

MPAS

Model for Prediction Across Scales

MPAS-Atmosphere Resources

MPAS-Atmosphere Users' Guide: On the MPAS-Atmosphere download page



MPAS Atmosphere Public Releases

MPAS Atmosphere 8.0.1 was released on 6 July 2023.

For information on the GPU-enabled MPAS-Atmosphere model, please refer to [this documentation](#)

As of September 2018, official support for MPAS-Atmosphere has migrated from the Google Groups forum to a web forum hosted by NCAR's Mesoscale and Microscale Meteorology. Users are encouraged to post any questions related to building and running MPAS-Atmosphere to the appropriate sub-topic in the MPAS-Atmosphere forum at <https://forum.mmm.ucar.edu/>. Posting to the forum requires the creation of an account, but no account is needed to browse the forum.

[MPAS Atmosphere 8.0.1 release notes](#)

Source code downloads:

- [MPAS v8.0.1](#)
- [GPU-enabled MPAS-Atmosphere v6.x](#)

[MPAS-Atmosphere Users' Guide](#)

[MPAS-Atmosphere tutorial](#)

[MPAS-Atmosphere meshes](#)

[Static geographical datasets](#)

[Configurations for idealized test cases](#)

[Sample input files for real-data simulations](#)

[Visualization and analysis tools](#)

A variable resolution MPAS Voronoi mesh

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MPAS-Atmosphere Resources

WRF&MPAS-A Support Forum

You need to create an account to post to it.

Searchable

forum.mmm.ucar.edu

WRF&MPAS-Aforum

Forums What's new Tags Members

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New posts Search forums

WRF & MPAS-A Support Forum

New posts

Welcome to the [WRF/WRFDA/WRF-Chem/MPAS Users' Support Forum](#), please read the guidelines & suggestions below.
WRFDA NOTICE

Registration

- You must create an account to post, first-time posts need manager approval and it may take 2-3 business days.

Posting Threads

Before posting, use the search utility to verify whether a solution to your inquiry already exists

- Post inquiries to the relevant forum and open a new thread for each new question. Do not post inquiries more than once.
- State the problem or error in the subject line and attach relative files - e.g., namelists, error logs
- Under "Options" check the boxes for "Watch this thread..." and "receive email notifications" to stay up to date on replies. Alternatively, click your name at the top of the forum site, and then "preferences" to choose notification options for the entire forum site.
- If the problem is related to compiling, please first see the [WRF/WPS Compiling web page](#).
- Add relevant tags to your thread (see [list of all tags](#)). [Contact us](#) if you need additional tags.
- There is no need to quote the previous post unless you are quoting a specific section. It is assumed your response is to the most recent submission.

Latest posts

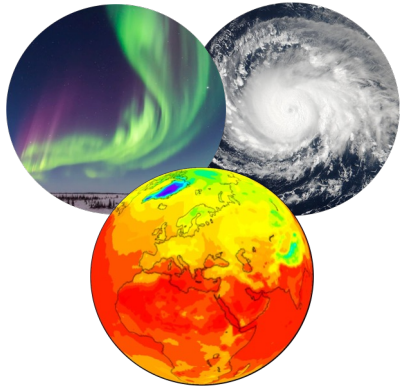
- P** [WRF Default Landcover and Soil Texture dataset sources and citations](#)
Latest: politeness · 23 minutes ago
Weather Research and Forecasting (WRF) Model > WPS
- C** [UCM model Issue](#)
Latest: climatewind · Today at 10:45 AM
Weather Research and Forecasting (WRF) Model > WRF Model
- A** [dveg option for NOAA-MP LSM](#)
Latest: Alessandro Delo · Today at 9:15 AM
Weather Research and Forecasting (WRF) Model > WRF Model
- R** [QVAPOR vertical interpolation](#)
Latest: Ruhee · Today at 7:11 AM
Weather Research and Forecasting (WRF) Model > WRF Model
- P** [Dust chemistry in MOSAIC mechanism code](#)



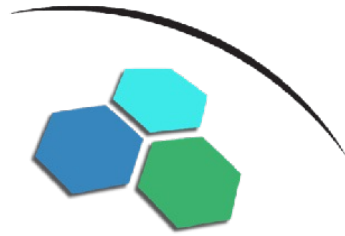
The Model for Prediction Across Scales Atmosphere

