

New Technology in FV3

Official FV3 GitHub site with 201912, 2021.01 and 2021.02 public releases

Multiple and telescopic nests (global and regional domain) in FV3, FMS, and FMS-nctools
Mouallem et al., in prep.

Vertical nesting capability added

Docker container for SHIELD

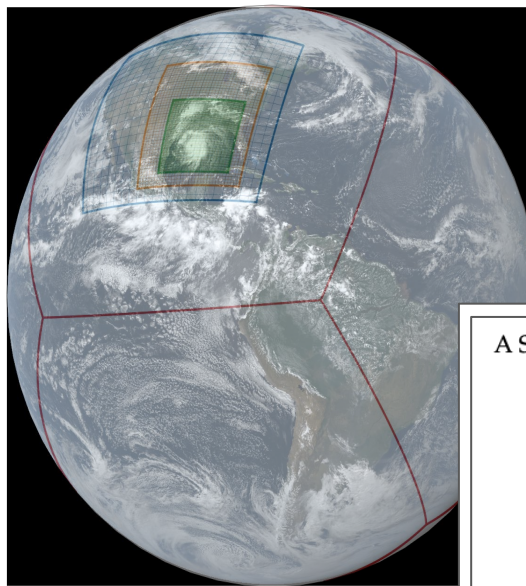
Cheng et al., to be submitted to GMD

FV3 Scientific Documentation now available

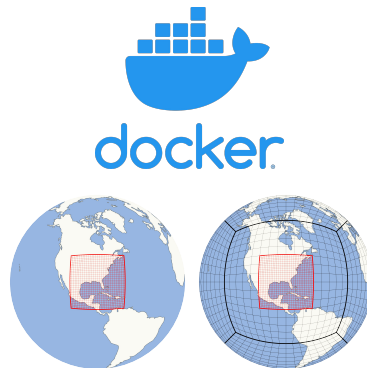
<https://www.gfdl.noaa.gov/fv3/fv3-documentation-and-references/>

Participation in NOAA GPU Hackathon and support
for Vulcan/UW collaboration on GT4py

See 25 March 2021 UFS Webinar



Plot courtesy Joseph Mouallem



A Scientific Description of the GFDL Finite-Volume Cubed-Sphere Dynamical Core

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Xi Chen
William Putman
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14 June 2021
Revision v1.0a 16 June 2021

GFDL Weather and Climate Dynamics Division
Technical Memorandum GFDL2021001



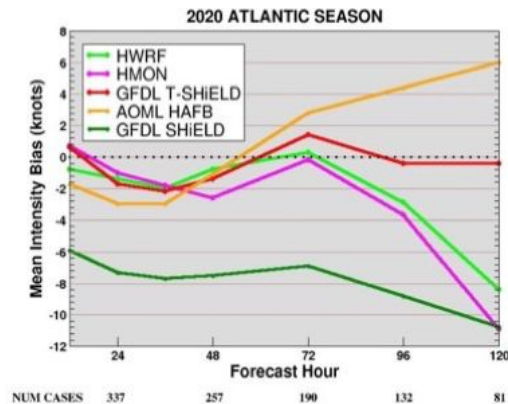
Fork FV3 on GitHub
github.com/NOAA-GFDL/GFDL_atmos_cubed_sphere

Improved FV3-based Predictions

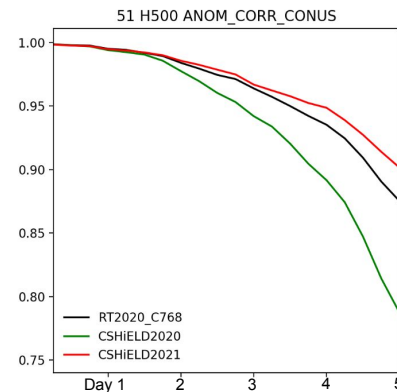
Positive-definite tracer advection scheme greatly improves TC structure and intensity
Gao et al. (accepted to JAS)

Regular SHiELD, C-SHiELD and T-SHiELD updates; participation in HWT and hurricane comparisons
Harris et al. (2020, JAMES)
Hazelton et al. (submitted to WAF)
and others

Updates to In-line GFDL MP, cloud-radiation interactions, GFS TKE-EDMF, mixed-layer ocean, and more.
Zhou et al (in prep.)
Additional in-line physics in progress



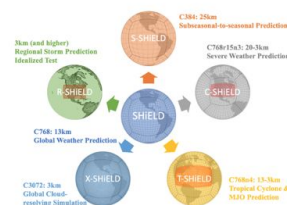
Plot courtesy Morris Bender



Plot courtesy Alex Kaltenbaugh



SHIELD: System for High-resolution prediction on Earth-to-Local Domains



SHIELD is a Unified Forecast System (UFS) prototype atmosphere model showing the power of a unified prediction system across a variety of time and space scales designed for a wide array of applications. It shows the abilities of the Finite Volume Cubed Sphere Dynamical Core (FV3), especially its flexible nonhydrostatic dynamics, variable resolution capabilities, and integrative physics, coupled with the elegance of the Flexible Modeling System (FMS) framework. Improvements in FV3 or the physics in SHIELD can be easily transferred into other FV3-based and UFS models, including the GFDL Modeling Suite and the Next-Generation Global Prediction System.

Configuration/Use Domain Integration Length

SHIELD Forecasts
shield.gfdl.noaa.gov

SHIELD Portal
www.gfdl.noaa.gov/shield

