



UFS Coastal and Applications:

A brief history, current status and the path forward

Saeed Moghimi (NOAA/NOS/OCS), Ufuk Turuncoglu (UCAR/NCAR), Jana Haddad* (NOAA/NOS/OCS), Maoyi Huang (NOAA/OAR/WPO/EPIC), Ann Tsay (UCAR/NCAR), Yunfang Sun (NOAA/NOS/OCS), Felicio Cassalho (NOAA/NOS/OCS), Soroosh Mani (NOAA/NOS/OCS), Fariborz Daneshvar (NOAA/NOS/OCS), Mansur Jisan (NOAA/NOS/OCS), Alexander Kurapov (NOAA/NOS/OCS), Ed Myers (NOAA/NOS/OCS), Panagiotis Velissariou (NOAA/NWS/NHC), Lucila Houttuijn-Bloemendaal (NOAA/NOS/CO-OPS), Corey Allen (NOAA/NOS/OCS), Greg Seroka (NOAA/NOS/OCS), Ayumi Fujisaki-Manome (CIGLR), Shachak Peeri (NOAA/NOS/NGS), Tracy Fanara* (NOAA/NOS), Derrick Snowden* (NOAA/NOS/IOOS), Patrick Burke (NOAA/NOS/CO-OPS), Ali AbdolAli (ERDC of the Army Corps of Engineers), Hendrik Tolman (NOAA/NWS), Ali Salimi-Tarazouj (NOAA/NWS/EMC), Saeideh Banihashemi (NOAA/NWS/EMC), Jessica Meixner (NOAA/NWS/EMC), Denise Worthen (NOAA/NWS/EMC), Carsten Lemmen (Hereon), Joseph Zhang (VIMS), Damrongsak Wirasaet (UND), Joannes Westerink (UND), Hernan G. Arango (Rutgers), Joseph Smith (OSU), Scott Durski (OSU), Jihun Jung (OSU), Keven Blackman (NOAA/OAR/WPO/EPIC, RTX), Jong Kim (NOAA/OAR/WPO/EPIC, STC), Kristopher Booker (NOAA/OAR/WPO/EPIC, Tomorrow.io), Christopher Domanti (NOAA/OAR/WPO/EPIC, RTX), Anna Kimball (NOAA/OAR/WPO/EPIC, RTX), Zach Cobell (Water Institute) and ...

May 8, 2025

UFS Webinar Series

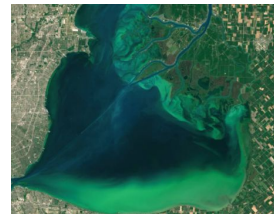


Safe, Efficient
Navigation



Managing
Marine Living
Resources

Protecting
Human Health



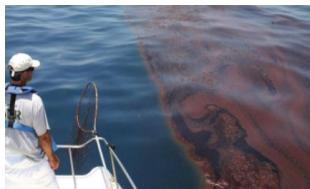
NOS Modeling Vision

Spill Response &
Search &
Rescue

Coastal
Resilience



Mapping &
Coastal Mngmt



*Protecting our coastal communities
and the nation's economy*

UFS-Coastal applications and components

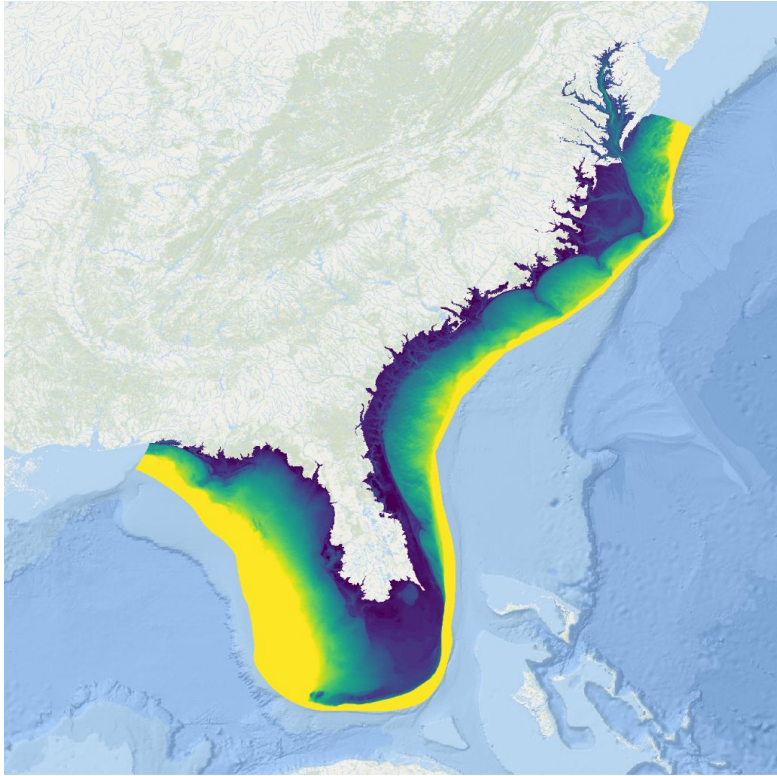
- **SECOFS:** DATM+SCHISM+WW3 (Leveraged - BIL)
- **STOFS-3D-Alaska:** DATM+SCHISM+CICE+WW3 (partially funded - DRSA / NOS Water team)
- **Hurricane-Surge:** PAHM+SCHISM+WW3 (Leveraged - BIL)
- **UFS-Surge-Wave:** NOS / STOFS-2D-Global & NWS / Wave prediction System
DATM+ADCIRC+WW3 (Initially developed through COASTAL Act - JTTI proposal in review)
- **NOS Workflow:** Unified workflow for NOS coastal applications (partially funded - DRSA)
- **UFS-Coastal code base** (Leveraged - BIL)

SECOFS: Southeast Coastal Operational Forecast System

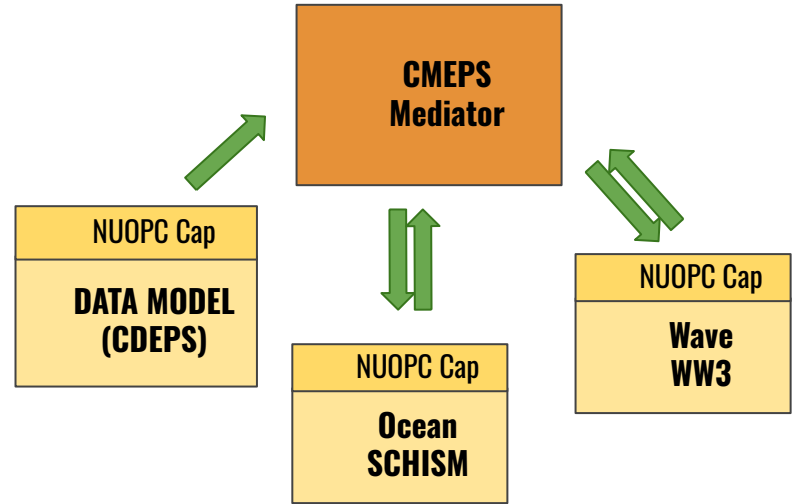
STOFS: Surge & Tide Operational Forecast System



SECOFS: DATM+SCHISM+WW3



CIFIM 12 - Southeast Coastal Operational
Forecast System (**SECOFS**)





UFS-Coastal and SECOFS (iterative plan)

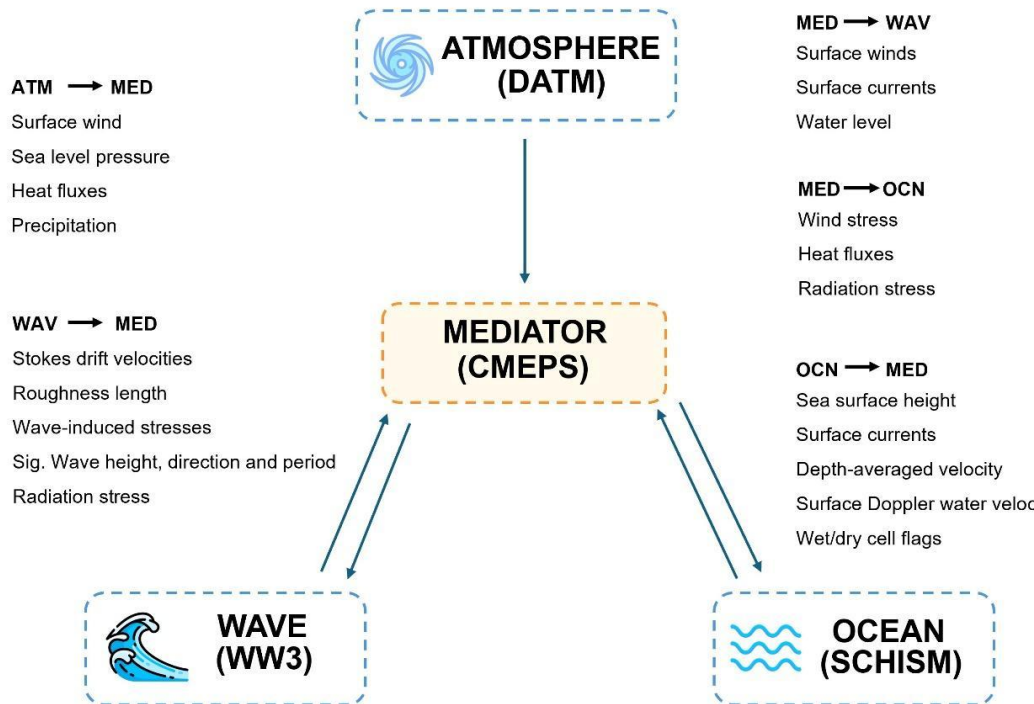
- **2025: UFS development**
 - Cap dev for SCHISM and WW3
 - Testcase: Duck NC for DATM+SCHISM, UFS-SCHISM-alone, DATM+SCHISM+WW3
 - Dev: CDEP-SCHISM-WW3 testing with vortex formalism (Duck)
 - Pre-op test (6 month parallel quasi-operational testing) with SCHISM alone under UFS-Coastal executable
- **2026: Implement and test UFS enabled SCHISM-WW3**
 - Dev: CDEP-SCHISM-WW3 testing
 - Test SECOFS (SCHISM standalone) under UFS environment on WCOS2
 - Pre-op test with CDEP-SCHISM
- **2027: implement SECOFS using SCHISM-WW3 as a potential upgrade after operation starts in FY27**
 - Long-term hindcasts (2-5 years) to test robustness
 - Pre-op: CDEP-SCHISM-WW3 development
 - Operational implementation: CDEP-SCHISM
- **Beyond 2027:**
 - Long-term hindcasts (2-5 years) to test robustness of CDEP-SCHISM-WW3
 - Operational implementation / upgrade: CDEP-SCHISM-WW3

