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Hydrology and Earth System Sciences
Discussions

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 #2

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Review of '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.

This is a short and concise paper presenting results on the attribution of an extreme rainfall event to global warming using three different approaches based on observed data (station and area average) and climate model simulations (GCM and RCM). This is a meaningful exercise as it enables a well-informed discussion on the consequences of climate change and may stimulate debate on how to adapt to unavoidable changes to extremes (given the current commitment to global warming). The methodology is

reasonably well explained and the paper is generally well written. It is somewhat let down by the lack of referencing to relevant Figures (or indeed incorrect Figures), which makes the reading process a little bit frustrating. My comments are minor in nature and are as follows:

1. Page 13198. Row 25 and onwards. I would perhaps suggest a little bit plainer language when outlining the research questions. 2. Page 13199. Row 27. The sentence starting with 'In the limit ..' is a bit confusing, would it not suffice to say: If the trends approximate each other, then they are completely due to anthropogenic climate change. 3. Page 13199 Row 28. The sentence starting with 'In the UK in winter . . .' perhaps just say 'In the UK winter . . .', further do you mean 'assumption' rather than 'approximation' here? 4. Page 13200 Row 7. The sentence starting with 'This implies . . .'. Perhaps replace the section '. . . the 24 h period from midnight to midnight 5 December . . .' with '. . . the 24 hr period starting from midnight on the 4th of December . . .' 5. Page 13201 Row 15. Do you mean Fig 3 rather than Fig 2 on this line? 6. Page 13201 Row 27. Please refer to relevant figure. 7. Figure 4. The text I think talk to Figure 4 (row 27-onwards) talks to results of both 1 and 2-day totals. The figure has a title that says '2-day ave rainfall' (guessing ave is short for average), the figure text says '2-day precipitation amount', and the y-axis says mm/day. In the text results are discussing a total of 132mm, but the y-axis only extend to 100 mm/day. If this is 1 day total, the text refers to 77 mm and a 95% CI of 4-13 in current climate. In the graph and event of 77mm seems to be associated with greater return periods. Please revise so that manuscript information in figure and text are consistent. 8. Page 13204 Row 20. Figure 6 rather than Figure 5? 9. Page 13206 Row 14. Perhaps insert 'driven' after 'thermodynamic'. 10. Page 13206 Row 21. Not keen on the word 'impactful' but up to you ('damaging' or 'destructive' perhaps?).

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