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Interactive comment on "Sensitivity Experiments on the Response of Vb Cyclones to Ocean Temperature and Soil Moisture Changes" *by* Martina Messmer et al.

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We would like to thank the Anonymous Referee #1 for his positive view and constructive comments on our manuscript on "Sensitivity Experiments on the Response of Vb Cyclones to Ocean Temperature and Soil Moisture Changes". Please note that this is just a short and first reply to the referee's comments. A point-by-point reply will follow with the actual revision process after the decision of the editor.

My main concern for this paper is that a very similar study already exists, that the authors don't seem to be aware of: Volosciuk, C. et al. Rising Mediterranean Sea Surface Temperatures Amplify Extreme Summer Precipitation in Central Europe. Sci.

Rep. 6, 32450; doi: 10.1038/srep32450 (2016). It is important that the authors cite this study and highlight how their study differs from the one of Volosciuk et al. They need to compare the results and discuss similarities and differences.

Regarding the major concern rose by the reviewer, unfortunately we were not aware of the study by Volosciuk et al. (2016) at the time of writing the first version of the manuscript. This is an interesting and closely related piece of work that we will certainly consider to improve the discussion of our results in the reviewed version. As a brief comment, it is interesting how both studies come to similar results, even if they use quite different methods and motivations. For instance, Volosciuk et al. test the sensitivity of cyclone properties over Central Europe to Mediterranean Sea temperature alone compared to 1970 – 1999 using a GCM, while we use a RCM and consider the sensitivity of Vb cyclones to up to three different variables, i.e. the Mediterranean Sea, the Atlantic Ocean and the soil moisture on 5 extreme Vb events. An additional difference is the fact that we have applied much stronger SST changes of up to 5 K in our study and hence it focuses more on climate change scenarios. Despite these differences, both studies agree on an increase in precipitation taking place in similar regions, making the Adriatic coast the most affected region by an increase in precipitation, while the eastern part of Switzerland and the western part of Austria exhibit a decrease in precipitation in both studies. These agreements are not redundant, but independent evidence that reinforces the findings of both studies. We will point out these similarities and differences throughout the results and discussion sections in the reviewed version.

Another point they should address is the following: In their last paper "Climatology of Vb cyclones, physical mechanisms and their impact on extreme precipitation over Central Europe" they conclude that heavy precipitation related to Vb events is mainly related to large-scale dynamics rather than to thermodynamic processes, yet they decide to analyse the effect of changes in SSTs. This needs some motivation.

The fact that we decided to study the response of Vb cyclones to changes in possible moisture sources is that there is still some uncertainty concerning the main moisture source during Vb events. Even though the large-scale dynamics determine if a Vb cyclone delivers heavy precipitation or not, an important source of moisture is still needed to trigger such extreme events. To study all possible sources of moisture, and their possible impact on Vb events, under climate change scenarios, we decided to perform these sensitivity studies. As the motivation seems to be somewhat unclear in the first manuscript, we will clarify this in the new version of the introduction.

Of course, we will also address the specific comments in more details throughout the review process. These comments will certainly help to increase the readability and understandability of this paper. In a point-to-point response we will show how these suggestions and comments will be implemented.

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