SCHISM-WW3 coupling

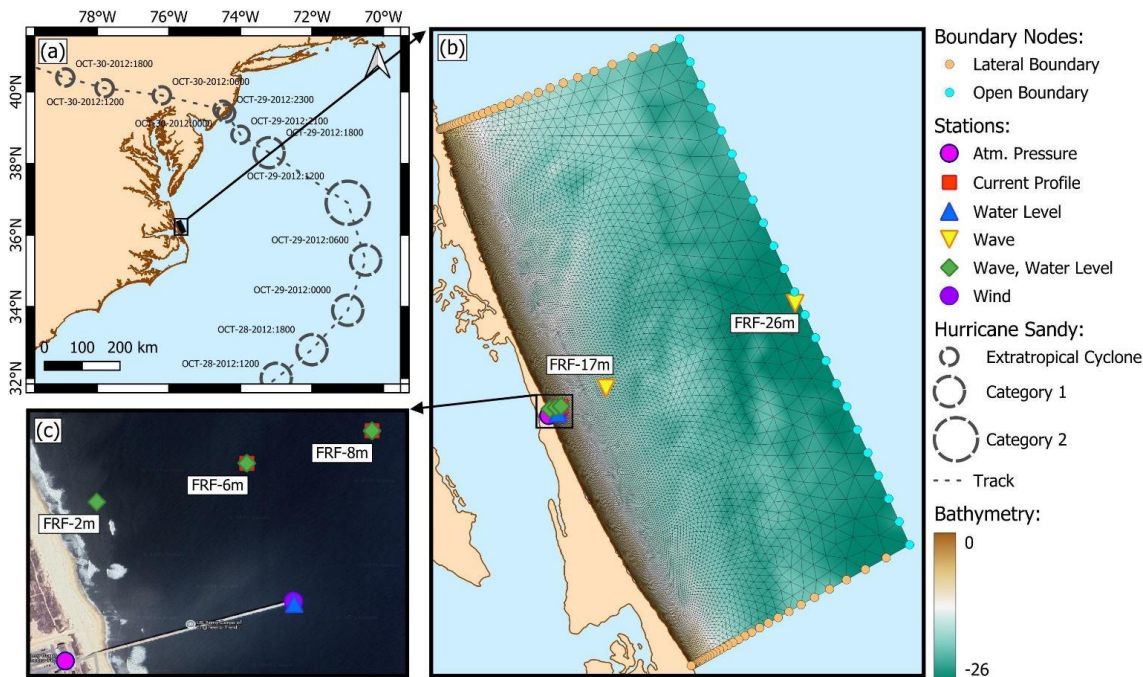
Case	Components	Details
#1	ATM+WW3	Without water level forcing
#2	ATM+OCN+WW3	With water level forcing
#3	ATM+SCH	2D
#4	ATM+SCH	3D
#5	ATM+SCH+WW3	Longuet-Higgins Radiation Coupling
#6	ATM+SCH+WW3	3D Vortex Coupling

Duck, NC test case

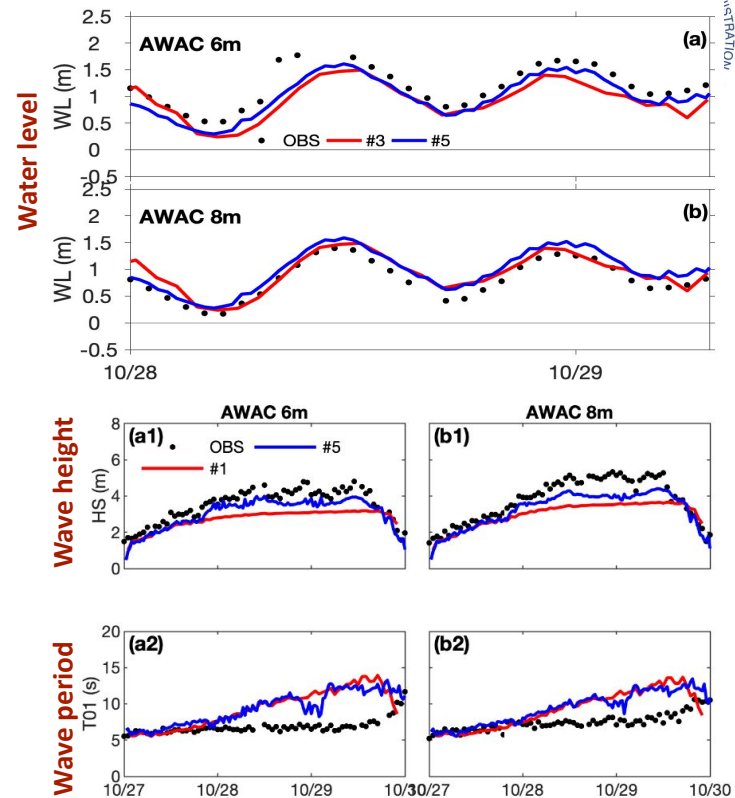
UFS Weather Model Architecture for Coastal Application



SCHISM-WW3 coupling - Duck, NC test case



Duck, NC domain & meshes for SCHISM and WW3 & Stations where observations are available during **Hurricane Sandy 2012**

