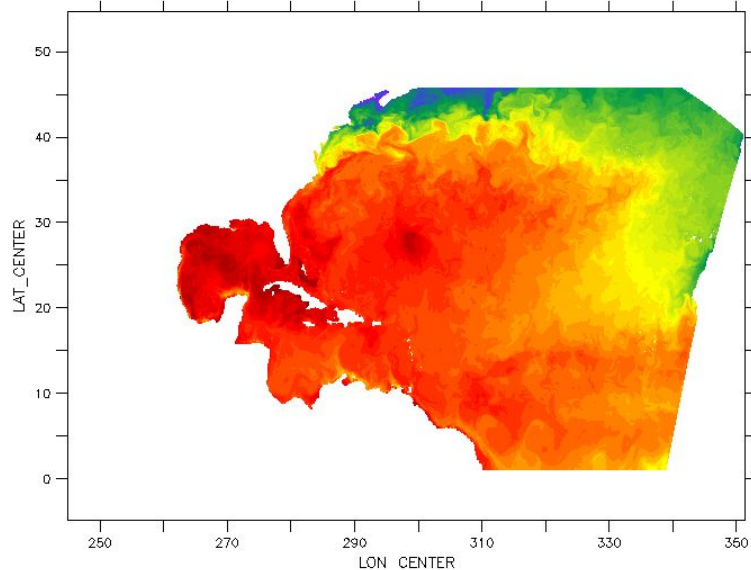
AIRTMP

After Merge

Notes:

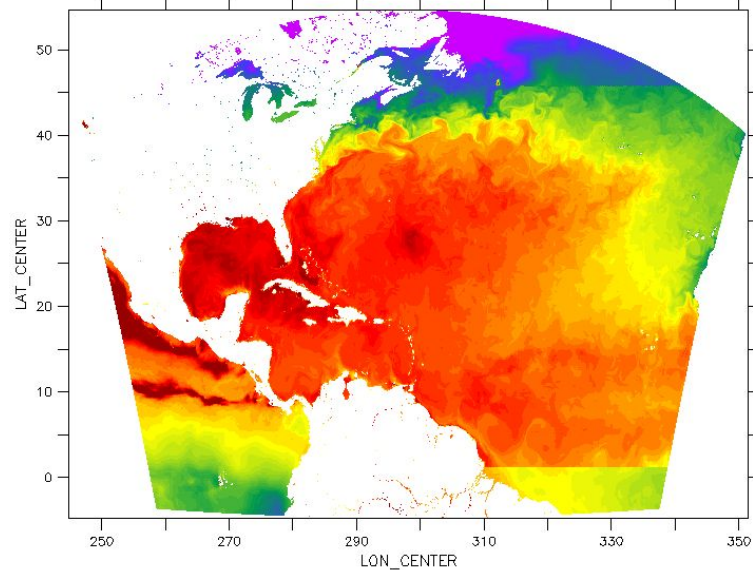
- artificial boundary (no smoothing)
- surface level pressure off

Merged Climatology Data (FV3)



SEA_SURFACE_TEMPERATURE

Before Merge



SEA_SURFACE_TEMPERATURE

After Merge

Notes:

