Reply to the comments of referee 1 for Second Revision of HESS-112

I found the manuscript much improved from the previous iteration, particularly with respect to readability, and the authors have addressed my comments satisfactorily. My final comments are minor suggestions that would further strengthen the text. I recommend minor revisions at this stage.

Minor Comments:

1. **Comments:**

The authors did a great job revising the manuscript for editorial issues. I found some lingering errors, and I've noted a glaring errors here, but I'm hoping the journal editor can solve the remainder.

Line 233-234: The strongest precipitation increase is found over West Sahel for the wet experience... Should read "experiment".

> ***Author's response****: Thank you for your comment. Yes, you're right. We checked both manuscripts and changed "experience" to "experiment".*
>
> **Author's changes in manuscript**:
> *Line 235: The strongest precipitation increase is found over West Sahel for the wet experiment.*
> *Line 337: The strongest mean temperature decrease is observed over the Central and West Sahel in wet experiments with the maximum change approximately −1.5 °C (Table 2).*

2. **Comments:**

In Fig 5, Fig 13, 15, 17, 19, 21 you make a reference to panels, but the panels are not labeled.

> ***Author's response****: Thank you. Done now.*
>
> ***Author's changes in manuscript****: Please see at the Fig 5, 13, 15, 17, 19 and 21.*

3. **Comments:**

It may be worthwhile to add a brief sentence on how your ensemble members are generated.

> ***Author's response:*** *Thank you for your suggestion. In this revised version, we added 3 sentences in section 2.2 at lines 138 to 143.*
>
> ***Author's changes in manuscript****:*
> *Lines 138 to 143: We designed three experiments (reference, wet, and dry), each with an ensemble of five (5) simulations. The simulation time period for each experiment lasts for 4 months, starting from June 1st to September 30th. The difference between these three experiments is the change in the initial soil moisture condition (reference initial soil moisture condition, wet initial soil moisture condition, and dry initial soil moisture condition) during the first day of the simulation (June 1st 2001, 2002, 2003, 2004 and 2005) over the West African domain.*

4. **Comments:**

I think you may be missing an interesting conclusion stemming from this work (though maybe

you've alluded to this and I missed it). In e.g. fig 5, the regional PDF shifts for dry and wet soil moisture are in the central Sahel are quite striking (what should be panel a) when compared to the West Africa region as a whole. Many of the other supporting Figures show regional PDF differences that are reflected in West Africa. I'm just curious if you have more to say on this.

Author's response: *Thank for your comment. You are right.*

Author's changes in manuscript: *We added the sentences below in the manuscript at lines 412 to 422: This study shows that when averaged over the entire West African region, the sensitivity of rainfall to initial soil moisture conditions is not captured. However, it is important to have a good initialization of soil moisture because depending on the region, the sensitivity of rainfall can be more or less strong. Indeed, rainfall is more sensitive to initial soil moisture conditions in the western and central Sahel (arid zones) than in the Guinean Coast (humid zone). In these arid Sahelian zones, wetter initial conditions will result in more rainfall, especially in the West Sahel, and dry initial conditions will result in less rainfall, especially in the Central Sahel. In the Guinean Coast, the sensitivity of precipitation to initial soil moisture conditions is lower and other factors could be involved such as moisture advection from the Atlantic by the monsoon flow (Kone et al., 2010) and a lower albedo (Charney 1975).*