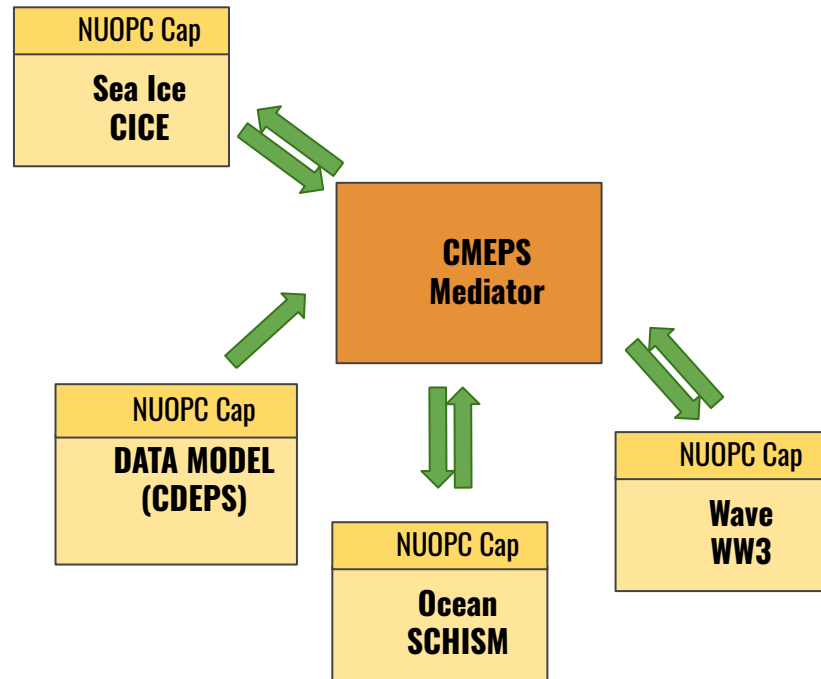


#1	ATM+WW3
#3	ATM+SCH
#5	ATM+SCH+WW3

STOFS-3D-Alaska: DATM+SCHISM+CICE+WW3



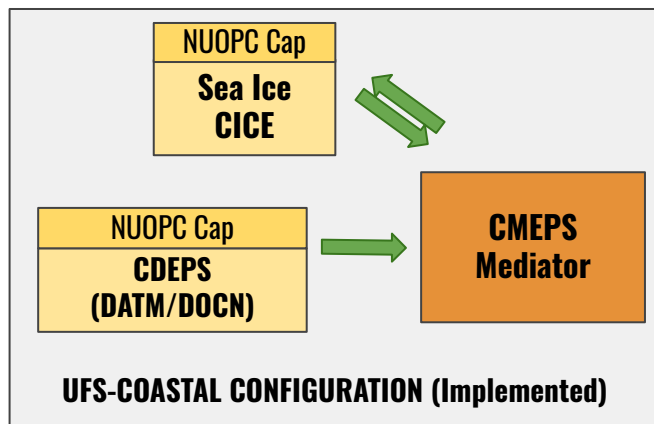
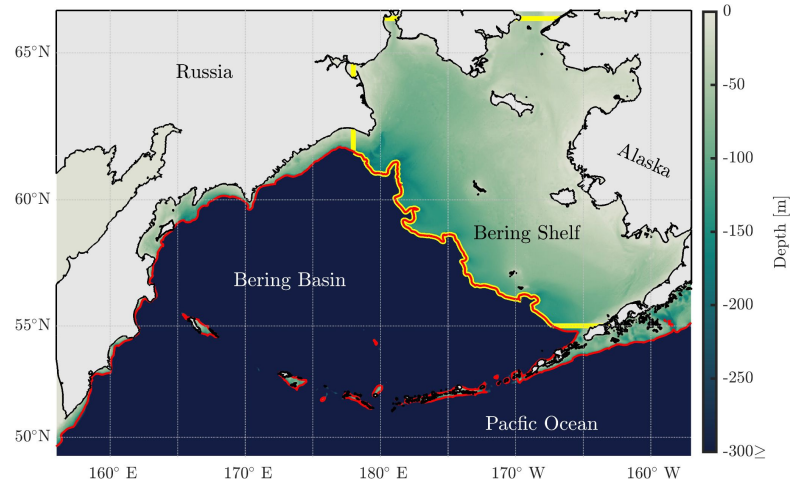
Surge & Tide Operational Forecast System (STOFS)



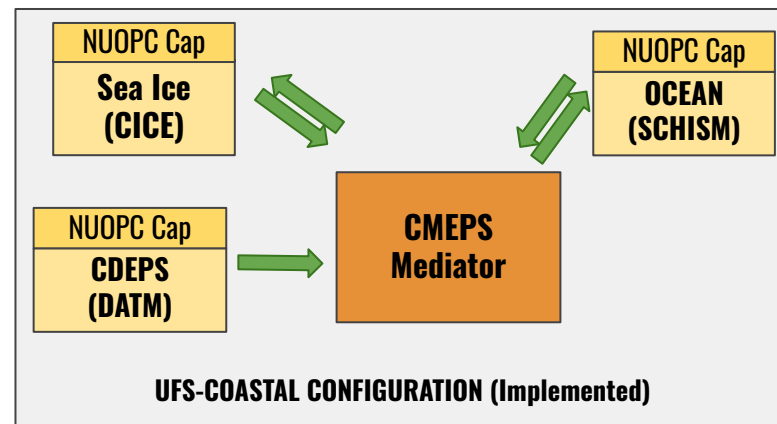
DATM+CICE+SCHISM - Bering Sea

Standalone CICE development

- CICE standalone (CDEPS+CICE):
 - ◆ 4km Standalone CICE using UFS-coastal coupling infrastructure (Domain top right)
 - ◆ Actively Benchmarked against satellite data
- Recently implmented DATM+CICE+SCHISM coupling

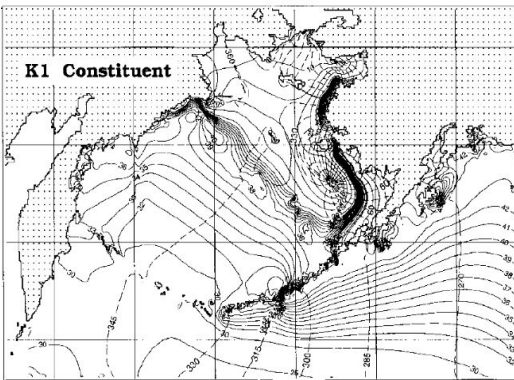
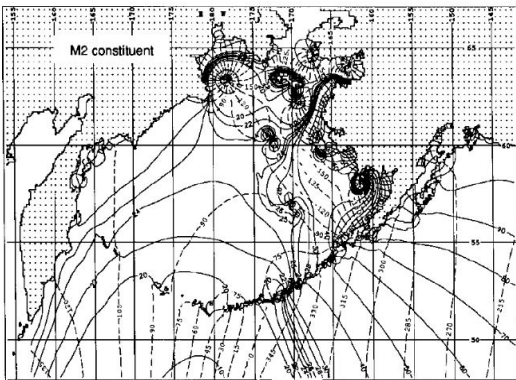
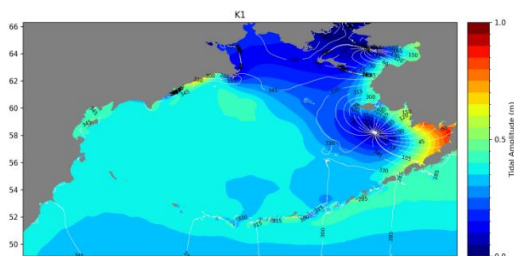
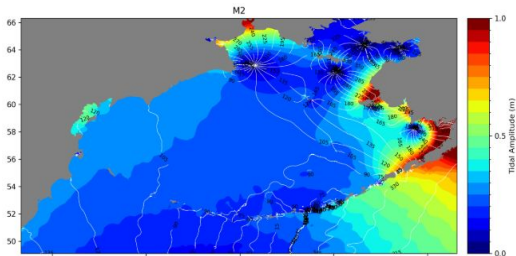


Transitioning to...

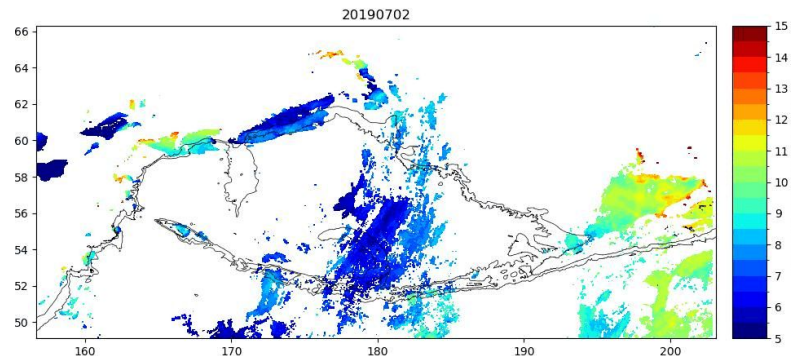
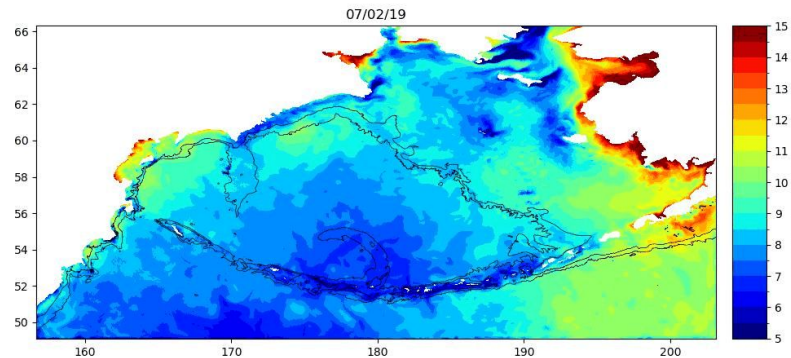


Bering Sea domain - Summer (no ice)

