**Geoscientific
Model Development
Discussions**

Interactive comment on "Development of high resolution land surface parameters for the Community Land Model" by Y. Ke et al.

Anonymous Referee #1

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The extensive response from the authors fails to address the fact there are fundamental flaws in the methods used to produce their new CLM land surface parameters that distort the global distribution of vegetation in CLM. The most fundamental issue is that the CLM4 model PFT representation of vegetation cover has no "vegetation fraction" as would be specified in a biome based land surface representation. This means that the bare soil percent represents vegetation fraction. By only taking the single dominant vegetation PFT from the Friedl et al (2010) "land cover" data set, vegetation fraction is lost. This results in 100% vegetation cover for all grid cells in the world except where barren desert is found. To demonstrate how much of a misrepresentation this is, the authors need only spend 5 minutes with Google Earth looking at central Australia where their new data set reports 100% shrub coverage. Google Earth by contrast will show for any area they choose that there is at most 10% vegetation coverage with

large expanses of bare soil in between individual plants. The authors' explanation: "We stated that assuming 100% of shrub or bare soil introduced some distortions in this landscape, but we believed that using MODIS VCF in which the bare soil fraction product was not validated will introduce greater uncertainties" suggests that science is based on belief rather than verifiable facts. This is not the way a geographer should go about describing the world as we know it.

The other major issue with their analysis is that they demonstrate that the existing CLM4 0.5 degree parameters have a better agreement with the National Land Cover Database than their new parameters, even when the bare soil percentage issue is not taken into account. Figure 4n (CLM 4.0 crops) is much closer to Figure 4o (NLCD crops) than Figure 4m (New CLM crops). Figure 4k (CLM 4.0 grass) is much closer to Figure 4l (NLCD grass) than Figure 4j (New CLM grass). Figure 4e (CLM 4.0 tree) is almost identical to Figure 4d (New CLM tree). Differences in shrub cover are almost entirely due to bare soil fraction in sparse shrub lands as mentioned above. If the authors were interested in producing a new improved product rather than trying to justify their flawed method, they would incorporate these comments, redevelop their methodology and produce a new and improved land surface representation for CLM which did not have these gross distortions in global vegetation. This however doesn't seem the authors' response nor the motivation for this paper.

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