Authors' Response to Comments of Reviewer #1

Thanks very much for the valuable comments. We've seriously considered each comment and taken actions to address them. Below are details of our responses:

1. Response to "*The lessons learned would be stronger if placed in the context of the evolution of terrestrial carbon and ecosystem modeling: one of those lessons could be to examine earlier studies and see what had worked and what did not!*"

   Thank you. To better address the reviewers' comments about acknowledging past activities, we added a new bullet "Study the past" as one of the lessons learned (section 5). When we prepared standardized environmental driver data sets for MsTMIP, we did extensively study past activities and benefited a lot from it. But we failed to include it as one of the most important lessons learned in the manuscript.

2. Response to "*In particular, this paper does not acknowledge or even cite any of the very similar precursor VEMAP papers. The manuscript paper is strikingly similar in approach to the two VEMAP data set description papers (Kittel et al 1995 and 2004) even to striking parallelisms in the statements of requirements between this paper and Kittel et al 2004. The lessons learned are also remarkably parallel, with Kittel et al speaking to similar needs for formats, informatics etc.*"

   We have added citations for a few related papers, including those two VEMAP data papers suggested by the reviewer (2nd paragraph on page 4 and 1st paragraph in section 5). Also, in the revised manuscript, we have focused on adding text and that show how knowledge from past MIPs helped guide the choice of, and processing steps applied, to the environmental driver data.

   However, discussion about how past MIP activities and their scientific outcomes impacted and inspired the general design of the MsTMIP framework is included in the companion paper (Huntzinger et al., 2013) of this manuscript. We revised this manuscript to better link these two manuscripts together (e.g. paragraph 2 on page 4).

3. Response to "*Since eventual ecosystem model validation is enabled by having low driver data error, it is critical that the driver data be first, as good as possible, and second, that potential bias errors and uncertainty be well-documented. The Kittel papers set a high standard for this, in terms of both quality and documentation, and this paper does not rise to that standard, especially for analysis of error and uncertainty. … The VEMAP data could even serve as a benchmark for sampling bias, correction for topography etc … The VEMAP papers present extensive validation and cross-validation information so that the contribution of error in the driver data sets can be propagated through to the model output … The VEMAP exercise also resulted in extensive and detailed model error analysis …*"

   The authors agree that Kittel et. al., 1995 and 2004 did a more extensive error and uncertainty analysis. Kittel et. al. developed gridded VEMAP climate driver data from station-based observations using sophisticated interpolation method. However, for MsTMIP, we took existing gridded climate data sets (e.g. NARR, CRU, NCEP, GPCP) and fused them together, since many new reanalysis gridded climate data products with better spatial/temporal resolutions have emerged in the past years.

However, it's hard to quantify the uncertainty of fused climate driver data without uncertainties associated with existing climate data sets. We've tried but we're unable to find uncertainties associated with NARR, CRU, or GPCP. In the revised manuscript, we added text (Section 3.1.3 and Supplement 2: Comparison of global and North American climate data) that drills deeper into the comparison between multiple climate data sets, including the improved climate variables (e.g. precipitation and radiation). We feel this comparison better describes the impact of and/or potential errors introduced in the data fusion process.

4. Response to "*Of the Wei et al concluding points, 1-4 were also directly addressed in VEMAP and are reported in the Kittel papers. With respect to 5, VEMAP made use of early workflow tools and processes to allow reprocessing. 6 is extensively documented in the literature for the VEMAP data sets and in fact, extraordinary efforts were made to harmonize ~8,000 station records and grid them. 7 was utilized and as noted influenced the evolution of NetCDF and THREDDS tools subsequently. VEMAP suffered badly from 8, with accompanying schedule delays!*"

   We think a full summary of "lessons learned" of the MsTMIP project is valuable for data-intensive and multi-partner modeling activities like MsTMIP, especially for data compilation, management, and distribution. Even though some of these lessons are not new and have been noted in previous MIP activities (e.g. Kittel, et al., 1995 and 2004), they have not been effectively dealt with and continuously shown as challenges faced by past and ongoing MIPs and should be given enough attention when conducting data-intensive activities. We thus added a new bullet (section 6.1 Study the past) as one of our most important lessons learned.

5. Response to "*In a similar time period to VEMAP, there were other terrestrial ecosystem model comparisons, sponsored by the IGBP, including the NPP intercomparison and CCMLP. None of these efforts are referenced at all, suggesting that while the authors have compiled lessons learned for future researchers, they have not heeded their own advice and sought lessons from prior studies.*"

   When we prepared standardized environmental driver data sets for MsTMIP, we did extensively study past activities and benefited greatly from it.

   This manuscript is a companion paper to a manuscript published in GMD last year (Huntzinger et al., 2013), which provides the general framework for and reasoning behind the MsTMIP experimental design. In the introduction of that paper, we discuss how the MsTMIP activity was built off of, and designed to complement, past, recent, and ongoing synthesis or MIP efforts. The development of the MsTMIP experimental design and its environmental driver data sets relied heavily on findings from past MIPs.

   However, we revised this manuscript to (1) briefly describe some other MIPs relevant to MsTMIP (paragraph 2 and 5 in section 1) and (2) discuss some of the environmental driver data sets that have been used in past and ongoing MIP activities (e.g. paragraph 1&2 in section 3.1.1, paragraph 1 in section 3.8, and paragraph 1 in 3.9.1) to showcase how other MIP activities inspired MsTMIP on its environmental driver data selection and preparation.

References

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