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Geoscientific Model Development Discussions

Interactive comment on "The Cloud Feedback Model Intercomparison Project Observational Simulator Package: Version 2 (COSP2)" *by* Dustin J. Swales et al.

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General comments

The manuscript describes version 2 of the CFMIP Observational Simulator Package (COSP). Especially enhancements in the software structure to disentangle the diagnostic modules, the coupling interface and the host model.

The manuscript is well written and easy to follow. The developments of the software to enhance modularisation is appreciated and should facilitate integration of the diagnostics in numerical models, as well as the integration of novel diagnostic modules in

COSP itself. As a technical paper, describing developments of a novel version of the COSP, it fits in the scope of the journal and should be published, subject to few minor comments.

Focusing on the novel interface is a good choice and keeps the manuscript at reasonable length. I assume measurements of computational demands vary over a wide range, depending on the complexity of the simulator package, and thus would not be very beneficial. Details of COSP and on the simulator modules can be found in a previous paper on version 1, this may be stressed a bit more (yes, I know it is cited on p.2 l.14).

There are several acronyms of satellite platforms and sensors (especially p.2 ll.4ff.). All the references are given and the acronyms are well known (at least in parts of the community), but maybe you could include the acronyms "decryption" (in-line, table, or list of acronyms?).

Specific comments

I have only one specific comment, the second part is more a suggestion on how to support developers integrating the COSP in their numerical models (and is a bit beyond the publication of the paper).

On p.4 l.10ff:
It seems clear to me, that for a coarse resolution general circulation model, one has to sample some kind of subcolumns, to reach a horizontal resolution compatible with the simulator modules. What, if using a high resolution model (1km or smaller)? Can columns be passed directly and "column-scale" properties have to be aggregated to a resolution suitable for the simulators (ISCCP)? Of course, you write, *"it is the host model's responsibility to generate subcolumns and map physical to optical properties consistent with model formulation"*. So, it should be the responsibility of the developer integrating the interface in a numerical model to provide the proper input fields, but

maybe you could add some hints on that.
It may be beneficial to have more details on the interface routines and the in- and output fields, which have to be used in the host model. If you do not want to bore the reader with too technical description, maybe you could think about a user's manual in the repository or as a supplement to the paper.

That leads me to an additional comment, which is not crucial for publication of the paper:
I also retrieved the code from github and managed to compile it and run the provided test routines. This was more or less straightforward (it took me some time, because I had to compile CMOR2 first).
However, there are some minor inconsistencies in the README(.txt) files (some changed filenames, *cosp_interface_v1p5.f90* mentioned in README not available). It is very good, that you include examples and testing routines in the repository. With the README files and the code examples, I think, I might be able to include the interface in a numerical model. For me it is fine to have the documentation in the README files and in the code. But maybe it would be more convenient to have an overview of the interface routines and details of in- and output fields in one place. So, you may think about a small user's manual as pdf in the repository or as supplement to the paper (there seems to be one for COSP 1.3.1) also including more technical details on the interface routines. It might ease the integration of COSP in numerical models.

Technical corrections

p.1, l.20:
Please include the acronym *CMIP* here, as it is used later in the text.

p.2, l.16:
Please update the reference *Webb et al., 2016* to *Webb et al., 2017* (see also below)

p.6, l.19:

Please include the section: *Code availability*
cf. https://www.geoscientific-model-development.net/about/manuscript_types.html
In the case where new code is described in the paper, this is subject to the same availability requirements as for complete model descriptions. The code should be made available, and a model availability paragraph must be included.

p.7, l.18:
Please change *Geosci. Model Dev. Disc.* to *Geosci. Model Dev.*

p.8, ll.20ff.:
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