SCHISM 3D - Qualitative Skill Assessment



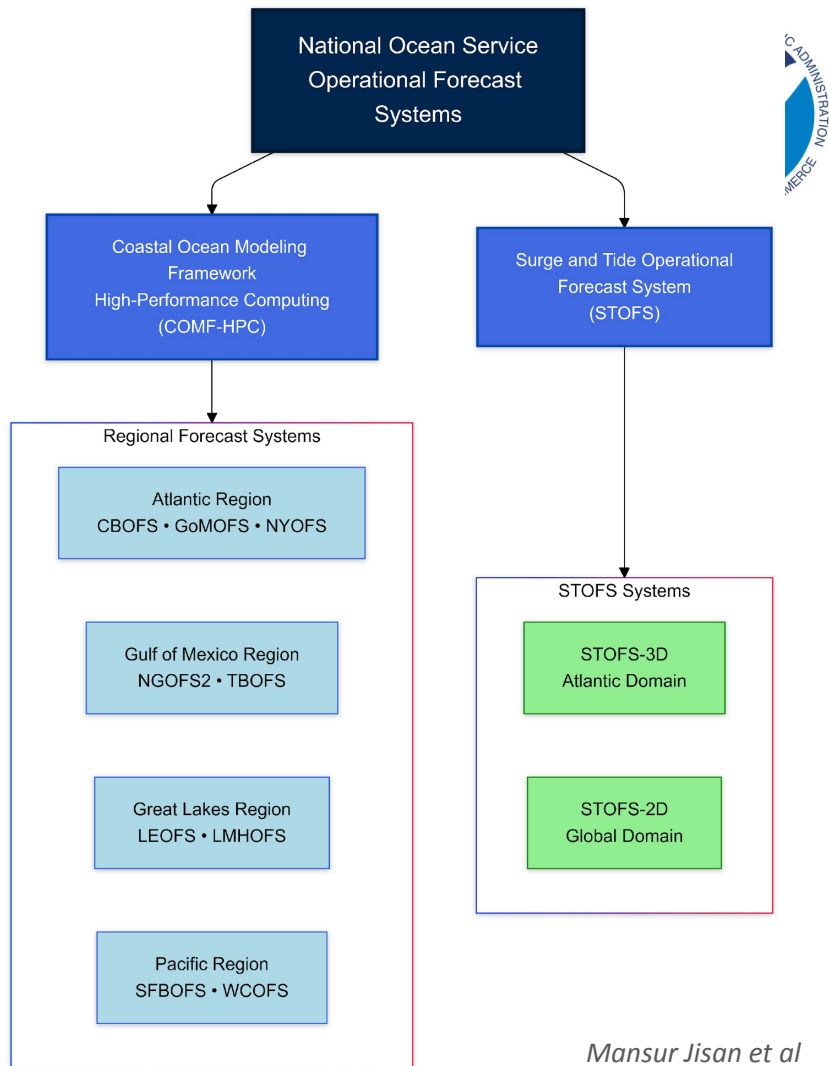
Major Tidal Constituents



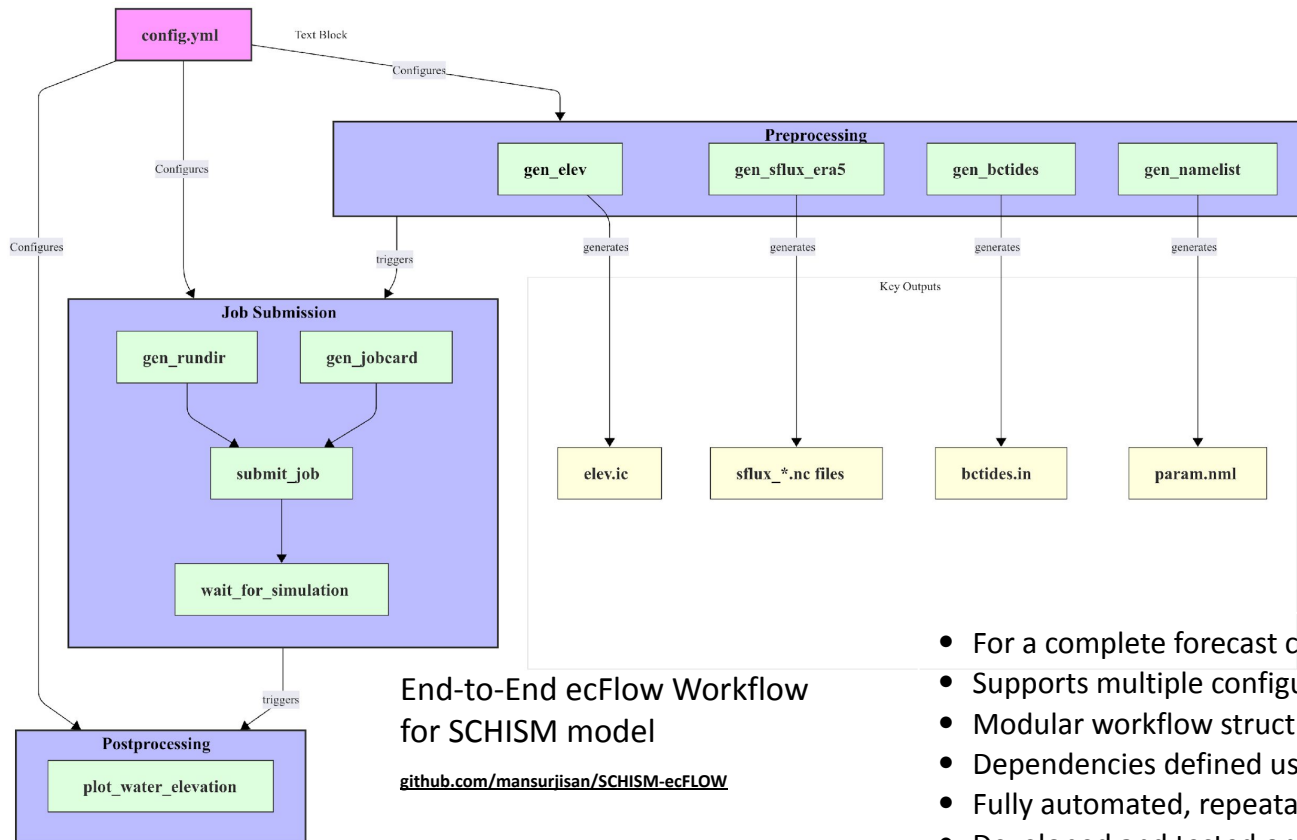
Sea Surface Temp. vs. Level 3 Satellite

Unified Workflow for the NOS' Operational Forecast Systems

- NOAA National Ocean Service (NOS) operates a suite of operational forecast systems
 - Coastal Ocean Modeling Framework (COMF) based high-resolution, regional modeling systems
 - Surge and Tide Operational Forecast System (STOFS) for storm surge and tidal predictions
- **A unified workflow across all NOS' operational models is being planned to enhance efficiency, scalability, and ease of maintenance**



YAML-Driven ecFlow-Based Workflow

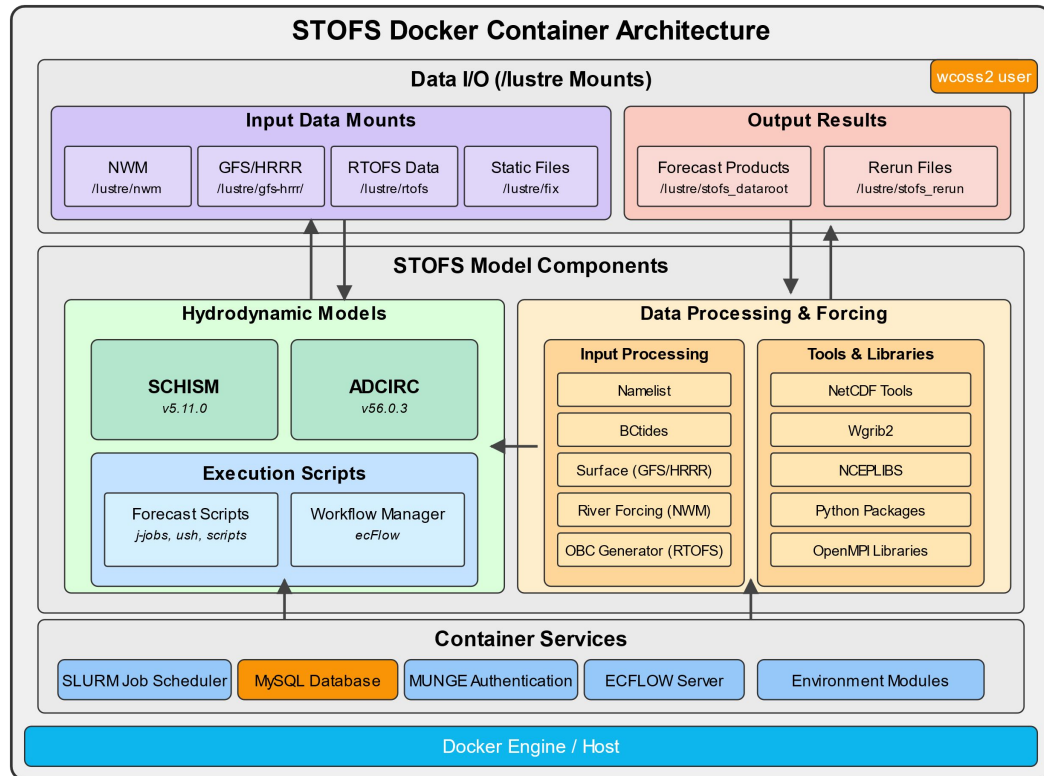


End-to-End ecFlow Workflow
for SCHISM model

github.com/mansuriisan/SCHISM-ecFLOW

- For a complete forecast cycle
- Supports multiple configurations via a single YAML file.
- Modular workflow structure.
- Dependencies defined using ecFlow's trigger conditions.
- Fully automated, repeatable, end-to-end pipeline.
- Developed and tested on MSU Hercules cluster

Container for STOFS System Emulating WCOSS2 Environment



Objectives

- Emulate WCOSS2 operational environment to support STOFS workflow development and testing.
- Incorporate NCO software stack to mirror production.
- Facilitate collaboration with external partners involved in upgrading STOFS workflows.

Progress Highlights

- Successfully tested the STOFS Atlantic preprocessing workflow within containerized environment.
- Integrating and testing a new YAML-driven command-line configuration system for STOF3D-Atlantic within the container

Let's pause here for a moment to assess our foundation by:

- reviewing our journey,
- examining existing infrastructure,
- acknowledging challenges, and charting a path forward.

