

## ***Interactive comment on “Climate Change Projections of Terrestrial Primary Productivity over the Hindu Kush Himalayan Forests” by Halima Usman et al.***

### **Anonymous Referee #1**

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This manuscript entitled "Climate Change Projections of Terrestrial Primary Productivity over the Hindu Kush Himalayan Forests" used LPJ-GUESS terrestrial dynamic global vegetation model (DGVM) to analyse the ecosystem productivity and landuse change over the Hindu Kush mountain range. The region is quite under studied given its importance for the future climate sustainability. Thus the research topic is of high relevance to Earth System Dynamics, but as presented the analysis is shallow. I have pointed out a few points where the authors can improve their work. In summary, a big effort is needed by the authors themselves to present/explain the plots.

Specific comments:

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Line 28: better to cite [https://www.esrl.noaa.gov/gmd/ccgg/trends/gl\\_gr.html](https://www.esrl.noaa.gov/gmd/ccgg/trends/gl_gr.html); what is 'presently'? during 2000-2019 the rate was above 2 ppm/yr. please give credit to the measurement people on such occasions

Line 50: remove "since 1960"

Figure 2: how some parts are appearing brown in the modelled VegC? how is the quality/accuracy of the GeoCarbon product over the HK region? Is there a product evaluation analysis?

Line 168: I agree with your assessment, but I see something systematic that the model using CCSM4 produce maximum Veg-C, and that using MPI is intermediate and lowest for IPSL. Please discuss the details, e.g., the with respect to the model drivers

Line 182: you did not define tundra in section 2.1? where are those located

Line 190: better to say 1-sigma, if true?

Figure 4: can this plot of NPP be reconciled with the VegC in fig.3? or VegC are a result of cumulative NPP over a longer period of time? need some discussions

NOT ENOUGH JUSTIFICATION TO WRITE ONE SENTENCE PER BIG FIGURES, Fig., 4 - Fig. 7. please discuss details if there is something interesting for the readers. else you need to delete most of these

Figure 9: It is a bit suspicious result that NBP increased during ~1960-2020 while the natural ecosystem is replaced by pasture. I do not know if this is an artifact of the CCSM4 meteorology or something else. at this point it should be nice to have a simulation case using CRU meteorology as submitted to the global carbon project using the same model. we need a good evaluation of the models for historical period and then discuss the projections, e.g., what you are showing in Fig. 10 in particular

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