MPAS-Atmosphere and the future

MPAS-A in an Earth System Model

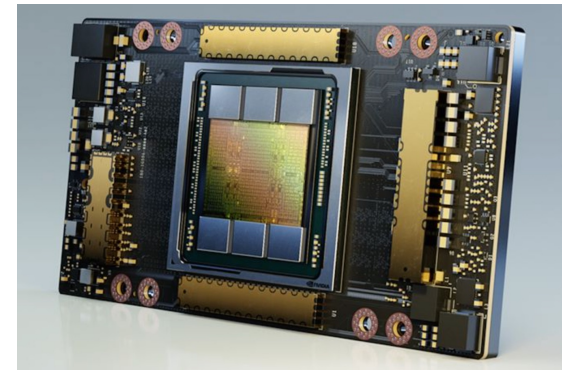


SIMA



EarthWorks

MPAS-A and GPUs



NVIDIA Ampere A100 GPU

MPAS

Model for Prediction Across Scales

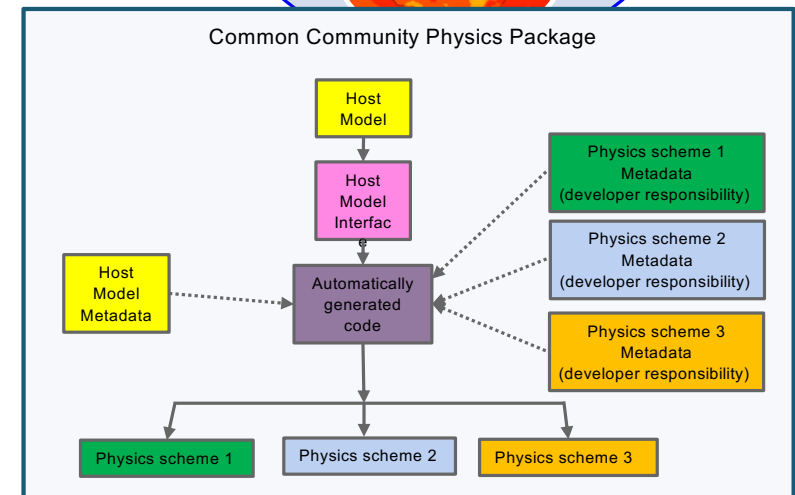
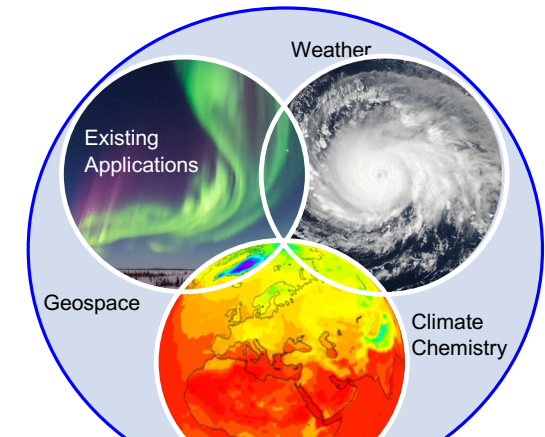
System for Integrated Modeling of the Atmosphere (SIMA)

(1) MPAS-Atmosphere in an Earth System Model (ESM), using CESM components. Other ESM components: ocean, land, land and sea ice, chemistry

(2) WRF/MPAS physics in an ESM using the Common Community Physics Package (CCPP) interface.

Status:

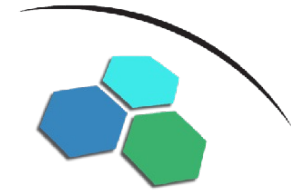
- MPAS-A in CESM is being tested.
- Only CESM/CAM physics will be available in this first release.
- CCPP implementation in MPAS and CESM is not yet complete.
- Initial release (experimental) TBD.



MPAS

Model for Prediction Across Scales

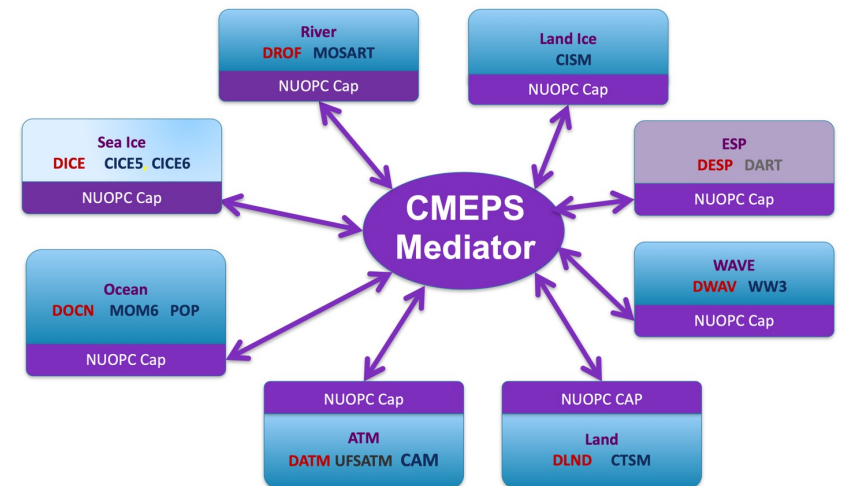
EarthWorks



EarthWorks is a five-year university-based project (CSU), supported by NSF/CISE, to develop a *global convection-permitting coupled model* based on the CESM with GPU capability for all components.