COASTAL Act: Supporting FEMA's National Flood Insurance Program (2016-2022)



Hindcast / Reanalysis

The Consumer Option for an Alternative System to Allocate Losses (COASTAL) Act

- NOAA develops multi-component Named Storm Event Model (NSEM) to lower costs to FEMA's National Flood Insurance Program (NFIP) by better discerning wind vs water damage in "indeterminate losses"
- Detailed post-storm assessment in the aftermath of a damaging tropical cyclone that strikes the U.S. or its territories, 90% accuracy required



Aftermath of Hurricane Michael in Mexico Beach, FL.
AP Photo/Gerald Herbert

Surge Model

Wave Model

Hydrology

- The skill analysis is confined to a duration of an event, e.g.:
 - High-water mark (HWM) data validation
 - Skill against coastal tide gauges during the storm
- Last issued inundation *forecast* to guide placement of HWM data
- Coastal anomalies to reduce *hindcast* bias
- Fully coupled ADCIRC/WaveWatch III to *hindcast* the best estimate of inundation

<https://www.weather.gov/sti/coastalact>

Coastal Coupling base ([CoastalApp](https://github.com/noaa-ocs-modeling/CoastalApp))



noaa-ocs-modeling / CoastalApp Public

<> Code Issues 35 Pull requests 4 Discussions Actions Projects Wiki Security

develop 6 branches 2 tags Go to file Add file Code

This branch is 89 commits ahead of master. #105

pvelissariou1 removed parmetis/metis libraries from thirdparty_open ✓ 85e3cf7 5 days ago 182 commits

.github/workflows

create new GitHub Action to test submodule pointers (#72)

11 months ago

ADCIRC @ 324de0e

ATMESH @ 7aab919

BARDATA @ 8acb271

NEMS @ 581d8be

NWM @ 3bc401d

PAHM @ ac45a59

SCHISM

WW3 @ 9726c8b

added rebasing modifications

last month

WW3DATA @ beda5f2

update submodules to point to new pull request commits

15 months ago

CoastalApp is a NUOPC application implemented following UFS best practices to couple coastal ocean models and other domains (Sea Ice, Atmosphere, Wave, Inland Hydrology, ...)

CC0-1.0 license

5 stars 18 forks

license CC0-1.0

<https://github.com/noaa-ocs-modeling/CoastalApp>

CoastalApp Test Suite

Number of reg tests: 18

Model components:

- ADICRIC
- SCHISM
- WW3
- PaHM
- ATMESH
- WW3DATA

Platforms Tested:

- RDHPCS - Hera, Orion, Cloud, ...
- NSF - TACC (Frontera, Stampede)
- Various Academic/Research Institution HPC/Clusters
- Local Clusters/Desktops

Job Scheduling:

- Slurm
- PBS
- Plain mpirun/mpiexec (no scheduler)

noaa-ocs-modeling / CoastalApp-testsuite Public

<> Code Issues 6 Pull requests 1 Discussions Actions Projects

develop 4 branches 0 tags

florence_hsofs.adc_spinup

florence_hsofs.atm2adc

florence_hsofs.atm2adc2ww3

florence_hsofs.atm2ww3

florence_hsofs.ww3_multi

florence_hsofs.ww3_nems

florence_shinnecock.adc_spinup

florence_shinnecock.atm2adc

florence_shinnecock.atm2adc2ww3

florence_shinnecock.atm2ww3

florence_shinnecock.ww3

ike_shinnecock.atm2sch

ike_shinnecock.atm2sch2ww3

ike_shinnecock.sch

images

sandy_shinnecock.pam2adc

sandy_shinnecock.pam2adc2ww3

sandy_shinnecock.pam2ww3

Table 1: CoastalApp-testsuite Usage

Usage: "run_all.sh" [{-|-}option1[=|space|option_value1]] [{-|-}option2[=|space|option_value2]] ...

-h|--help|-h|--help
Show this help screen.

-y|--yes|-y|--yes
Automatically answer yes for all questions.
Default: 0|no (user is required to enter a yes/no response).

-mod|--mod|--mod_file|--mod_file [=|space| "module_file"] (OPTIONAL)
The module file to use.
Default: none.

-bin|--bin|--bin_dir|--bin_dir [=|space| "bin_directory"] (REQUIRED)
The path to bin_dir where the CoastalApp executables are located.
Default: CoastalApp/ALLBIN_INSTALL.

-com|--com|--com_dir|--com_dir [=|space| "com_directory"] (OPTIONAL)
The path to com_dir where the data for the extended tests (e.g., "hsofs") are located..
Default: comm.

-work|--work|--work_dir|--work_dir [=|space| "work_directory"] (OPTIONAL)
The path to work_dir where the tests are to be run.
Default: work.

-tests|--tests|--tests_file|--tests_file [=|space| "tests_list_file"] (OPTIONAL)
The path of the tests_list_file where all available tests are listed.
Default: regtest_list.dat.

-batch|--batch|--batch_system|--batch_system [=|space| "hpc_batch_system"] (REQUIRED)
The cluster batch system (if any) to use (slurm, pbs, none).
Default: slurm.

-acct|--acct|--batch_account|--batch_account [=|space| "hpc_batch_account"] (REQUIRED)
The cluster batch/project account to use.
Default: coastal.

-queue|--queue|--batch_queue|--batch_queue [=|space| "hpc_batch_queue"] (REQUIRED)
The cluster batch queue to use.
Default: batch.

-slurm_opts|--slurm_opts|--batch_slurm_opts|--batch_slurm_opts [=|space| "hpc_slurm_options"] (OPTIONAL)
Additional command line options to pass to the "sbatch" command (SLURM only).
Refer to the SLURM/sbatch documentation.
Default: none.

-pbs_opts|--pbs_opts|--batch_pbs_opts|--batch_pbs_opts [=|space| "hpc_pbs_options"] (OPTIONAL)
Additional command line options to pass to the "qsub" command (PBS only).
Refer to the PBS/qsub documentation.
Default: none.

-runexe|--runexe|--batch_runexe|--batch_runexe [=|space| "hpc_batch_runexe"] (REQUIRED)
The cluster batch run executable to use.
Default: srun.





Breakthrough

IIJA / BIL Provision 3

Driver: [H.R.3684 Infrastructure Investment and Jobs Act \(IIJA\)](#), Provision 3: \$492,000,000 shall be for coastal and inland flood and inundation mapping and forecasting, and next-generation water modeling activities, including modernized precipitation frequency and probable maximum studies

Multiple related research and development projects were initiated including the **OAR/NOS/NWS collaborative project entitled:**

Advancing UFS Infrastructure in Support of Inland and Coastal Coupling

UFS Coastal development team

NOS team

Saeed Moghimi (NOS/OCS) - NOS Earth System Model Coupling lead; Jana Haddad (OCS) - Technical project management; Yunfang Sun (OCS) - Scientist / Developer; Mansur Jisan (CO-OPS) - Scientist / Developer;

ESMF / NUOPC: Ufuk Turuncoglu (NCAR), Daniel Rosen (NCAR), Ann Tsay (NCAR)

OAR/EPIC team: Keven Blackman (NOAA/OAR/WPO/EPIC, RTX), Jong Kim (NOAA/OAR/WPO/EPIC, STC), Kristopher Booker (NOAA/OAR/WPO/EPIC, Tomorrow.io), Christopher Domanti (NOAA/OAR/WPO/EPIC, RTX), Anna Kimball (NOAA/OAR/WPO/EPIC, RTX)

SCHISM: Y. Joseph Zhang (VIMS), Carsten Lemmen (Helmholtz-Zentrum Hereon)

WW3: Saeideh Banihashemi (NOAA/EMC), Ali Salimi (NOAA/EMC), Ali Abdolali (USACE-ERDC), Denise Worthen (NOAA/EMC), Jessica Meixner (NOAA/EMC)

ROMS: Hernan G. Arango (Rutgers), John Wilkin (Rutgers)

ADCIRC: Damrongsak Wirasaet (UND), Joannes Westerink (UND)

FVCOM: Jianhua Qi (UMass-D), Siqi Li (UMass-D), Changsheng Chen (UMass-D)

CICE: Joseph Smith (OSU), Jihun Jung (OSU), Scott Durski (OSU), Alexander Kurapov (NOAA/NOS/OCS)



This is a non-exhaustive list of team members who have actively contributed code, but many others have been involved in the UFS Coastal project.

UFS Coastal is a community-centric project

Next-generation coastal ocean coupling infrastructure for integration into the Unified Forecast System portfolio

Stakeholders

Current testers

Future users/testers

Workflow collaborators

Project team members

Model developers

External partners

...

**Github
Platform**

[Discussions](#)

[Wiki](#)

[Roadmap](#)

Tech. advice

[Office Hours](#)

[Monthly Stakeholder
Meetings](#)

Presentations

UFCW

AGU

AMS

Community-owned collaborative environment



Ocean Modeling Collaboration

<https://github.com/oceanmodeling>

People



[View all](#)



ufs-weather-model

Public

forked from [ufs-community/ufs-weather-model](#)

About



This repo is forked from ufs-weather-model, and contains the model code and external links needed to build the UFS coastal model executable and model components, including the ROMS, FVCOM, ADCIRC and SCHISM plus WaveWatch III model components.



ufs-coastal-app

Public

About



UFS Coastal Application is a NUOPC based application implemented following UFS best practices to couple coastal ocean models and other domains (Sea Ice, Atmosphere, Wave, Inland Hydrology, ...)

oceanmodeling.github.io/ufs-coastal-app/



oceanmodeling



Overview



Repositories 40



Discussions



Projects 7



Packages



Teams 7



People 75

UFS-Coastal Project Management



☰

oceanmodeling / Projects / ufs-coastal project

🔍 Type / to search

🔒

🌐 ufs-coastal project

📅 Table: Iter./Repo

📅 Table: Repo/Iter.

