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## ***Interactive comment on “The impact of land cover generated by a dynamic vegetation model on climate over East Asia in present and possible future climate” by M.-H. Cho et al.***

### **Anonymous Referee #1**

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This paper analyzed the different roles of dynamical vegetation and dust radiative effects on the East Asia Summer Monsoon (EASM) with the HadGEM2 model simulations for present and future climate. This is an interesting view to compare the contributions of these two processes as the ML12, although they are two independent/distinct processes that controlled by different equations and schemes in the model system. I listed some specific suggestions for the authors: (1) The authors stressed two distinct processes impacting the EASM within the models system related to the land cover, i.e., the dynamical vegetation process and dust direct radiative effects. The authors mentioned that the DGVM simulated regional bare soil expansion causing dust loading and direct radiative effects, this might be one of the motivations of the work or connections

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of the two processes, it was not clearly expressed in the title and abstract, although their impacts on climate had been listed in the introduction. It would be better if the two processes are explicitly pressed, because they are two distinct processes in the model systems, which impact the climate through different ways. (2) The authors compare the relative contributions of the DGVM and dust radiative effect, which is consistent with the results of ML12 at the South Asian area. Besides the HadGEM2 family, are there any other model/observation studies to support the results? (3) In the section 3.1.3, Fig.10, it seems that the radiative effects due to land cover changes (LCC) appear in the downstream areas of the LCC areas, is it common feature of the radiative effect, or model dependent? (4) In the DGVM of HadGEM2 family, if the crop is included? If not, I suggest the authors add some discussions about this, because although the crop might have some similar features as grasses/shrubs, but the evolutions of natural vegetation types are not enough to present those of crop, especially for the Asian, North American areas. Therefore in some model groups, the crop models are explicitly expressed (like in CLM4). (5) I agree that the DGVM and aerosol radiative effects are two important factors for the EASM climate, but from the view of the model system, they are both complex and the parameterization schemes in the model systems needs further developments, so the uncertainties of the models should be stressed in the discussions. Some technical questions: (1) P1320, the last line, reference "Bayer et al.", should be "Batlle Bayer et al."? (2)P1323, Line 4-5 of the 2nd paragraph, the references are duplicated. (3) P1323-1324, the author didn't introduce detailed information about the dust loading. (4) P1354, Fig.14(b), the subtitle should be 'Ts', not 'T15'?

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