

Interactive comment on “Simulations of the last interglacial and the subsequent glacial inception with the Planet Simulator” by M. Donat and F. Kaspar

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As suggested by the referees, we had a closer look into the simulated vegetation patterns. This analyses revealed some severe problems of the model that already affect the simulation under preindustrial conditions. In our study we mainly looked at the signal that results from changing the orbital configuration. However, the referees are right when they criticise that one should document the ability of the model to simulate current climate before applying it to past periods.

As figure 1 of our paper showed there is a distinct decrease in temperature when all sub-models are activated. A closer analysis of this phenomenon showed that this is mainly due to unrealistic behaviour of the vegetation coverage over Asia. It is simulated reasonably when only one, either the ocean or the vegetation model, is activated.

When both are active, the vegetation disappears over large parts of Asia. As a consequence, albedo increases in this region resulting in a locally reduced temperature. This behaviour was observed for all orbital configurations and is quite unrealistic already for present-day conditions. The cooling has therefore to be considered as artificial. Vegetation coverage on the other continents is simulated much more reasonable. Due to the non-existence of vegetation over large parts of Asia for all orbital configurations, there is not simulated any reaction of vegetation to changes in orbital parameters for this continent. The reaction on other continents is meaningful. This is also true for other parameters, e.g. the expansion of perennial snow-covered areas is simulated reasonable over North America. However, as the model has problems on one large continent it is very difficult to draw clear conclusions. Especially as glaciation is a threshold problem, a systematic cooling on one continent prohibits an obvious interpretation of the results. We fully agree with the referees at this point.

The developers of the model confirmed that the fully coupled version of the model has not been tested in detail.

In our opinion, these problems have to be solved before applying the model in the fully coupled mode to further paleoclimatic questions. We therefore withdraw the current version of the paper.

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