📅 Table: Iter./Assignee

📅 Kanban: Assignee/Mile:

📅 Roadmap: Technical

📅 Roadmap: M

🔍 Filter by keyword or by field

Oct

Nov 2024

Dec 2024

Jan 2025

Feb 2025

Mar 2025

Apr 2025

📍 Markers

↕ Iterations, Status

📅 D

1

4

18

2

16

30

13

27

10

24

10

24

7

21

5

19

2

16

30

> ○ MVP of app-level workflow 54 ...

Mon, Jul 1 - Mon, Mar 31 2025

timestep assessments

> ○ MVP of automated testing (RT) pi... 13 ...

Tue, Oct 1 - Sun, Sep 28 2025

WWM and WW3 in VF coupled m

> ○ Stakeholder engagement and doc... 11 ...

Mon, Jul 1 - Sat, Dec 27 2025

stion through CDEPS enhancement

▼ ○ External collaborations 9 CICE, PaHM, ...

Tue, Oct 1 - Fri, Jun 27 2025

anually bug

50 ✓ ROMS-CICE coupling for Bering Sea #5

←

51 ✓ Run global UnWW3 to provide boundary to ... #9

✓ Run global UnWW3 to provide boundary to Atlantic set up #9

beta snapshot ahead of v8.9

52 ✓ CICE + SCHISM #27

✓ CICE + SCHISM #27

53 ✓ Implementation of ROMS+CICE coupling #4

✓ Implementation of ROMS+CICE coupling #4

☐ ✓ RT system enhancements enhancement

Feature #152 · janahaddad opened on Feb 25



UFS Coastal CI/CD

Continuous Integration / Continuous Deployment



- Nightly build and full regression test suite at MSU Hercules
- On-demand build/tests triggered by Github pull request
- Build-test artifact results stored in publicly accessible AWS S3 bucket



Jenkins

Jenkins

Pipelines Admin

NOS / UFS Coastal WM Pipeline ☆ ⚙️ Act

STATUS	PR	SUMMARY	AUTHOR
	158	Bring new co-processing component	uturuncoglu
	157	Feature/jenkins cicd	kbooker79

hercules-nos-RT

Affix this label to pull requests in order to automatically run regression tests

UFS Coastal Pipeline/

Copy S3 URI

Objects Properties

Objects (1)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

☐ Name

☐ PR-157/

☐ Type

Folder

☐ Last modified

-

☐ Size

-

☐ Storage class

-

EPIC CI/CD pipeline to expedite UFS Coastal development



Earth Prediction Innovation Center



Unified Forecast System

Get Code ▾

Get Support ▾

News & Events ▾

About EPIC ▾



Collaboration Through a Common Infrastructure and Best Engineering Practices Expedites UFS Coastal App Development

📅 November 18, 2024

Authors: Saeed Moghimi¹, Jana Hadad¹, Ufuk Turuncoglu², Keven Blackman³, Christina Holt⁴, Maoyi Huang⁵

¹NOAA Office of Coast Survey

²Earth System Modeling Framework Team, National Center for Atmospheric Research

³Office of the Chief Engineer, NOAA EPIC Program, RTX

⁴UFS Unified Workflow Team, Cooperative Institute for Research in Environmental Sciences, NOAA Global Systems Laboratory

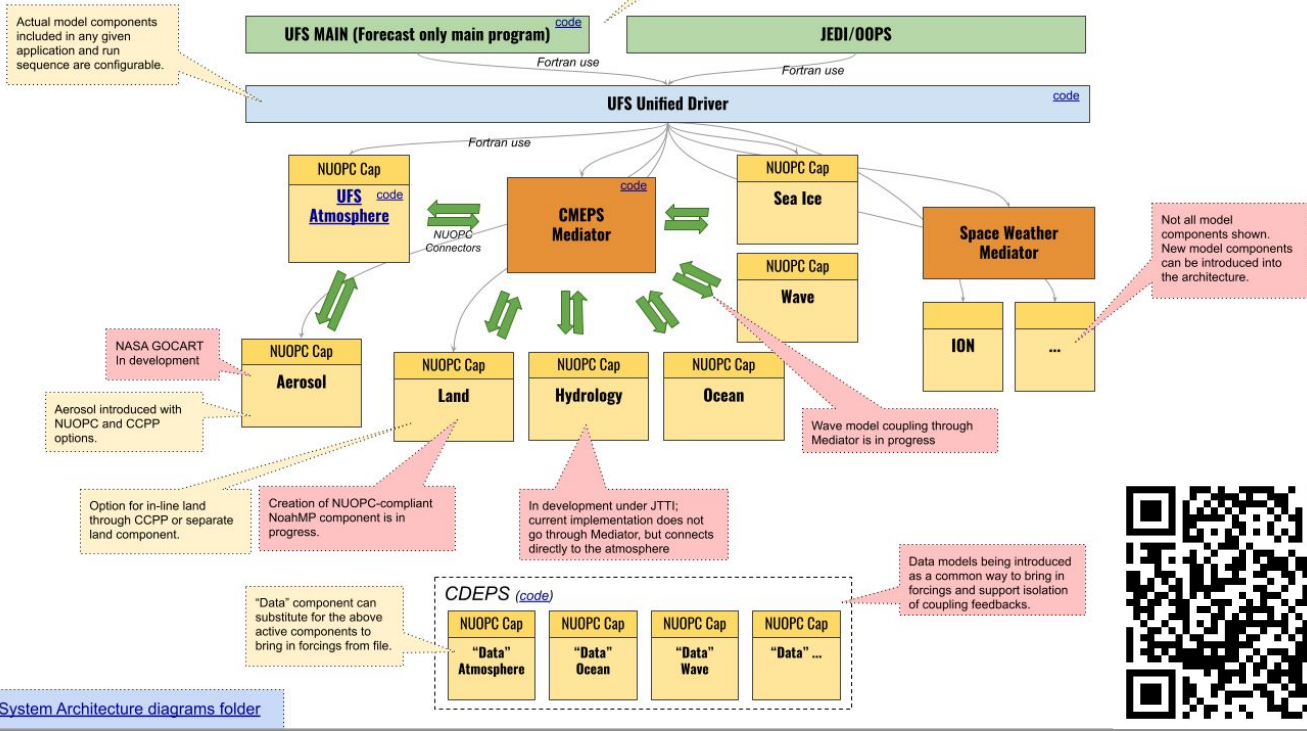
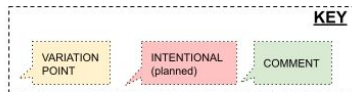
⁵EPIC Program, NOAA Weather Program Office

Read the article here: <https://epic.noaa.gov/ufs-coastal-app-development/>

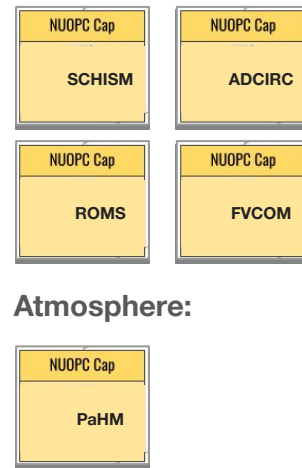


Actual model components included in any given application and run sequence are configurable

Choice between forecast only through UFS main or JEDI/OOPS for driving forecast



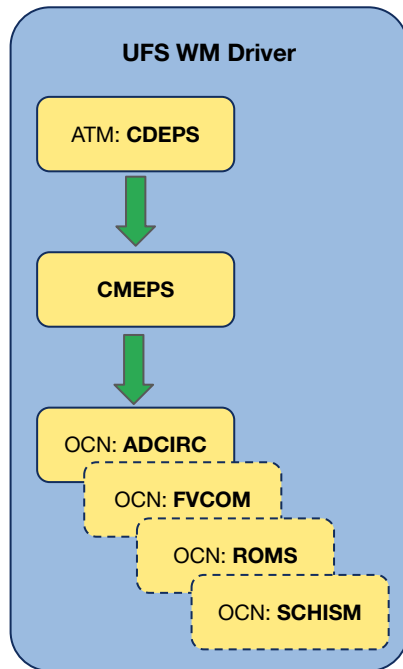
Ocean:



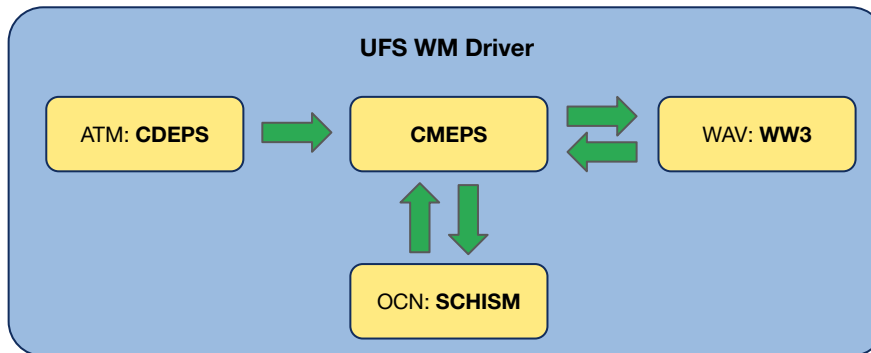
UFS Coastal Model / Application

- It is a fork of UFS WM with additional features and components
- Additional components:
 - Ocean: [ADCIRC](#), [FVCOM](#), [ROMS](#), SCHISM
 - Parametric Atmosphere: [PaHM](#)
 - Co-processing: [GeoGate](#) (still under development and in a [development branch](#))
- Sphinx based [documentation](#) (needs to be extended)
- Application
 - Includes initial version of [UWTools](#) based workflow (active collaboration between UWTools and UFS Coastal Teams)
 - Currently supports coupled DATM+SCHISM configuration (WW3 is the next)

