Geoscientific
Model Development
Discussions

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Interactive comment on "Designing and Documenting Experiments in CMIP6" *by* Charlotte Pascoe et al.

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Received and published: 7 August 2019

All, thanks for the chance to review this truly interesting paper.

I won't repeat Ron Stouffer's main comments, but I agree with them.

Broad comments: given that the experience of interacting with ES-DOC and its predecessors has often been tedious for the modeling groups, it's difficult to convey the power and significance of these tools for the MIPs. I think this paper does a good job of that, but overall the intro and sections 1 and 2 still sometimes read too much like a conversation with close colleagues in metadata management, rather than an exposition that would be widely understood by the larger community. Starting with Section 3 the paper opens up and flows better.

A few examples:

Section 2, p. 3 - lines 15-19 - what is the Data Request coordinator, and what sort of "input" does s/he provide? By the end of the article I understand the role that "additional documentation" could play in streamlining experimental design, but it's counterintuitive at this point.

P. 4 line 11- p 5 line 2: this paragraph seems to come out of nowhere, unattached to what precedes and follows it. Again, by the end of the article I can understand this, but not here, perhaps because it reads as if the Ãű is about the DCPP, when it's really about something more general.

Figure 3. Here we start to get the 0.1, 0.N, etc. notation, but it's not explained until Table 1 on the following page.

Section 2.3 - begins with a discussion of the ES-DOC controlled vocabulary, but this is a bit confusing since you have just spent 2 pages introducing your own, different vocabulary for talking about numerical experiments. Maybe simply saying "the ES-DOC controlled vocabulary" a few times early in this section would resolve the confusion.

Table 1 - probably your target audience will follow this, but I would have liked an explanation of what a "type" is.

P 7 lines 4-6 - this is aimed at your argument about the potential for ontologies to help with experimental design. That would work better if it flowed directly to the second half of the second sentence of the following paragraph, without the self-interruption about an updated ES-DOC ontology; that can go elsewhere.

P 7 lines 19-21 - this is an opportunity to say more about the issue of poorly constrained experiments in the simulation sciences, which is ubiquitous and in desperate need of clear answers. I think of your work, along with the MIPs themselves, as a crucial step in the direction of that answer; this could be brought more to the fore in your article. A brief discussion of the history of MIPs, and their epistemic importance, appears at pp.

349-352 of my book A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming (MIT Press, 2010).

Section 3.2 - p. 13 line 3: what I've really enjoyed hearing Bryan talk about is the human side of working with Metafor and similar tools (e.g. evidence of cutting and pasting in model descriptions as people become bored and inattentive during a tedious, detail-focused process). Here all of that is packed into one word - "infamous" (and a short paragraph on p 18, lines 21-25). I think it would be worth the space to discuss those experiences a bit more deeply, because they may affect modellers' ability and willingness to use the documentation for experimental design, as you're suggesting. I've attached a paper that might be of interest for your discussion of how metadata are actually used in science: Edwards, P. N., M. S. Mayernik, A. L. Batcheller, G. C. Bowker, and C. L. Borgman. 2011. "Science Friction: Data, Metadata, and Collaboration." Social Studies of Science 41 (5): 667–90.

Section 4.1 is really interesting.

Section 4.3 - last sentence on p. 16 âĂŤ can you interpret this for us? What does it say about the potential for re-use of constraints, or perhaps about the particular experiments where constraints were not reusable?

Section 5, Summary - last sentence on p. 17 - is this earlier involvement realistic, given the pace of change and the hectic IPCC schedule? How would it start to gain a foothold in the community?

Detailed comments:

P 2 line 14: don't you mean "but also the experiments themselves" (that is, you mean ES-DOC helps not only with documenting experiments, but also with designing them)? Rephrasing the sentence would make this clearer. The logic of your "not only ...but also" here is hard to parse.

P 5 line 8 - should be "e.g. whether the model should be ..." to avoid embedding a

question in a statement.

P 8 line 7 - this might be better as "cannot be measured empirically," since simulations do generate (simulated) measurements.

P. 12 lines 14-15 - there's something wrong with the last half of this sentence - I can't follow what's been agreed by whom, or to what.

P 12, last 3 sentences: these could be much clearer.

P 13 line 14 - G6sulphur is misspelled

The whole paper needs a review of punctuation. There are commas where none should appear, commas that should be semicolons, and places where commas are needed.

Please also note the supplement to this comment:
https://www.geosci-model-dev-discuss.net/gmd-2019-98/gmd-2019-98-SC1-supplement.pdf

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-98, 2019.