

## ***Interactive comment on “On the Relationship Between Atmospheric Rivers, Weather Types and Floods in Galicia (NW Spain)” by Jorge Eiras-Barca et al.***

### **Anonymous Referee #2**

Received and published: 29 September 2017

Below is my review of the manuscript entitled "On the Relationship Between Atmospheric Rivers, Weather Types and Floods in Galicia". The article talks about the significant contribution of the atmospheric rivers to major floods in northwestern Spain. This is such an interesting and relatively new climate research. The results may improve the flood emergency plans in Galicia. The manuscript contains a high scientific quality and methods are relevant to obtain the results. On the other hand, some discussion of the results is missing. Furthermore, the writing might be improved.

### **MAJOR COMMENTS**

1) Writing needs improving. Many short paragraphs should be joined with other para-

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graphs. Other details are listed in specific comments. 2) Discussion is missing in the article. Only L6-7P7 appear to be discussed. Please include other previous works when writing the discussion. I would propose to name section 3 as “Results and discussion”. 3) Several figures must be improved: Figure 2: What do the different colours mean? Please add a legend to the map. Furthermore, an N arrow and a scale bar are missing. Figure 3: It shows 14 WTs, but in the text you talk about 9 WTs in winter and 12 WTs summer. It is important to specify in the text and in Figure 3 which ones are for winter and which are for summer. Figures 4 and 5: The scale units in y axis have to be the same in all 4 plots for comparison. Figure 4 and 6: Please consider writing (a), (b), etc. at the beginning of the text of each subfigure. Figure 5: Precipitation ratio is not mentioned in the caption. 4) Methodology section: Some description about how precipitation ratio is calculated would be welcome. Furthermore, any comment about computing anomaly maps could be also included.

#### SPECIFIC COMMENTS

L4P1: Please add “northwestern” to this sentence: “. . .and floods in the northwestern Spanish region. . .” L16P1: Please rewrite as “3,700 km”. L1P2: Please replace “integrated vapor transport fields (IVT)” with “IVT fields”. L3-4P2: These lines should be included in the next paragraph. It cannot be an only paragraph of two lines. L9-10P2: The following sentence “An example of a well-defined. . . . , can be found in Figure 1” should be shifted to L2P2, after “surrounding areas”. L13P2: Please replace “fall” with “autumn”. L1P3: Please add “, above all in southern Galicia,” after “variability in precipitation”. L3P3: Please replace “SCA” with “SCAND”. L4P3: Please exchange the positions between “Bueh and Nakamura (2007)” and “Lorenzo et al. (2006)”. L5P3: Please rewrite as follows “Extreme precipitation and anomalous winds are the most frequent. . .”. FEs is somehow already derived from heavy precipitation and strong winds over the coast. L7P3: “. . .by no means abnormal” sounds weird. Please review it. L11P3: Please replace “WT” with “WTs”. L14P3: Please replace “flood episodes” with “FEs”. L5-6P4: These two lines should be added to the preceding paragraph.

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L9P4: Please specify what is “Interior”. This is not a family name. L20-21P4: Please join it with the following paragraph. L22P4: Please rewrite as “. . . developed in Trigo et al. (2000), which. . .” L28P4: Please replace “nine” with “9”. L3-4P5: These two lines should be added to the preceding paragraph. L4P5: Please replace “The” with “the”. L9P5: Please replace “A3” with “A1”. L12-13P5: These two sentences must be deleted. This content corresponds to the caption of Figure 4, where you already explained the colours of the bars. L5P6: Please rewrite this sentence. The meaning is not clear. L5-6P6: Please delete “meaning unclear please clarify”. L10P6: Please replace “floods” with “FEs”. L2P7: Please replace “Table 1” with “Table A2”. L4P7: Please replace “case” with “region (Table A3)”. L9P7: Please delete “In other words”. L12-13P7: Please rewrite as follows “Especially noteworthy is the case of the ANW type for the SIL and COSTA regions and NW for SIL region, where the expected winter rainfall is five times larger than. . .” L14P7: Please rewrite “for types SW, W and C for the winter. . .” L15-16P7: Please rewrite the sentence as follows (for example): “In the summer months, the most outstanding cases are W type in SIL region and AN type in COSTA region”. When you write “the same occurs. . .” is difficult to associate with the “five times larger. . .”. L16-18P7: I do not follow the meaning of the “exception” you mention. I do not understand what you mean with the last sentence when I look at Figure 4. Please review these last two sentences. L34P7: Please rewrite as follows: “detection of an AR in winter months is contingent on the. . .” L2P9: Please replace “SW” with “NW”. L3P9: Please replace “atmospheric rivers” with “atmospheric rivers (ARs)”. Equation 2: It needs further explanation of some variables. Figure 1: Please rewrite the first sentence of the caption as follows “Example of an atmospheric river (AR) landfalling in Galicia (NW Spain) on 5th January 2001”. Figure 4: Please replace “(ONDJFM” with “(ONDJFM)”. Figure 5: Please rewrite as follows: “Same as Figure 4 but with precipitation ratio. Table A1: Please replace “A1” with “A2”. Please replace “07/09/99” with “03/07/99”. Table A2: Please replace “A2” with “A3”. Missing data in the last event. Old tables A1 and A2: Dates must follow English style mm/dd/yy. Some events take more than a month, is it correct? For instance, 4th, 6th and 7th events in

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old Table A1; 14th in old Table A2. I do not think that a rainfall event can take longer than a week. If this is the case, please justify what you consider for a precipitation event in the Data and Methods section. Table A3: Please replace “A3” with “A1”. Geographic coordinates are in decimal degrees in Santiago, please replace it with degrees, minutes and seconds. Please replace “Coast” and “Miño-Sil” with “COSTA” and “SIL”, respectively, in the last column. Figure A1: Please rewrite as follows: “. . .of the weather types (WTs)”.

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