



In-Situ Visualization of MPAS-Atmosphere

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What is MPAS-Atmosphere?





Variable mesh density of MPAS-A

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Simulation of 2012 Tropical Cyclones at 4 km resolution -Courtesy of Falko Judt, NCAR



What does in-situ mean?



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Goals and Advantages

Goals:

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- Enhance visualization capabilities of MPAS-Atmosphere
- Support the outreach program at NCAR

In-Situ Advantages:

- Reduce amount of I/O bandwidth required
- Interactively diagnose model's behavior
- Reduce time to visualize data



In-Situ Visualization of MPAS-Atmosphere

Has this been done before?



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http://sc14.supercomputing.org/sites/all/themes/sc14/files/archive/sci_vis/sci_vis_files/svs105s3-file4.pdf

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ParaView Catalyst



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In-Situ Visualization of MPAS-Atmosphere

Traditional Method



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In-Situ Method





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The Adaptor



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The Pipeline

Configures, executes, and passes VTK objects to the ParaView server



- Python pipeline generated with ParaView GUI using MPAS output NetCDF file
- Pipeline establishes a connection to ParaView during the initialization of MPAS
- Pipeline can be adjusted during execution using ParaView Live

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Progress



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Future Work

Collaborations

 Continue to work with NCAR and NVIDIA as a University of Wyoming Graduate Research Assistant

Porting to GPUs

- Use NVIDIA DGX Station to create 'weather in a box'
- Run both simulation and visualization on GPU

Demonstrating at SC19

- Engage with students
- Engage with potential collaborators







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Questions?

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