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Earth System
Dynamics
Discussions

Interactive comment on "The influence of dynamic vegetation on the present-day simulation and future projections of the South Asian summer monsoon in the HadGEM2 family" *by* G. M. Martin and R. C. Levine

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The vegetation processes are complex and one of the major sources resulting biases in current model simulation and future climate projection. For instance, majority models projected that the monsoon will enhance in the global warming scenario. But the observations did not show the enhancement till now. This disagreement implies that something (such as vegetation, cloud processes) may be missed or incorrect in the models. This work investigated the influence of dynamic vegetation on South Asian Monsoon through some sensitive experiments. The results should be interesting for the community. I list some suggestions for authors to improve the current ms or to do

some possible examinations in future.

(1) Both the mean state and variability of the South Asian summer monsoon are important. Some previous works (e.g., Meehl and Washington, 1993: Science, 260, 1101-1104; Hu et al. 2000: GRL, 27 (17), 2681-2684) suggested that the mean state and variability of the South Asian summer monsoon will change in global warming scenario. It will be interesting to check what is the impact of the vegetation processes on the variability.

(2) Model dependence: It is clear that there are obvious biases of GCM in simulating the regional climate, such as the monsoon. Thus, I believe that these sensitive results in this work are also largely model dependent. Thus, some additional discussion in the last section may be necessary.

(3) In addition to the direct impact of vegetation processes on the Monsoon, the vegetation processes may alter the climate variability modes that affect the Monsoon. For example, Potter et al. (JGR 2003, 108(D17)) pointed out the connection of SO and AO with carbon flux. Hu et al. (JGR 2004, 109 (D21113) suggested that an energy sink/leak over land may change the mean state in the tropical Pacific and ENSO, implying the potential impact of land property change (such as deforest) on ENSO and ocean climate. So these indirect influences might be mentioned.

(4) Figs. In addition to the wind vectors (Figs. 2, 10, 15, 18, 21), it would be more straightforward for the explanation to add the divergence and convergence.

Fig. 5. It is better to add the corresponding observations.

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