

# ***Interactive comment on “Climate change increases the probability of heavy rains like those of storm Desmond in the UK – an event attribution study in near-real time” by van Oldenborgh et al.***

## **Anonymous Referee #4**

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### General comments

This paper examines the attribution of the "Desmond-like" heavy-rain event in the UK in the context of climate change. The authors provide a probability attribution analysis for the extreme rain event using three independent methods: historical observed trends, coupled climate model simulations and a large ensemble of regional model simulations. All three methods agree that the effect of climate change makes the extreme event more likely.

The manuscript could be an important contribution to diagnosing attribution of extreme weather events in the context of climate change. However, the paper is not well-written

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and is hard for readers to follow. In addition, the role of internal climate variability such as NAO is not well discussed, given the fact that the NAO is in the positive phase this winter. Therefore, I expect the paper will be suitable for publication after a major revision with consideration of my major points listed below.

#### Major points

P13200L2, "Low-frequency variability also plays a minor role here." I am not convinced with this statement, given the fact that NAO is in the positive phase this winter. There is a robust relationship between NAO and precipitation in UK. I would suggest to compute the conditional probability of the extreme rain event modulated by NAO. If the NAO matters, it would be interesting to see if the conditional probability of the extreme event to NAO is more likely due to the climate change.

#### Minor points:

1. P13201L15, "The results are shown in Fig.2 for the two regions." The figure here should be Fig. 3. 2. P13201L16, "The horizontal line denotes the preliminary indication for precipitation in these areas." What does preliminary mean here? 3. P13206L21, "After a an impactful climate ..." There is an extra "a" here.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 13197, 2015.

## HESSD

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