

Response to Short Comment R. Pavlick, C6699–C6700.

I found this paper to be highly interesting and well-written.

In Sec 4.1, you contrast your approach based on observed trait-climate relationships with a modelling approach based on mechanistic filtering. However, you do not cite any references for models based on mechanistic filtering. I would like to point out that regarding terrestrial vegetation modelling, previous studies have used trait variation and mechanistic filtering to investigate the global patterns of functional diversity (Kleidon and Mooney, 2000; Kleidon et al., 2009), biome distributions/biome shifts (Reu et al., 2010, 2011), and biogeochemical fluxes (Pavlick et al., 2012). Similar mechanistic filtering approaches have also enabled significant progress in the modelling of ocean ecosystems (e.g. Follows et al., 2007; Dutkiewicz et al., 2009).

Response:

We thank the reviewer for his suggestion to make a wider comparison to other modeling approaches. One might opt to use traits observations to identify drivers of trait variation (as we do in our approach) in order to allow traits to change with changing climate conditions (and which may be extended by additionally taking trait trade-offs into account). Alternatively, as in the references indicated above, one may choose a more continuous representation of vegetation by focusing on trait trade-offs and environmental filtering impacts. The current complication of the latter approach is that it is difficult to parameterize based on trait observations.

Also other reviewers suggested incorporating a broader comparison between modeling approaches, therefore, we will add a discussion in the revised manuscript on other approaches to incorporate trait variation in global models.