

## ***Interactive comment on “qtcM 0.1.2: A Python Implementation of the Neelin-Zeng Quasi-Equilibrium Tropical Circulation model” by J. W.-B. Lin***

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Very interesting paper. This mixed language approach brings us innovative and powerful environment of experimentation in the climate modeling field. The author made significant efforts to represent the different families of computer languages and to remind of the historical weight of the Fortran in domain.

- 1) Does the paper address relevant scientific questions within the scope of GMD? Yes absolutely.
- 2) Does the paper present novel concepts, ideas, tools, or data? Using python as a framework for climate modeling simulations is a new tools. And generally speaking

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wrapping fortran call with f2py is quite a new approach in the climate modeling community.

3) Are substantial conclusions reached? Substantial conclusions although controversial were made in this article.

4) Are the scientific methods and assumptions valid and clearly outlined? Yes.

5) Are the results sufficient to support the interpretations and conclusions? Mainly yes. Can be that some concrete examples furthermore would help to support conclusions.

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes.

8) Does the title clearly reflect the contents of the paper? Yes.

9) Does the abstract provide a concise and complete summary? Yes.

10) Is the overall presentation well structured and clear? Yes.

11) Is the language fluent and precise? Yes.

12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes.

13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes. See general comments and specific comments.

14) Are the number and quality of references appropriate? Yes.

15) Is the amount and quality of supplementary material appropriate? See general comments and specific comments.

General comments :

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- If possible, I think that a complete use case would be needed to support conclusion saying that this approach can change the manner of analysing the results of models. ie : an example fully describing an instance of the figure 10 schema. This would simply mean to precise the hypothesis you want to test doing the Fig8 and Fig9 set of simulations.

- Article make several references to climate models and in the same time presents results with an atmospheric model of intermediate complexity. It would be interesting for the article to assess briefly the capacity of this framework to adapt to a coupled model which are now needed for most of the climate modelling study. The question would be how this framework can adapt to several components (let's say Atmosphere and Ocean), impact on restart procedure for example.

- One would like to know what is the structure of the underlying fortran routine. A few comments on the weights due to the f2py constraints would also be welcome as it is the price to pay to have the python flexibility and object oriented positive feedback.

- When talking about performance and climate models simulations one would like to hear a few words about parallel characteristics of proposed solution (MPI and/or OpenMP). What about the proposed python implementation and the parallel environment ?

Specific comments :

- In introduction - You wrote that "Being mainly a procedural language, Fortran lacks the default programming structures to organize a model into truly self-contained units, thus limiting modularity". Fortran 2003 offers some solutions (dynamic allocation by affectation, object oriented fonctionnality, data structure, inheritance, C interoperability ...) to bypass those limitation. As you said the continued development of climate models has made it difficult to take advantage of those advances.

- In section 3.2 - A short introduction to the object oriented terminology would help

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beginner in this field to really understand the package structure and the interactions between python and fortran. - Potential use of metadata associated to field value was not clear nor specify. We could imagine those metadata are process by plots submodule, but they may have other uses.

- In section 3.8 - Could it be possible during qtcn run time to use CDAT method and/or function on field value and then send them back to the fortran layer ?

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Interactive comment on Geosci. Model Dev. Discuss., 1, 315, 2008.

## GMDD

1, S118–S121, 2008

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