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Earth System Dynamics Discussions
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Interactive comment on "Role of moisture transport for Central American precipitation" *by* Ana María Durán-Quesada et al.

Anonymous Referee #1

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This paper addresses an important topic regarding the role of moisture transport mechanisms on precipitation over the Central American continent. The paper provides an updated literature review and further analyses on moisture transport over the region by implementing a water vapor tracer model (FLEXPART), providing new elements for our understanding of atmospheric moisture dynamics and variability in Central America and the Intra-American sea (IAS) region. Moreover, the paper aims to address a discussion regarding the role of the low-level jets (Caribbean (CLLJ) and Choco (CJ) jets) on regional precipitation variability, and the further connection between the IAS region, particulary between Northern South America, Central America, and the Caribbean.

The paper is well organized, although I consider necessary to revise the manuscript by a native English speaker, since there are several typos and punctuation errors. Figures are generally clear and provide the necessary information to be understood by a reader.

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Discussion paper

In my opinion, although the paper provides interesting results and discussion, it needs a further revision in order to be published in Earth System Dynamics.

Specific comments:

1. Page 8 and section 3.3 give some suggestions on how northern South America could contribute to moisture transport toward Central America, with particular emphasis on the role of the CLLJ. Several previous studies are cited. I suggest to include the study by Arias et al. (2015), who used another semi-lagrangian water vapor tracer model, and obtain results suggesting that a weakening of the CLLJ during La Niña years enhance moisture transport toward northern South America, reducing moisture transport to Central America. This is an important coincidence among both studies, since they use different modeling approaches and moisture sources regions.

Arias, P.A., J.A., Martínez, & S.C. Vieira, 2015: Moisture sources to the 2010-2012 anomalous wet season in northern South America. Climate Dynamics, 45(9-10), 2861-2884.

2. Line 179: Moisture transport is quantified using Sv units. Since this is a unit commonly used in oceanography but not in atmospheric sciences, I suggest to give its equivalent in the SI system.

3. Line 239: Several of the conclusions presented in the document are based on OLR analyses, however those are not shown in figures. I consider they sould be included by adding a new figure or modifying current figures.

4. Figure 2: I suggest to include the location of the different national parks mentioned in the text since not all readers may be familiar with the region.

5. Figure 5 and related text: I do not find easy to follow the interpretation of the negative correlations shown in this figure, as explained in figure caption and the main text. I suggest to include further analysis supporting the physical interpretation of these correlations. Also, which statistical test was used for significant correlations? Does the test

account for autocorrelated data? A short explanation of the test should be provided in the methodology section.

6. Figure 6: The figure caption indicates that El Niño and La Niña events were obtained using a threshold of +/- 0.8 °C for the MEI, whereas main text indicates 0.75 °C. This should be clarified.

Technical comments:

The manuscript should be revised by a native English speaker since it contains several typos and punctuation errors. Some comments regarding typos are:

1. In line 29, I suggest to use "natural phenomena-related disasters" or "disasters related to natural phenomena", instead of "natural disasters".

2. In line 34, it should be "regional patterns" instead of "regional patters".

3. In line 39, it should be "represented in numerical simulations." instead of "represented in numerical."

4. Line 115: Sometimes, the authors use "et al" whereas in others they use "et al.". They should use the same sintax.

5. Line 126: It sould be "5 mm/day" instead of "c.5 mm/day".

6. Line 273: It should be "transport from Northern South America accounts..." instead of "transport from Norther South America iaccounts..."

7. Lines 493-495: The reference has a different format.

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