Specific comments:

P1450, L13-14: It is confusing having the "Hadley Cell (HC)" changing intensity at different latitudes. It is a "cell". Preferable would be to indicate changes in the vertical motion – rising and subsiding branches of the HC.

Reply: mass stream function (MSF) is the most frequently used to describe the HC, the latitudinal positions where the values of MSF at 500hPa equal zero in the subtropics are defined as the HC boundaries (Hu and Fu 2007).Thus, the intensity of HC changes in the subtropics lead to the HC boundaries widening or shrinking (Kamae et al., 2011).

P1451, L11: Suggest removing "at least" since you are giving a range of sea level high stand.

Reply: I will delete "at least" in the revised manuscript.

P1451, L26-28: Participating modeling groups were not "required" to complete both experiments.

Reply: recommended instead of required.

P1452, L12: wording is awkward here. Not sure what is meant by "the multi-coupled models and corresponding atmospheric components proposed by PlioMIP".

Reply: This past almost global warming has been well reproduced by the most recent PlioMIP modeling studies (Bragg et al., 2012; Contoux et al., 2012; Kamae and Ueda, 2012; Stepanek and Lohmann, 2012; Zhang and Yan, 2012; Haywood et al., 2013).

P1452, L26-29: You should note that the Kamae et al., 2011 study presents an AGCM simulation with specified PRISM SST.

Reply: Kamae et al., 2011 study presents an AGCM simulation with specified PRISM3 SST and found one of the key aspects of the mid-Pliocene climate is a slow-down of Walker circulation, resulting from reduced east-west gradient of SST in the tropics, particularly in the Pacific Ocean and Indian Ocean. Additional sensitivity experiments indicate that the ascending branch of Hadley cell in both hemispheres expands poleward in mid-Pliocene warm period.......

P1454, L3-26: Only include the resolutions and features of the IPSL-CM5A model that are being used in this study.

Reply: I will delete sentences in P1454 L18-26.

P1455, L14: Explain "fixed inherent ocean boundary".

Reply: we performed fixed inherent ocean boundary due to challenge of changing the land-sea mask in the ocean model (see the P1455, L18).

P1456, L7-12: The details of the other RCPs are not needed here.

Reply: I will delete the sentence in L7-12.

P1456, L16-20; Table 1: Clarify if for all six models compared, you use the last 50 years of 300-year RCP4.5 simulations. If not, you need to justify why this is still a valid comparison or delete.

Reply: all six models compared, the last 50 years of 300-year RCP4.5 simulations are selected for present comparisons.

P1457, L7-13: Before discussing the changes in the MSF in the MP and RCP4.5 simulations, you need to include a discussion on how well the IPSL PI simulation simulates the intensity and extent of the HCs as compared to observations.

Reply: Before discussing the changes in the MSF in the mid-Pliocene and RCP4.5 simulations, we first examine the intensity and extent of Hadley circulation derived from pre-industrial, mid-Pliocene and RCP4.5 scenario. The observed Hadley circulation is well captured by the three simulations. As shown in Fig.1a-b, the structures of annual average MSF derived from mid-Pliocene and RCP4.5 scenario are identical to that of pre-industrial simulation (not shown).

P1457, L16-24; P1458, L1-10: See comment P1450, L13-14 above.

Reply: See Reply P1450, L13-14 above.

P1458, L17-21: Use southward and northward for shifts rather than S and N.

Reply: I will correct it in the manuscript.

Section 3: You need to include whether the MP and RCP4.5 changes in intensity and latitudinal extent of the Hadley circulations are significant statistically as compared to the PI control or with each other.

Reply: Both are significant statistically (significant level 0.05 t-test)

P1458, L23+: Just because IPSL agrees in the location of maximum MSF with three other models does not make it right. First, the IPSL PI results need to be compared to observations (see comment above). This paragraph should instead discuss changes in the maximum MSFs and poleward extents of the northern and southern Hadley cells in the MP and RCP4.5 simulations for the models analyzed in Table 1.

Reply : Thanks for your reconstructive suggestion and I will modify the manuscript in this paragraph.

P1459,L14: Explain that "omega" is the pressure vertical velocity so negative values represent ascending motion.

Reply: I will give the brief description for this issue.

P1459,L19: The descending motion in the eastern Pacific seems to be concentrated along and just west of the Andes. Is this realistic?

Reply: The descending motion mainly dominated the eastern tropical Pacific, as evidenced by three different simulations. The latitudinal position of the maximal descending is south of the 20°S and it is beyond

the southern limit of Walker cell. What cause the mismatch between maximal convergence and descending needs to be addressed in future work.

P1459, L24: Better wording would be "large reduction" rather than "drastic decay". Is the reduction in the upward motion in the tropical western Pacific warm pool statistically significant?

Reply: I will use large reduction instead of drastic decay in the revised manuscript. The reduction is statistically significant.

P1461, L1-2: A sample size of 3 models agreeing is small. Too small to conclude that the "behavior of the Walker cell in future warm climate is robust".

Reply: Thanks for your suggestion and I will correct it in the new manuscript.

P1465,L9-10: Are the changes in precipitation in the subtropics consistent with the MP biomes in Salzmann et al.?

Reply: Drier subtropical Sahara is still evident in MP compared with present day. Note that, East Asian summer monsoon (EASM) area is much wetter in MP than present day (Salzmann et al. 2007), which is consistent with stronger EASM in MP (Zhang et al. 2012) and present study. Note that, excessive rainfall is in the southern Sahara (20°N) as shown in Fig.9d, which is consistent with "green Sahara" in Salzmann et al. 2007.

P1465,L26-27: See comment P1450, L13-14 above.

Reply: See Reply L13-14 above.

Figure 2: panels c and d not needed. This information is already deducible from Panel

Reply: I will delete Fig.2c and Fig.2d

b.

Figure 3: This figure is only useable if it can reproduce at much larger size in final paper. I found it difficult to read even after enlarging it to over 300% on my screen.

Reply: Maybe it changed the display resolution when edited. If possible, I will attach the original plot.

Technical comments:

I recommend that the Authors have a scientist who is a native English speaker copyedit the manuscript.

Reply: Thanks for reconstructive comments. I will do it in my new manuscript.