Interactive comment on "Variations and determinants of carbon content in plants: a global synthesis" *by* Suhui Ma et al.

Anonymous Referee #1

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General comments
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This manuscript describes a synthesis of carbon (C) content measurements in plants– i.e., the fraction of biomass that is C. This is quite important, as many researchers assume that this value is, e.g., 45-50%, without measuring it themselves, and systematic errors could bias ecosystem- to global-scale estimates of vegetation C pools. The authors assemble a large dataset from both TRY and the scientific literature and analyze the effects of plant organ, life form, latitude, etc., on reported C values. In general, I think this is a very worthy effort, and the analysis seems solid in most respects.

There are some problems. The text says that "interactive" factors were explored, but

there's no mention of interactive effects in the results, and it's not clear, for example, whether the latitudinal trends shown are independent of life form. It seems to me really important to report type III SS and interactions, so that readers understand the relative importance and relationships of the tested factors. This would also allow the text to be clearer and more prescriptive about the primary effects and what values or ranges researchers should use.

On a related note, no code or data availability is specified (and please note that "available from the authors" is not, in my opinion, acceptable). It's 2017, and I expect all code and data (at least that backing the main results) to be included as supplementary info, or posted in a repository. It's not acceptable to produce results from a black box, and there's a huge benefit to making the data (for future analyses) and code (so readers can see exactly what was done) available. At the very least, why not contribute your assembled literature data back to TRY?

Finally, while I appreciate the difficulties of writing in a foreign language, the current manuscript has many minor errors and thus frustrating to read. Please work with either an editing service or English-fluent colleague to improve it in this respect.

In summary, this is an interesting and valuable data synthesis and analysis, but the statistical approach needs to be strengthened and clarified; code and data made available; and language improved.

Specific comments
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1. Lines 23-25: unclear ending; more suitable than what?

2. L. 44: "ignores"

3. L. 136: can you give examples of large-scale studies that have assumed a 50% value?

4. L. 157-158: "Plant organs. . .are likely"

5. L. 163: consistent? Inconsistent?

6. L. 198: how specific? Do researchers need to use latitude-weighted values? Life form weighted? It would be good to very clear: what are the most important factors for researchers to consider, if they need a C content value and aren't going to measure one themselves? E.g. "We recommend using the values given in Table 1, which are specific to plant organ and life form."

7. L. 356: latitudinal trend after accounting for other factors?

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