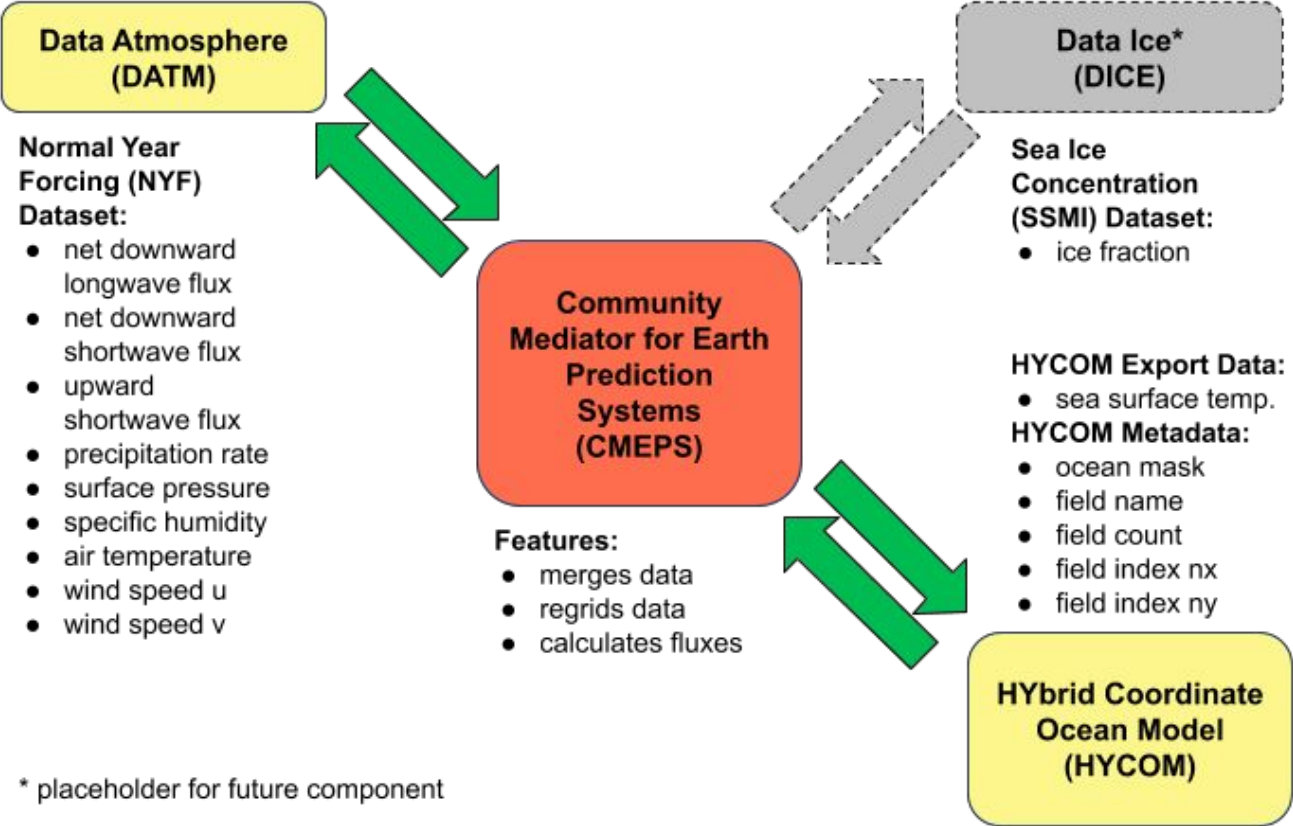
- cold bias in climatology data
- verification in progress
- artificial boundary (no smoothing)
- Pacific Ocean masked as land

Direct Coupling - Next Iterations

- Clean up HYCOM code
 - maintainability
 - optimizations
 - diagnostics
- Verify climatology data merge
- Turn on surface level pressure in HYCOM
- Expand HYCOM domain (reduce unmapped points)
- Change Pacific Ocean mask to water
- Smooth merged data
 - within model
 - within mediator

DATM-CMEPS-HYCOM

Common Infrastructure for Modeling the Earth (CIME)



* placeholder for future component

CMEPS Coupling - Next Iterations

- Build CMEPS using HAFS build system
- Configure CMEPS for FV3-HYCOM coupling
- Add CMEPS to HAFS workflow

Status Summary

- Directly coupled FV3-HYCOM using nearest neighbor remapping is complete with unrealistic extrapolation
- Directly coupled FV3-HYCOM using bilinear interpolation with merged GFS/climatology is in review
- CMEPS coupled DATM-HYCOM using CIME infrastructure is complete
- Directly coupled FV3-HYCOM workflow is complete (to be edited as needed)