

Interactive comment on “Influence of targeted observations on short-term forecasts of high-impact weather events in the Mediterranean” by J. Campins et al.

Anonymous Referee #1

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The paper analyses the impact of targeted observations from two Mediterranean field campaigns on forecasts of high-impact weather events. The authors analyse many different cases, and verify forecasts against both analyses and observations. The results are in general agreement to the results of many other studies of targeted observations. The use of the SAL method to analyse precipitation forecasts for a targeting experiment is to my knowledge novel. The paper is generally well-written, though I have some general comments which should be addressed before publication.

General comments

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In their discussion of the results, both the abstract and conclusions are vague about the size of the impact from targeted observations. Both should be re-written to be more quantitative, quoting numbers from the results section. Examples from the abstract – ‘generally positive impact’, ‘the improvement is slight’, ‘the improvement is significant’.

I was confused by the discussion of the prediction of the sensitive areas in Section 3. Both SV and ETKF methods are mentioned. However, in the discussion of sensitive areas for the different cases, and the location of the targeted ATOVS data in particular, only the SV sensitive areas are mentioned. The text states several times that ATOVS data is assimilated in SV based sensitive regions (abstract, introduction, section 3.2.2 for example). Were the ETKF SAPs used to determine the sensitive regions where additional observations were added? If the ETKF information was available but they were not used, then this should be discussed.

Minor comments

1. P2783, L18 The statement ‘certain regions’ is rather vague. Data targeting refers to the addition of observations in regions of forecast sensitivity.
2. P2783, L20-26 – It may be worth adding here that these field campaigns generally use dropsonde data from research aircraft, i.e. they are adding an extra component to the observing system. This is distinct to making better use of observations that we already have, such as by using more of already available satellite observations (which is a far more cost-effective and practical way to do data targeting).
3. P2788 – For the assimilation experiments, why is the EXP-ATOVS*2 experiment using the same data as EXP-RS plus ATOVS data, rather than the same data as the control + ATOVS. The two setups will not necessarily give the same results.
4. P2788 – What other analyses did you use to test the effect of using a different analysis on your results? The details are rather vague – did you re-calculate your results against an independent analysis? (i.e. not from one of the experiments EXP-

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RS, EPS or EXP-ATOVS*2).

5. P2789 Equation 1 and L6 – Please define DTE. In the previous paragraph, it says that EXP-RS is used as the verifying experiment, therefore in equation (1), should EXP be EXP-RS?

6. P2791 – High resolution rain-gauge data. Typically how much data was available in each 500km x 500 km box, and how much variation was there by case? This may affect your results.

7. Section 3 – The locations of the sensitive regions depend on some of the details of the techniques used to identify the sensitive regions. Therefore I suggest adding some more details here. For example, what kind of singular vectors and at what resolution were they calculated? How many ensemble members were used to create the ETKF and at what resolution? Did the different sensitivity techniques always agree?

8. Section 3.1 – The section headings refer to events c and f, but the figure caption for Figure 1 refers to individual cases, 863 and 1025, which is confusing for the reader. It would be clearer if the caption for figure 1 also specified which case belongs to event c and which case belongs to event f.

9. P2793, L5 and P2794, L21 – Are the sensitive areas referred to here SV regions? Was similar guidance provided by ETKF?

10. Section 3.2.3 and Figure 4 – AMDAR data, both profiles and data from cruise altitude are displayed on Figure 4 as red dots. Therefore it is difficult to see from figure 4 the density of AMDAR profiles or how it compares to radiosounding stations, because we cannot differentiate between the profiles and cruise-level data.

11. P2798 – In figure 5b, it would be helpful to point out to the reader that negative values of REL_RMSE correspond to forecast improvements.

12. P2806, L21-23. This sentence is very confusing. Please re-phrase.

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13. P2807 L26 – This is not the only study analysing targeted observations for the Mediterranean region. Please see: Garcies and Homar, 2013, Q. J. Roy. Meteorol. Soc. (at <http://onlinelibrary.wiley.com/doi/10.1002/qj.2148/abstract>)

Technical corrections

P2794 L21 and L15 – ‘along’ the (date) – in both cases replace ‘along’ by ‘during’.

P2799 L1 – ‘worsenings’ – ‘degradation’ is a more commonly-used term.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 2781, 2013.

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