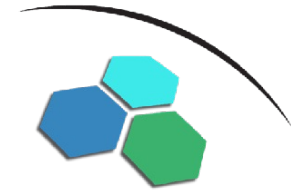
Earthworks consists of:

- The MPAS non-hydrostatic dynamical core, with a resolved stratosphere and CAM-ish physics
- The MPAS ocean model, developed at Los Alamos
- The MPAS sea ice model, based on CICE
- The Community Land Model (CLM)
- The Community Mediator for Earth Prediction Systems (CMEPS)





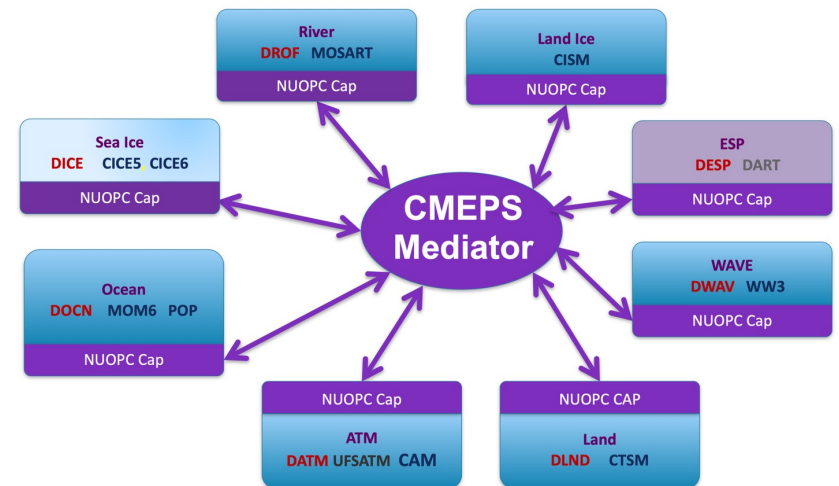
EarthWorks



EarthWorks is available now in a first “functional” release:
`git clone https://github.com/EarthWorksOrg/EarthWorks.git`

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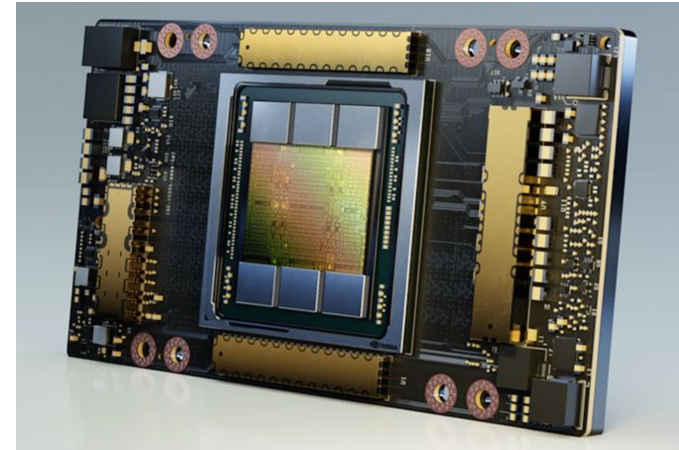


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Model for Prediction Across Scales

MPAS and GPUs

We released the GPU-enabled MPAS-Atmosphere in October 2020 as a branch from MPAS Version 6.1. We have a Version 7 update but it has not been released.



NVIDIA Ampere A100 GPU

What is in current (2020) release:

- GPU-enabled MPAS dynamical core using OpenACC directives.
- Some GPU-enabled physics (e.g. YSU, WSM6, M-O, scale-aware nTiedtke)
- Asynchronous execution capability on heterogenous architectures - currently radiation (lagged) and NOAH land model on CPUs, all else on GPUs
- Configurations tested and validated on IBM POWER9 architectures and on AMD architectures employing NVIDIA V100 and A100 GPUs.

