

Jeffrey Painter
Supported Projects: UV-CDAT, ACME

Quarterly Report for October 2016 – December 2016

Last quarter's roadmap for this quarter:

- **Done:** Merge the metrics branch with improved ID and naming systems into the master branch.
- **Some done:** If time, I will continue development of better titles and other text fields in plots.
- **Not done:** Clean up, and if necessary re-implement, some of the emergency changes which Jim had recently made in tables (he and I had agreed to this division of labor).
- **Not done:** Start on a better system for user customization.
- **Mostly done:** Modify or (more likely) replace metadiags in order to better suit our current needs for maintainability and flexibility.
- **Not yet applicable:** In the near future ORNL will hire a replacement for Brian Smith. Jim and I will want to discuss what he should work on first. Of course, I expect that he will be responsible for land diagnostics.

This quarter's accomplishments:

- I wrote the “multidiags” script, which is a replacement for metadiags. It works better, e.g. doesn't lose output by overwriting files, and allows for specification of any obs files. And it has new features, e.g. allows user customization and definitions at several levels. And it is more maintainable because it is built out of a number of short functions. Today's AIMS presentation described it.
- I studied apparent discrepancies between NCAR AMWG means and our means, as reported by Chris Golaz and Jerry Potter. As it turned out, the discrepancies could mostly be resolved by clarifying which obs data files were being used, including different versions with the same name. But also I ended out making our computations more similar to AMWG's, and I found an AMWG error (it computes the mean of a difference as difference of means – wrong when missing data or regridding is involved, but it may have been intentional – if you do it right, you confuse the users).
- Later, while working on multidiags, I realized that mass weighting would be possible in the level-dependent plots (lon-lev and lat-lev axes) if I restructured their computation. So I did it.
- Merging my previous quarter's work with the master branch of uvcmetrics, was a long task involving many bug fixes.
- There was a problem with the mean computation in plot set 4A. I fixed it by restructuring the computation of the plotted data.
- Various file naming improvements and bug fixes. I worked around a memory leak in VCS.

- I experimented with regridding methods and added an option for the user to choose one for the difference plot.
- We have a facility for a derived variable to be available to all plot sets. It is exposed to the user, so that users may define their own diagnostic variables, even at runtime. This had been implemented only for lat-lon contour plots, plot set 5. I moved the bulk of that implementation to a method common to all plot sets, and then implemented the feature for plot sets 4 and 7 as well.

Plans for next quarter:

- Continue to implement the “common” derived variables for all plot sets.
- Improve Multidiags as needed.
- The “not done” items from last quarter’s plans