

Response to Reviewers

We thank both reviewers for careful and positive readings of our manuscript. Most of the comments are constructive suggestions for how to modify the manuscript, so we have taken the approach here of either providing direct answers to questions, or describing how we will modify the manuscript in response to the reviewers comments. (In the text which follows, we underline material which will be provided in a revised manuscript, assuming we are given that opportunity.)

Reviewer 1:

Reviewer one is generally positive about the aspirations of the paper, and recognises that the work is in early stage, both technically, and socially in terms of adoption. There are some general questions, and some specific remarks. In this response we attempt to address both the general and specific.

Firstly: “It would have been useful to have a section demonstrating at least initial evidence that CIM was indeed supporting this. How many modelling sites have adopted it? How easy is the website to navigate? Are all metadata fields being used? What are the gaps in the conceptual model? It would have been nice to have more details on these findings.

These are good questions, but perhaps mix three different aspects of the problem confronting establishing new methods of documenting simulations: “how we document them?”, “how we interact with those documents (i.e. the website)?”, and “how pervasive is this new method becoming?”

To some extent we had deliberately tried to make this paper about how we went about answering the first of these questions in the context of CMIP5, and not about the latter two, not least because the website will be changing with time, as will the pervasiveness, while the new technique (“the CIM”) ought to be slowly changing. (For example, section 6 does begin with the statement “The focus of this paper is on describing the construction and structure of the metadata”). Hence, it's not obvious to us that we should answer (in detail) all of these questions here, nor is it obvious that the implication, that for example, the pervasiveness of the method is relevant to whether or not there is utility in what has been done. For example, the CIM could be very unsuccessful, we (and/or the community) could have some lessons to learn from that lack of success! Nonetheless, we agree that these are questions that should at least be discussed in the paper, and we had attempted to do in sections 6 and 7. We clearly can do more, and will do so in the revised paper, in particular, we will:

1. Include new paragraphs in section 6 which will both discuss some of the strengths and weaknesses of the ESG gateway as it was originally constructed, and briefly discuss the technology which is in the new websites being deployed in the latter part of 2012, which address a lot of our concerns with the first generation websites. However, we do not propose to discuss them in great detail, since a full discussion would require a paper in its own right.
2. Include some summary sentences about the state of the CMIP5 documentation as it was in Summer 2012 (in terms of how many CIM documents had been collected, and what has been used). However, this will be accompanied with a paragraph describing why this doesn't really tell us too much about the future pervasiveness of the CIM methodologies.
3. Expand on the problems on the conceptual model which we briefly address in section 7, to more specifically address the questions the reviewer asks.

With respect to the specific remarks about the CIM (“In Fig 1”)? We answer these here, but do not propose to modify the text specifically since there is effectively an infinite number of these sort of questions which could be asked – but we will modify the text with a generic comment that supporting arguments for the decision and extra detail are available on our trac site (<http://metaforclimate.eu/trac>).

1. Should we have simply modelled the Simulation as being composed of many of itself? We believe that this would have confused the two distinct specialisations that we have of Simulation (which is abstract): a SimulationRun is the thing most folks are interested in, but we wanted to support the concept that any given SimulationComposite (piece) could be composed into different SimulationRuns. (Is this contrary to good UML practice? We do not believe so, in particular, the composition must always be of one of the actual sub-classes, not of the abstract Simulation super class.)
2. “You state that 'A SimulationRun may aggregate SimulationComposites' but this is not shown in the model”. Actually it is, and it is why we have the abstract super class, the SimulationRun inherits exactly those properties (and perhaps this answer also helps answer the first question.)
3. Why is platform not associated with software? Good question! Primarily because the maturity of our platform description in CIM 1.5 isn't up to it. However, there is an indirect association: because a Simulation is executed on a platform, the software used for a specific simulation on a platform can be obtained (and vice versa). So, for a specific example, the CIM doesn't support the direct query which one might like to have made, such as: “What software can I run on this platform?”, but it does support, a first query “What simulations ran on this platform”, followed by “What software did they use?” ... but we agree that this would be cumbersome, and not well supported by the tooling. We will consider this issue in a future version of the CIM.
4. The relationship between conformance and data objects was an example of the detail omitted, we will strengthened the statement about omissions, and add a link to the site where the greater detail exists – in the trac site at <http://metaforclimate.eu/trac/browser/CIM/tags/version-1.5>). The specific answer to this question is by reference to a data source where a conformance is, for example, via a specific input dataset.
5. The colours indicate the package from which the specific classes come, the caption will be modified accordingly.

Quantitative/Qualitative Requirements? It is true that the numerical requirement class is abstract, and all the implementation classes are “quantitative”. It would be possible to introduce a “soft” specialisation for other qualitative requirements. This is relatively trivial to do, and will be incorporated in the next version (this paper describes not what we could do, but what we have done). We note this in the text. (CIM_Quality should be used to describe aspects of the simulation/data archive (post fact), but currently has little usage.)

Actual usage? We will introduce a new paragraph describing how the various tools have been and are being used in the community (including a link to the metafor questionnaire).

We will add some new sentences on the futures for CIM governance. Suffice to say that we intend to embed the governance in other long-term activities, and would have done so already but for workload commitments, meanwhile, the metafor team is still operating the governance.

The technical corrections will be included.

Reviewer 2.

Reviewer 2 is very positive about our manuscript, but asks for more discussion of how the CIM is and will be used. We will include more discussion on this alongside the paragraph on tools introduced in response to reviewer 1. The new material will appear in both section 6 (discussing existing tools) and in a new paragraph in section 7 discussing the next steps (where hitherto we had confined ourselves to discussing only the next steps in the evolution of the CIM itself).

We address reviewer 2's specific comments below:

1. More detail on how the CIM decision making was carried out is now will now be included in the relevant paragraph (which we will split into two).
2. We are not sure what the reviewer meant here, however, since this is the nub of the paper, we will add new material on the software description after the package enumeration, where we discuss further the different types of software involved.
3. We will further answer the question on who is working with the CIM today in the next steps section (individuals in three different organisations are continuing to put major amounts of effort, using a variety of funding, and we will expand upon this.)
4. The sentence beginning section 3 will be rewritten for clarity.
5. Since the paper was written in this form, we have carried out the work alluded to (on the way to CIM2), so we will modify the text accordingly (and in the next steps explained how this will be taken forward and by whom, following the answer to #3 above).
6. The raw mind map format is subject to evolution by the freemind team, and we cannot guarantee stability, additionally, it's not very easy to parse. We will expand upon this in the new version of the text, but a fuller discussion is in Moine et al.
7. We will add some sentences in section 5 describing how colleagues are beginning to extend the use of CIM in the context of dynamical core intercomparisons and work on NCAR models.
8. The short answer is no, there are as yet no self-describing models, and we will expand upon this further in the next steps section (the issue is that the life cycles of these codes are very very long.)
9. There are no concrete initiatives yet underway for decorating codes that we are aware of.
10. We will enhance the figure caption as described in the response to reviewer 1, and provide appropriate links.