Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., community comment CC1
https://doi.org/10.5194/gmd-2022-201-CC1, 2022

Comment on gmd-2022-201

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Community comment on "Daily INSOLation (DINSOL-v1.0): an intuitive tool for classrooms and specifying solar radiation boundary conditions" by Emerson D. Oliveira, Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2022-201-CC1, 2022

General Comments

The author introduces a new modeling package to create values for incoming top of atmosphere solar radiation based on variable orbital parameters and insolation constants. The purpose of the package is to easily create useable inputs for earth system modeling and educational purposes.

The paper details the construction of the model and compares output to existing PMIPII simulations. It seems like the fundamental calculations done by the model are thoroughly detailed, and the model seems to compare well to the state-of-the-art simulations in PMIP. I think the paper could however benefit from some clarifications and figures could be made more readable (both detailed below). In particular, DINSOL's advantages over other TOA shortwave calculators could be made clearer.

I was able to easily download and run the model on a Linux server. I was unable to test the GUI, however – I run MacOS (which the paper clarifies is not supported by the software), and the Linux server I have access to runs CentOS, which has known issues with installing required dependencies such as PyGTK.

Since the paper emphasizes the educational component of the model, moving forward (beyond the publication in this journal), it may be helpful to bundle the code with a sample lesson plan to detail how it can be used in the classroom.

Specific Comments

L55: This paragraph would benefit from a clearer description of what benefits DINSOL has over existing programs. Though a sentence is given for this point, I was still a bit confused as to these differences – is it usability? Speed? Flexibility?

L129: Most GCMs use 365-day years these days – though this might not be the case for other types of models, perhaps a clarification could help

L335 – 354: Please clarify what exactly is meant by 'sample' – samples of eccentricity, etc.? or Q?

L355: Please clarify which time intervals

L400: why were the differences between DINSOL and PMIPII only with the 360-day calendar?

Appendix B: - this is useful performance information, thanks for including it. Could you also include an example for a more 'typical' GCM-level output (say, 1 degree x 1 degree, while keeping the 30-minute timestep)

Typos / Other fixes

A few places, including L80, L158, L233, could you please use $\times$ instead of x for the multiplication sign? The latter makes it look at first glance as if a variable is being referred to.

L92: please clarify true anomaly of what (solar longitude I assume?)

L96: Typo: find instead of finding

L100: Recommend placing the sentence starting with "However" after eq 3 for clarity.

L114: Typo: should be "Kepler"

L125: Please specify what the 'beginning' of the year is defined as – a particular value of λ?

L131: perhaps 'supports' instead of 'uses'

L159: maybe clarify that S_0 can be manually set in the model as well

L241: clarify that it's +/- 1 Myr "of the present"

L322: "Even under hypothetical cases…" perhaps

Figures

Figure 7 – please label axes on figure as well

Figure 10 – I recommend putting all of the lines for each subplot onto the same axis and differentiating them perhaps by color. Right now, it's very difficult to see that the Be90 and Lask curves have a different eccentricity amplitude, due to the different y-axes used.

Figure 11 – please use a divergent colormap (red to blue, for example) for difference maps (g, h, i) – they are currently unreadable with the monotonic colormap (from the screenshots of the GUI, it seems like the same colormap is used for difference maps in the program as well – it would definitely be preferable to use a divergent colormap whenever differences are shown). Also it would be great if the broad categories of subplots were labeled on the side – i.e., 365-day for a-f and 360-day for g-l (this can easily be done in a post-processing program – paint, powerpoint, etc.)