MPAS

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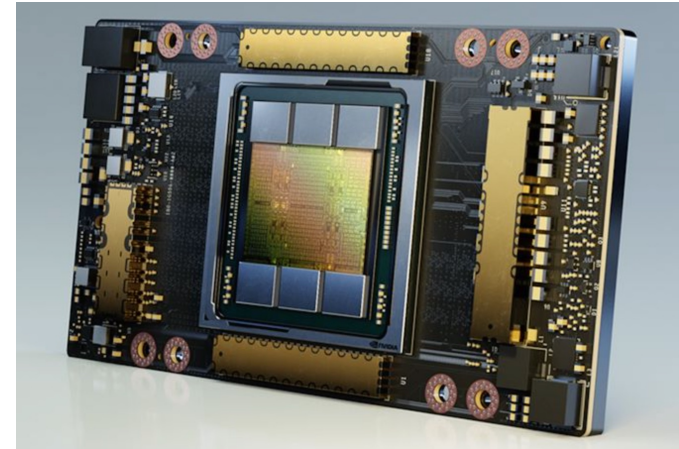
MPAS and GPUs

We released the GPU-enabled MPAS-Atmosphere in October 2020 as a branch from MPAS Version 6.1. We have a Version 7 update but it has not been released.

What is *NOT* in this release:

- Regional capability
- Most of the physics options

We are currently evaluating the viability of this GPU implementation of MPAS-Atmosphere.



NVIDIA Ampere A100 GPU

MPAS

Model for Prediction Across Scales

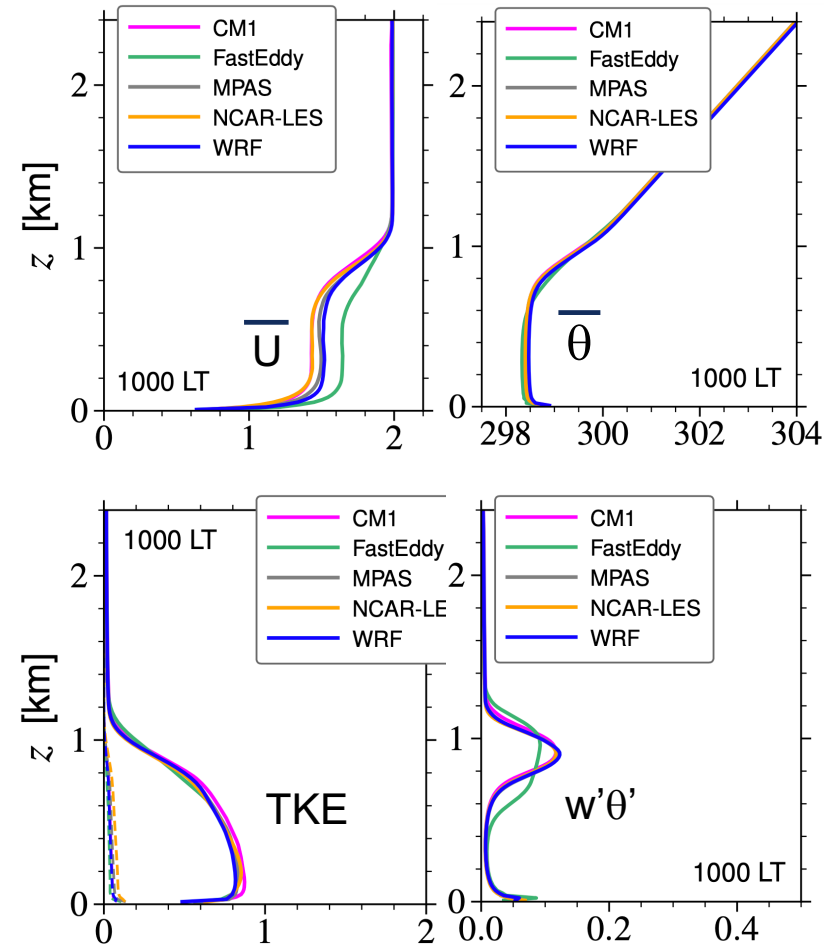
LES capabilities in MPAS

We implemented 2 LES SGS turbulence models in MPAS: 3D Smagorinsky scheme (diagnostic) and a 1.5 order TKE scheme (prognostic).

MPAS LES results look a lot like WRF and CM1 results.

Extensions for terrain need implementing.

Release timetable TBD.



SAS LES test case, NCAR PBL reinvestment project



Also under development...

- LES capabilities – we have an LES branch that incorporates a 3D Smagorinsky (diagnostic) scheme and a 1.5 order prognostic TKE scheme.
- Scalar transport in physics parameterizations (convection, boundary layer) in preparation for chemistry.
- Prognostic ozone
- NOAA-MP, Unified (MPAS, WRF, CM1) physics
- Mesh generation, global and regional



Coming Events

Version 8.? Releases: (1) NOAA-MP; (2) MPAS-JEDI
MPAS virtual tutorial, Spring 2024, dates TBD

WRF-MPAS workshop
June 2024 (in person), specific week TBD

We've begun work on an MPAS NCAR Technical Note. Available
sometime 2024?