Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on essd-2021-411

Anonymous Referee #2

Referee comment on "A data-driven topsoil $\delta^{13}C$ dataset and the drivers of spatial variability across the Tibetan Plateau" by Yunsen Lai et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-411-RC2, 2022

I agree with the authors that the Tibetan plateau can be considered a third pole on planet earth and also that the documented rapid rise in air temperatures in the region make it an important area for monitoring and study and by extension that this synthesis of data for the region is an important contribution.

Line 100: to increase the utility of the data set the GIS derived variables described starting at line 100 should be added to the xcel file. Would also be useful to add actual measurements of soil properties in addition to the soil grid (GIS) derived measurements of soils, for the sites for which you have these data.

Re the beta values: from my reading you use %C measurements from a GIS source (soil Grids). In my experience GIS derived estimates of SOC can be quite variable / uncertain, therefore related to the point above it would be good if you could include in your database actual measurements of %C to compare against the soil grid derived estimates, even if it isn't possible for all sites. Further upon rereading the Garten et al paper I see that their models for turnover times for soil C were made using measurements of isotope ratios and their changes across the soil depth profile (Rayleigh equations). Since you do not present this information, I am not convinced that you can use the approach of Garten et al to calculate beta values. this either needs to be rectified or deleted in the revised ms.

Discussion: didn’t review the discussion, the above points need addressing first.