Author response to Reviewer #1

On the manuscript

Mid-Pliocene West African Monsoon Rainfall as simulated in the PlioMIP2 ensemble

by Ellen Berntell et al., submitted to *Climate of the Past* (https://doi.org/10.5194/cp-2021-16).

We thank the reviewer the time and effort spent reviewing our manuscript a second time. We have corrected the manuscript based on the comments provided, and below is listed our response to the specific questions, with the reviewer's comments in black and our replies and revised text in blue.

Reviewer Comment #1: The statement "...leads to a decrease of the surface albedo and a warming of the region..." in line 385 is not necessarily correct. Instead of "warming" better write "increase in equivalent potential temperature". Moreover, alternative vegetation-precipitation feedback mechanisms for West Africa have been suggested by Patricola and Cook (2008, JGR, doi:10.1029/2007JD009608) and Rachmayani et al. (2015, Clim. Past, doi:10.5194/cp-11-175-2015). These studies should also be cited.

Response: Thank you for these suggestions, we have corrected the text and expanded the discussion to reflect the additional vegetation-precipitation feedback mechanisms. (L. 384-390).

> **Revised:** Land surface changes are also known to impact rainfall over West Africa, where, e.g., expansion of vegetation into the Sahara region at the expense of desert leads to a decrease of the surface albedo and **an increase in equivalent potential temperature**, further strengthening the Sahara Heat Low, and subsequently the WAM, leading to a vegetation-albedo feedback (Charney, 1975). **Additionally, later modelling studies have emphasized the role of soil moisture (Patricola and Cook, 2008) and evapotranspiration (Rachmayani et al., 2015) in the vegetation-precipitation feedback due to their effect on low-level moist static energy, convective instability and surface latent heat flux anomalies.**

Reviewer Comment #2: The statement "This is consistent with our results, where e.g., CCSM4-NCAR exhibits larger rainfall anomalies than CESM1.2 ..." in line 326 is misleading since CCSM4 is older than CESM1.2. Please correct.

Response: Thank you for pointing this out, the text has been corrected to indicate that it is the **CESM2** model, released in 2019, that exhibits larger rainfall anomalies than CESM1.2, released in 2013 (L. 326-327).

> **Revised:** This is **also** consistent with our results, where e.g., **CESM2** exhibits larger rainfall anomalies than CESM1.2 …