

Geosci. Model Dev. Discuss., referee comment RC1
<https://doi.org/10.5194/gmd-2021-223-RC1>, 2021
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Comment on gmd-2021-223

Anonymous Referee #1

Referee comment on "CSDMS: a community platform for numerical modeling of Earth surface processes" by Gregory E. Tucker et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-223-RC1>, 2021

General Comments

This paper has two purposes – to inform the reader about activities of the CSDMS and to describe the tools and standards developed for model interoperability.

- **On the usage of FAIR.** FAIR standards apply to data not software. Several papers have discussed why software is not data which motivated the development of FAIR4RS. While FAIR is used appropriately in some contexts, it is not used appropriately in others.
- **Verification and Validation.** The paper begins a discussion on code testing but does not address this point further for codes in the CSDMS repository. Assuming unit testing is done, and codes are validated and verified, it would be nice to have a discussion on what this means in the context of the ecosystem created especially in coupling models/components and error propagation.
- **Computational Overhead.** CSDMS has created a rich ecosystem of tools and standards. Has any performance benchmarking been done to understand the computational overhead?

Specific Comments

Line 94: I am unclear what the analogy the quote is trying to draw.

Line 143: The reviews for JOSS journals are objective reviews set against a checklist of items. Reviewers check for what the authors says it does. Do they inspect the software code itself, that is "evaluate the software directly"?

Figure 2: Include a descriptive figure caption.

Line 241: Strictly speaking, reproducing needs an executable, not necessarily the source code.

Line 244: FAIR data need a persistent identifier such as a DOI.

Figure 3. Include a descriptive figure caption.

Line 347: What happens in the interpolation when there is a first order discontinuity?

Line 360: What happens when the timesteps are not multiples of one another?

Figure 13: Clarify that c. and d. are with the “with landsliding” model

Line 580: Sentences is awkward. Librarization of tools to access data sets not librarization of the data sets themselves.

Technical Corrections

Review usage of title case in section and subsection headings for consistency

For inline text, use Fig. or Figure consistently. Similarly for figure referenced in parens, ()

Figure 1: Many of the labels on the figures are hard to read at 100% magnification

Line 154:

For citing PETSc, see:

<ftp://ftp.mcs.anl.gov/pub/petsc/nightlylogs/xsdk/xsdk-configuration-tester/packages/petsc/src/docs/website/documentation/referencing.html>

deal.II (not capitalized)

For citing deal.II, see:

<https://www.dealii.org/publications.html>

Line 279, 359: Are contractions allowed?

Line 295: References Fig. 6 before referencing Fig. 5 (and not referenced elsewhere)

Table 3. Change Table caption to: "... Python Modeling Toolkit *pymt*."

All models are capitalized here but may be used as lowercase in text. These should be consistent.

Line 384: (Fig. 2). Should this be deleted?

Figure 1 and Figure 13: Descriptions use a syntax of referring to the different panels e.g., a. vs (a)

Figure 13: Sediment thickness is plotted as soil depth as a yellow and not an orange line according to the legend.

Figure 14: Technically there is no "(b)" so should there be an "(a)"?

Figure 15: Define EKT

Line 614: Define ESPIN

Line 618: CoMSES Net

Line 619: pyOpenSci