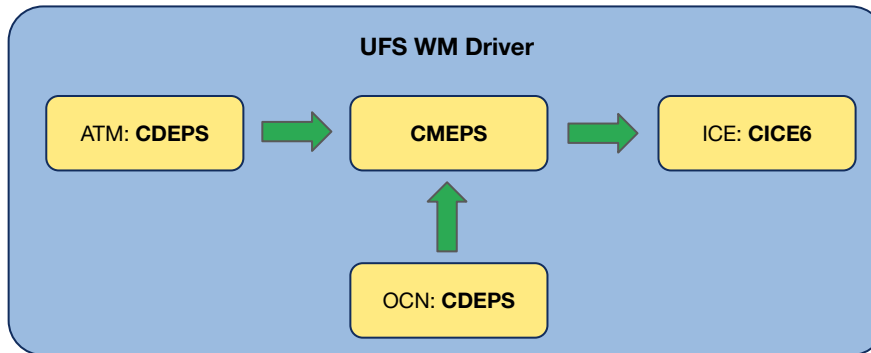
Supported Configurations



DATM coupled configurations



DATM+SCHISM+WW3
coupled configurations
OCN <-> WAV: 2d and 3d
vortex formulation

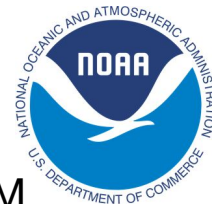


DATM+DOCN+CICE6
coupled configuration

DATM+SCHISM+CICE6
under development

Once the
configurations are
finalized and tested,
they will be available as
a part of the RT system

Testing: UFS Coastal Specific Regression Tests and CI/CD



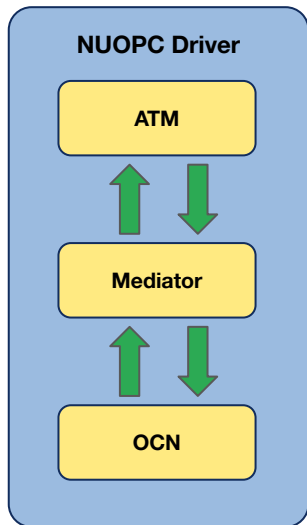
- UFS Coastal heavily relies on existing testing infrastructure provided by UFS WM
- List of the available RTs (seen also in [tests/rt_coastal.conf](#))

coastal_ike_shinnecock_atm2adc	Intel	DATM+CMEPS+ADCIRC
coastal_scituateharbor_atm2fvc	Intel	DATM+CMEPS+FVCOM
coastal_ike_shinnecock_atm2sch	Intel	DATM+CMEPS+SCHISM
coastal_ike_shinnecock_atm2sch2ww3	Intel and GNU	DATM+CMEPS+SCHISM+WW3
coastal_irene_atm2roms	Intel and GNU	DATM+CMEPS+ROMS
coastal_ike_shinnecock_ww3	Intel	WW3
coastal_ike_shinnecock_atm2ww3	Intel	DATM+CMEPS+WW3

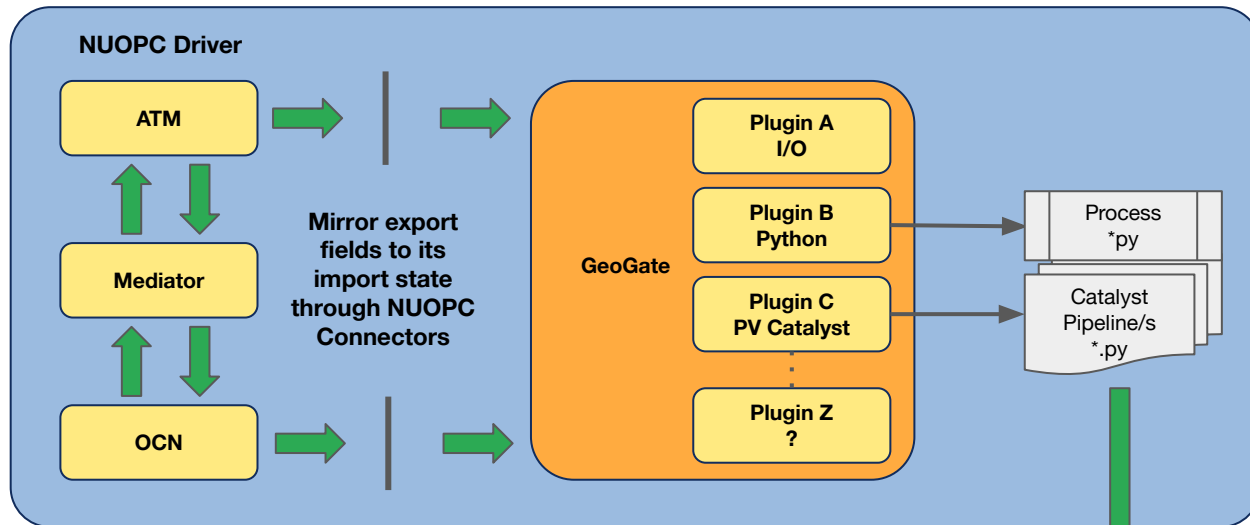
- The input files for UFS Coastal specific RTs are available only on **Hercules** (development platform) and **Frontera** (used by external collaborators and testing)

New Co-processing Component: GeoGate

- Aims to bring co-processing capability to NUOPC based coupled modeling applications (like UFS Coastal and WM) with minimal effort.



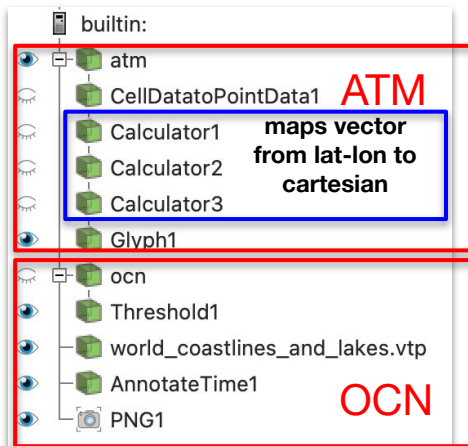
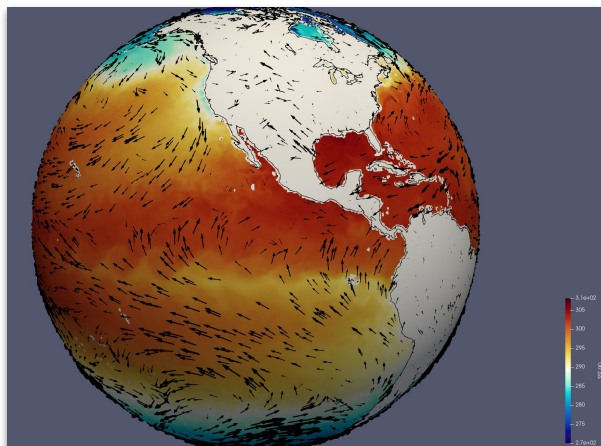
Simple NUOPC App



Simple NUOPC App integrated with GeoGate

Designed to be Totally Independent and Flexible

- Plugin based generic component uses LNLL developed [Conduit library](#) to transfer data between different programming languages *Fortran*, *C* and *Python*
- Currently has three plugins: (1) basic I/O (dumps all fields to disk), (2) Python (pass desired fields to Python to process), (3) ParaView Catalyst (in situ, co-processing)
- Example for PV ParaView pipeline - [two channel \(atmosphere, ocean\)](#):

