Reviewer 1 comments on revised manuscript copan:CORE

I am pleased to comment favourably on this revised manuscript. The authors have made considerable efforts to improve the manuscript. The revised manuscript now clearly outlines the motivation for a new generation of WEMs, the theoretical foundation for their framework and how they have implemented it.

I hope that the authors will be able to successfully develop what they present here. That undertaking will make an urgent and important contribution to understanding the complex drivers of social and environmental change in our globalised world.

Specific comments

The revised structure for sections 1.1 and 1.2 is much improved and clearly outlines the current state of modelling earth system processes, the shortcomings of these approaches and the motivation for the new framework presented here as well a helpful introductory overview to the theories and concepts relevant for WEMs.

The addition of a rationale section is a great help for helping the reader understand the motivation and relevance of model design choices.

I think it is a good decision to move most of the detailed code description to the SI and point readers to the most recent API documentation online. I agree with the editor on this that the discussion manuscript was somewhat caught between framework specification which might be more appropriate for a software journal such as Geoscientific Model Development and an introduction and academic motivation of your modelling framework, which I think is what you want to achieve here.

The link between abstract concepts of culture, social-metabolism and environment in figure 2 with figures 3 and 4 is a big help in linking there theoretical grounding for your framework with how it will actually be implemented.

Section 1.2.2 on design principles is much improved and provides a powerful motivation for a new generation of WEMs.

The new section 2.3.5 is a welcome addition, which clarifies how the model may serve to couple internal and external model components.

Page 9, line 16: Perhaps provide the link to the git here.