Reviewing of the paper NPG80-2014-80

I performed a review with new eyes and I decide to change a few things in the paper that referees did not address.

I changed the title, I added the word equilibrium before temperature, so the new title "Equilibrium temperature and Hadley cell in an axisymmetric model" explains better the paper.

I removed the discussion about the old figure 4, it did not address really the problem I wanted to discuss and in my opinion it was misleading in some respects.

There were too much "temperature" words where I meant "equilibrium temperature", although the temperature try to adjust to the equilibrium temperature, rarely they coincide. I changed in according with I meant (I hope that all be coherent, now).

Reply to referee #2

I would like to thank the referee for his careful reviewer and for all the questions arisen in reviewing the paper.

To my viewpoint this paper is an interesting contribution in the topic and can be published taking into account some minor questions.
1 – In section 2 it is not necessary to explain all the equations, altough some more explanations will be wellcomed. But I have some concerns on the assumptions. Specifically the step between equation 6 and 7 is not clear for me. Figure 1, helps to visualize the physical meaning of n and k. The question is that the election of the experiments between 0.5 and 3 is not well motivated. Why not other interval or other step? This election determines all the subsequent results and therefore must be well motivated under physical assumption.

I wanted to parameterize the change of horizontal and vertical distribution of temperature. Since the parameters used to fit the "present" climate are n=2 and k=1, it appeared as natural to me to explore the parameters n and k in the range of 2 and 1 respectively. In my opinion a step of 0.5 was sufficient to explore the space of parameters. I change the organization of the paragraphs close to Eq. 6 and Eq. 7.

The location of maximum zonal wind is somewhat problematic. First of all is always located under 30°, but there is a transition when n=3. To my viewpoint a discussion based on physical constraints would be grateful. What does it means a planet with n=3? Is this a realistic scenario? Perhaps we can see in the next future a situation like
that because of climate change.

A climate with n=3 would be defined as a equable planet (Farrell, 1990) i.e. a planet with very small temperature gradient, a situation that is realistic since the Earth has already experimented this situation in the Cretaceous and Eocene, even though the equator-pole temperature gradient was different the tropical temperature gradient was flatter than the present one (see Greenwood and Wing reference). I added a brief explanation of what happen in terms of physics as suggested by the reviewer.