

Pi-WRF 3.0: Transition to Jupyter Notebook



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BACKGROUND

Pi-WRF is an education outreach project through the National Center for Atmospheric Research (NCAR) that allows users to run the Weather Research and Forecasting (WRF) model on a Raspberry Pi.

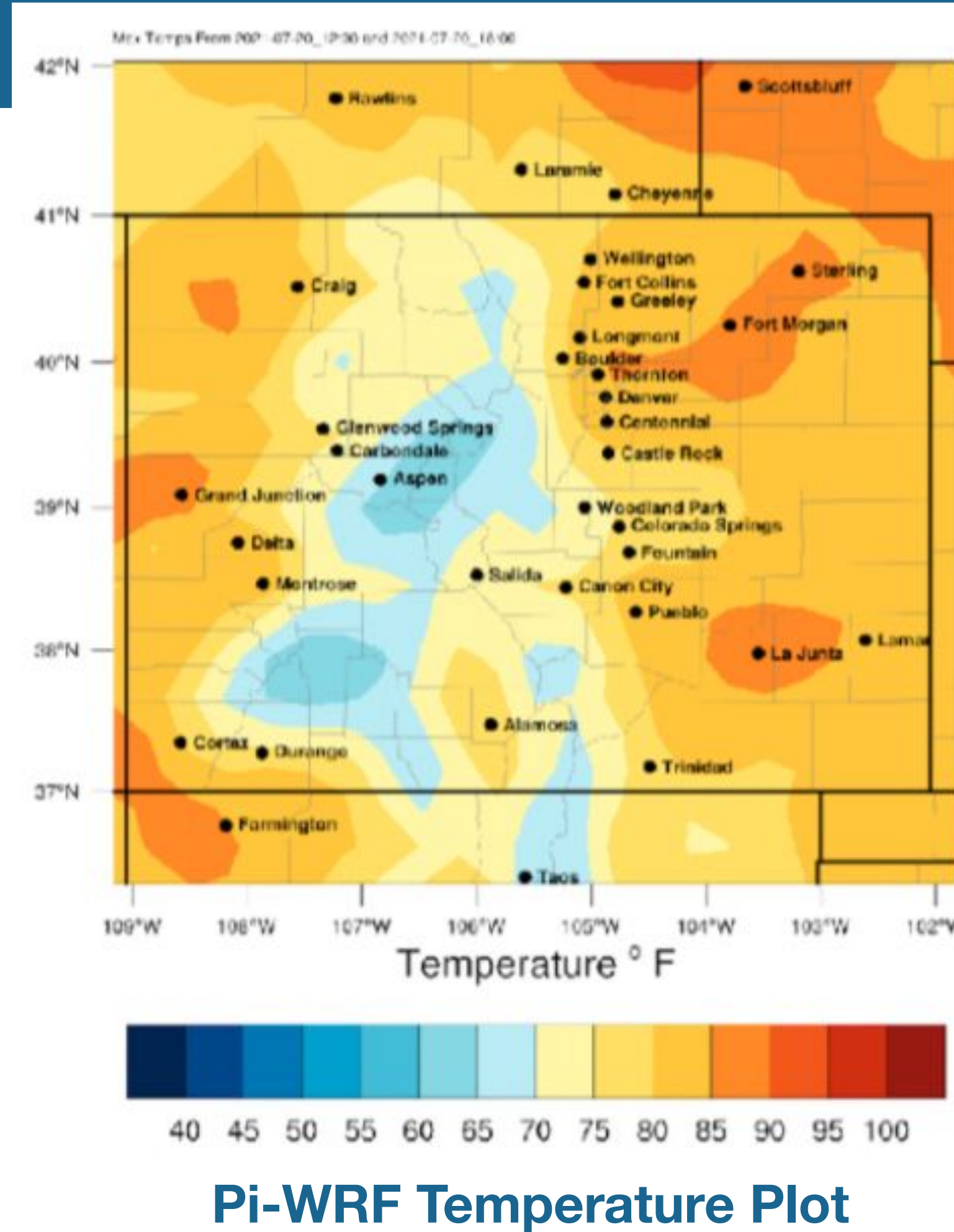


Raspberry Pi



Education Modules

While Pi-WRF enables students to run WRF themselves, developing educational modules related to WRF and numerical weather prediction in general would better facilitate education in the classroom making Pi-WRF even more useful for the classroom.



OBJECTIVES

Community Contributions

Transitioning Pi-WRF to a community driven effort will harness the experience of educators and other contributors. A goal was to **provide a more flexible framework for community contributed module development.**

User Interface

Pi-WRF's user interface is Python Tkinter based GUI which presents various hurdles to development. Consistent with Pi-WRF's transition to a community driven effort, a **shift away from the Tkinter GUI towards a more flexible framework** and user interface became a major objective.



DEVELOPMENT

Jupyter Book was used as a framework for publishing informational content related to Pi-WRF called, 'Pi-WRF Teaching Box'. Jupyter Book is easy to learn as it has lots of available support.



Jupyter Notebook was used in place of Pi-WRF's Tkinter based GUI. For this, we developed our own Jupyter Docker image compatible with Raspberry Pi's ARM architecture. This was then merged into the existing Pi-WRF Docker image.

Ipyleaflet is a Jupyter – LeafletJS bridge we used for the domain selection. With this, the user clicks and drags a marker to select the center of their desired domain. After running the model, the user may access the generated plots.



CONCLUSIONS

Pi-WRF

This new version of Pi-WRF is currently doing what the previous version did. The important difference is the new framework opens Pi-WRF up for community contributed modules. With Jupyter notebook as the UI, Pi-WRF gains:

- Interactivity and an expansion in what is possible.
- Developers now have more convenient access to the underlying model files.
- The notebook is now conducive to building computational narratives around the PiWRF concept.
- It also expands the suite of capabilities across platforms beyond the Raspberry Pi.

ACKNOWLEDGMENTS

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