Atmosphere Diagnostics Framework

Development history and current status

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June 15, 2022



AMWG Diagnostics

Plots Created Thu May 19 14:09:02 2022





AMWG Diagnostics



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 The AMWG diagnostics package has provided "push-button" diagnostics for AMP and the wider CAM community for ~20 years.

Plots Created Thu May 19 14:09:02 2022

 It is essentially a collection of NCL scripts with a large C-shell wrapper to run them all as a single package.



Issues with AMWG diags

• NCL is being deprecated.





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GitHub

 Lacking modern SE practices (open development, CI/CD, etc.)

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AMWG replacement

AMP developed a task force to decide on a replacement. This included making a quick strawman python program to show what it might take if we started from scratch.



That strawman program is now the ADF:

https://github.com/NCAR/ADF



Design principles

• Push-button capability





Design principles

- Push-button capability
- Error tolerant





Design principles

- Push-button capability
- Error tolerant
- Easy to port



Minimal number of external packages (ideally either with wide community buy-in, or developed by NCAR/UCAR).



Design principles

- Push-button capability
- Error tolerant
- Easy to port
- Relatively easy to customize and modify (e.g. add a new analysis script)



PSL:

colormap: "Oranges" contour_levels_range: [980, 1052, 4] diff_colormap: "PuOr_r" diff_contour_range: [-9, 9, 0.5] scale_factor: 0.01 add_offset: 0 new_unit: "hPa" mpl: colorbar: label : "hPa"

Design principles

- Push-button capability
- Error tolerant
- Easy to port
- Relatively easy to customize and modify (e.g. add a new analysis script)
- Python-based



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ADF design and workflow



ADF Script API

```
def my_script(adf):
compare_obs = adfobj.get_basic_info("compare_obs")
cam_case_names = adfobj.get_cam_info("cam_case_name", required=True)
my_script_conf_opt = adfobj.read_config_var("my_config_opt")
```







- Hoping to have "version 1" ready by end of summer/early fall.
- Lacking observational datasets for many CAM variables.
- Still missing multiple different plot types (we have a weekly hackathon to try and address this issue, feel free to join if you would like to add something).
- Currently only works with monthly output. Eventually will want to work with daily and sub-daily output as well, or even be time-dimension agnostic.
- ADF has difficulty working with very large datasets, which will need to be fixed for eventual use with high-resolution model simulations (e.g. EarthWorks).
- Relatively low code-coverage with regards to testing.

Future Work

- Implement Intake-ESM to allow for simple cataloging of the relevant model data (which should help with non-monthly data).
- Implement DASK in a uniform way, particularly for memory management.
- Bring in additional plots and statistical calculations from AMWG, as well as "beautify" the website more.
- Develop notebook interfaces (both as inputs and as an output).
- Significantly increase unit testing and testing code coverage
- Develop a formal integration and regression testing framework.

Thanks for listening!

Any Questions?