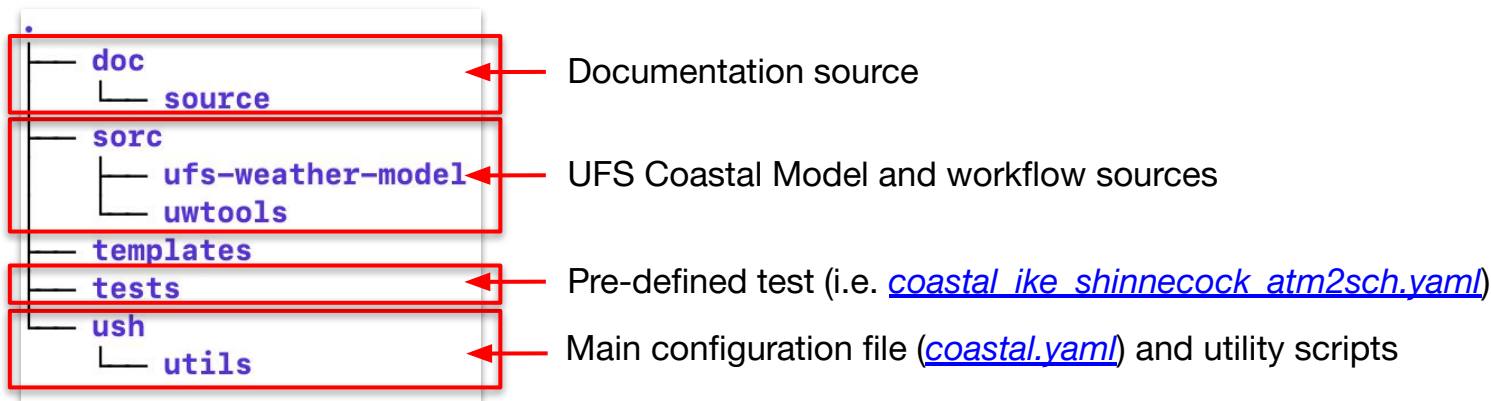


```
Driver:
componentList: [ATM, OCN, COP]
attributes:
  Verbosity: low
runSequence: |
  @43200
    ATM -> COP :remapMethod=redist
    OCN -> COP :remapMethod=redist
    COP geogate_phases_catalyst
    #COP geogate_phases_io
    #COP geogate_phases_python
    ATM
    OCN
  @
```

UFS Coastal Application



- [UFS Coastal App](#) enables easy to use and configurable workflow to create supported configurations



- The workflow currently supports DATM+SCHISM configuration only but this will be extended to cover also WW3 wave component in the near future



Application Level Workflow

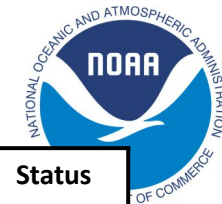
- The workflow uses [UWTools](#) as a task manager
 - Currently using [development fork and branch \(feature/cdeps\)](#) based on 2.5.1
 - It uses [iota Python package](#) for task dependencies
- Running workflow
 - Install UWTools (or use available one if it is compatible with UFS Coastal App)
 - Build model ([./build.sh](#))
 - Customize [coastal.yaml](#) and run
- The detailed documentation
 - <https://ufs-coastal-application.readthedocs.io/en/latest/Workflow.html>

Does not currently need management attention

May need management attention

Management attention needed

Project snapshot



<p><u>Project Purpose/Description:</u></p> <ul style="list-style-type: none">Next-gen coastal coupling using UFSApply Agile principles in planning/managingCommunity modeling approachModel-level code that creates a model executableApp-level code that will host workflow wrappers around the executable <p>Project Team:</p> <ul style="list-style-type: none">Link to diff slide with full team <p>Project Tracking:</p> <ul style="list-style-type: none">Model-level repository, app-level repository		Target	Status
	MVP of app-level workflow	FY25	In progress
	MVP of the CI/CD pipeline on Jenkins (EPIC's automated testing platform)	FY25	In progress
	Stakeholder engagement	FY25	In progress
	Documentation improvements	FY25	In progress
<p>Progress/Accomplishments:</p> <ul style="list-style-type: none">Created initial version CI/CD pipeline on JenkinsSCHISM+WW3 3D model cap modifications to use vortex formalismSync'd with UFS-WM and resolved all resulting issuesSync'd with latest coastal model releasesStakeholder engagementInitial version app-level workflow for DATM+SCHISM... <p>Next steps (see roadmap for relevant issues):</p> <ul style="list-style-type: none">Continue testing of SCHISM+WW3 configurationResolve CI/CD pipeline issuesResolve issues resulting from latest sync'sAdd small-domain regression testsWorkflow MVP implementation...	<p>Emerging project risks & possible mitigation:</p> <ul style="list-style-type: none">Active support from partners, especially WW3 developers, is essential.Several tasks are currently unplanned/blocked due lack of resources or needed collaboration to move forward: linkWhile we have benefited from EPIC support, uncertain future EPIC support limits our ability to provide the best support to stakeholders given our small core team, e.g. documentation, multi-platform/cloud support, code maintenance, user support, etc.Relying on the UW tools project and collaboration with that team for workflow development. Changes to that project (positive or negative) would impact UFS Coastal app-level workflow timeline.		

Outlook - UFS and UFS-Coastal

- **Unclear UFS-WM and UFS-Coastal Relationship:**
 - Consideration should be given to whether the two projects should eventually merge.
 - Guidance based on UFS Governance framework is needed to clarify the relationship between UFS-WM and UFS-Coastal.
- **EPIC Program Support and R20 Pipeline:**
 - Support from the EPIC program, resulting from UFS Governance updates, will significantly impact development.
 - It will also clarify how UFS-Coastal fits into the R20 pipeline and define necessary next steps for operations and upgrades.

Thanks for your attention

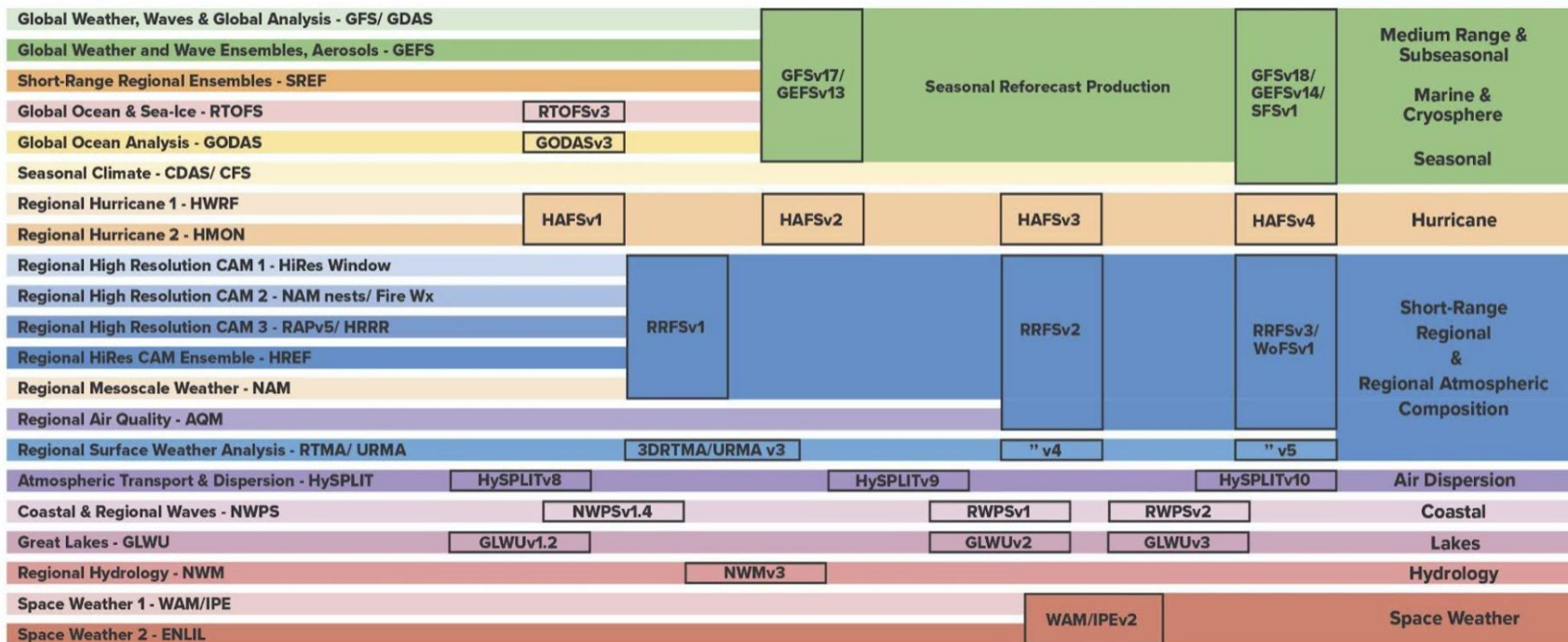
Contact: Saeed.Moghimi@noaa.gov



Very old Rainbow chart

21 Independent Stand-alone Systems

8 UFS Applications



UFS Coastal CI/CD

Continuous Integration / Continuous Deployment



- Jenkins as the CI/CD tool
- Nightly build and full regression test suite at MSU Hercules

✓ NOS / Coastal-Test-WM-under-development < 554

Branch: —

🕒 3h 11m 37s

Commit: —

🕒 4 hours ago

Run UFS WM Build & Regression Test / Hercules: Run UFS WM Build & Regression Test - <1s

✓ > Check out from version control

✓ ▾ Shell Script

```
1 + export machine=hercules
2 + machine=hercules
3 + pwd
4 /work/noaa/nosofs/role-nosofs/jenkins/workspace/hercules/coastal/ufs-weather
5 ++ hostname
6 + echo hostname=hercules-login-1.hpc.msstate.edu
7 hostname=hercules-login-1.hpc.msstate.edu
8 + [[ -e ufs-weather-model ]]
9 + ls -al
10 total 168
11 drwxr-s--- 30 role-nosofs nosofs 4096 May  1 01:49 .
12 drwxr-s---  4 role-nosofs nosofs 4096 Oct  2 2024 ..
```



Jenkins

NOAA Unified Forecast System & Coastal ocean modeling

