

We thank again Editor Julia Hall for the additional comments. Our responses are provided below.

Comments from the Editor

The authors have satisfactorily addressed the comments from the last round of reviews. There are only a few corrections/comments before the paper can be accepted for publication.

General Comment:

Please make sure that either Parana or Paraná is used consistently in the text.
We have used “Paraná” along the entire manuscript.

Detailed comments

P2L29: Please check the sentence, due to the correction in the last revision the sentence structure has become corrupted.

Corrected. Thanks.

P4L16: ‘about 98 flood events (ranging from 76 to 131 events)’ This is not clear, is 98 the average for over all sites and the range is given per site? Please specify.

It is the average across all sites, ranging from 76 to 131. We have rephased the sentence in the revised manuscript.

P4L 26: Add the values of ‘mb’ used for the low and high level vorticity.

We didn’t identify the need to add mb in P4L26. Perhaps the Editor meant to refer to P4L32. But even in this case, we think that the term “vorticity” does not require the use of mb.

P4L27: ‘It covers and are...’ Please correct sentence structure/grammar.

Ok. Thanks.

P5L 9 to 11: Please correct sentence structure/grammar.

Corrected. Thanks.

P8L 7: Please specify what 'm' is.

Done.

P9L 25 to 28: The figure has changes since the last version, so now 'left panel' or 'right panel' should be replaced by 'top' or 'bottom' panel.

Done.

P9L 29-30. Suggest swapping the order of 'neurons 1 and 3' and 'neurons 2 and 4' to maintain the increasing order of distances.

Done.

P10L 11: 'some connections' Please specify/ elaborate.

Done.

P10L31: suggest adding 'slightly' before 'positive' or something similar to indicate that the southern part of the basin is not very positive.

Done.

P10L33: 'also observed in ...' Yes, but in Fig 4 the dipole exists in the larger scale but not so much in Fig3.

Yes, it appears as large scale in Figure 4 and also covers a large portion of the basin (Figure 3, Neuron 1 at time t).

P11L8-10: Please make sure that the sentence conveys that the values in the south have almost no positive values in the basin.

We thank the Editor for the suggestion but we think that the positive values across the basin are in the same range as in other parts of the country, so we prefer to keep as it is.

P11L10: 'The moisture divergence pattern is again similar to the rainfall field at time t for neuron 3...' I'm not able to see this. Please be more precise in describing what you mean.

We have added a sentence in the revised manuscript.

P11L20: 'also shows cyclonic rotation...' the values in the Figure are very small, please indicate in text.

We thank the Editor for the suggestion and we agree that the values are small, but we think that it is not necessary to indicate it in the text.

P11 L22-23: The trough is not only 'weaker' but appears to be very weak to almost non existing in the south of the basin. I suggest adjusting the language to convey this fact. (Maybe adding a zero line to the map in Fig 6 would help in interpreting this).

We have removed the word "strong".

P11 L24: 'centered around 45...' Does this refer to the positive or the negative values. Please specify..

Positive vorticity. The negative vorticity occurs over the entire basin, as indicated in the text.

P11L26: 'negative vorticity appears only in the south' The negative values are very low and almost nonexistent. Please adjust text. And replace 'kind of' with a more specific statement (this also applies to P12L1)

We have used the term "slightly", replaced "kind" by "type" a removed "kind" on P12L1.

P11L30: 'also a sharp contrast'. Please adjust text, as the values are small and do not contrast shapely.

We have removed the term "sharp".

P 11: Figure 7 is only covered by about 4 lines of text. I suggest elaborating a little more on the causes of the strong anomalies and sharp contrasts mentioned instead of just describing the Figure.

We understand the concern of the Editor but we believe that further analysis, including the causes of these anomalies, is beyond the scope of this paper and should be addressed in future work.

P12L 9: suggest either using 'south of 40...' or 'around 50...'.

Done.

P12L13: 'Combining all the analyses...' Please specify which analyses are combined to reach the conclusions of the transition probabilities, as it seems that not all analyses are used.

We have replaced "all the" by "the preceding".

P 24: Suggest making the red catchment boundaries in the inset map of Fig 1 thicker as they will be hardly visible when the Figure is adjusted to the smaller publication size.

We thank the Editor for the suggestion.

P 25: Add to the Figure caption that the red numbers correspond to the number of the neuron.

Done.

Figures: Please correct the colour scale for Figure 3-4 and 6-7 to reflect a symmetric colour scale with similar linear increase for both negative and positive values.

We have corrected Figures 3, 4, 6 and 7 to address this issue.

References: Please remove/correct the several references containing 'n/a-n/a'

Done.