

Interactive comment on “Annual changes in plant functional types and their responses to climate change on the Northern Tibetan Plateau” by L. Cuo et al.

Anonymous Referee #2

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Re: Annual changes in plant functional types and their responses to climate change on the Northern Tibetan Plateau (by Cuo et al.)

General Comments: The manuscript by L. Cuo describes a new application of well-established dynamics vegetation model of LPJ-DGVM and its response to historical climate change in on the Northern Tibetan Plateau (NTP), which presents a new analysis and advanced quantitative understanding of the effects of changes in precipitation, air temperature, CO₂ concentration, soil temperature and soil moisture on plant functional types (via the changes in foliar projective coverages (FPCs)). They found that changes in FPCs across the NTP during 1957-2009, with 34% (13%) of the region showing increasing (decreasing) trends. The precipitation is the major controlling fac-

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tor of FPC (with a positive impact) , while the soil temperature increase exhibits small but negative impact on FPCs. The key findings of the paper are of potential interest to global change research community and well fill in scope of the journal. The paper is generally well structured and written and did a reasonable job on presenting the model modifications and calibration and key results.

However, I have two major concerns: 1) lacking a robust model validation for FPC (or FPT). The model validation for soil temperature seems acceptable and reasonable (Fig. 3), but, for the FPC, it seems very weak although the authors tried to simply compare the simulated PFT with a published national vegetation map of China (by Zheng et al, 2008). I am not clear how this has been done and how good is the comparison? I would suggest to use a better quantitative method like Kappa Statistic (Cohen, 1960) to improve the comparison; Cohen, Jacob (1960). A coefficient of agreement for nominal scales. Educational and Psychological Measurement 20 (1): 37–46.

2) lacking some discussions on the uncertainties of model key parameters (like “CO₂ fertilization effect” for 6 main PFT)? Because the CO₂ fertilization effect at PFT level seems a big challenge and remain large uncertainty in model simulations. It is not clear for me how the authors have considered and quantify the different response of 6 PFT to increasing CO₂ concentration over past 52 years in the model simulations? Did they use the same or different parameters?

Specific points: 1) On page 13, line 276-279: I am not clear this mentioned comparison here. Please clarify this point by providing more information or explanations. 2) On page 14, line 311-317, Why you used the elasticity (E)? What is advantage of the E? Please also provide a key reference if possible. 3) On page 17, line 382-385: It is too general statement here. How did you judge “it is largely consistent”? It would be better to use some quantitative indices or methods to justify this critical point here. 4) For the Fig. 2 -3, There are missing some important information for the figure captions. I have no idea which line is model simulation and which is the observation? Please add this missing information directly in both figures.

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I would be happy to see this paper to be accepted after a major revision.

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