

## ***Interactive comment on “Sensitivity of the WRF model to the lower boundary in an extreme precipitation event – Madeira Island case study” by J. C. Teixeira et al.***

**Anonymous Referee #1**

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The authors investigate the sensitivity of WRF forecast skill of wind and precipitation on the use of 3 different orography databases (GTOPO, SRTM and ASTER) and two land use data bases (USGS and CORINE). The analysis is restricted in one case study of an extreme precipitation event. The study is interesting but I have two major concerns. The first is that the authors state that they did not activate any convective parameterization scheme for their simulation (and this is wrong) and the second is that not statistically significant results can be obtained with the investigation of only one case study. Both concerns are important but the first concern is really major and implies that the simulations are wrong and rerunning of all simulations is needed. Thus

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the paper cannot be accepted in its current form and major revision of the paper is needed.

**Major concerns** The authors state that for their simulation the cumulus parameterization scheme (CPS) is not activated (page 3, lines 156-158) and they use a reference of Luna et al. (2011), but the latter authors explored the activation or not of the CPS in the finer domain of their simulation (1km resolution) while they used the CPS in their coarser domains. In the current paper the use of CPS at the 25km and 5km resolution domain is necessary because at this resolution convection cannot be explicitly resolved. Further as stated before not statistically significant results can be derived by the analysis of only one case study. This issue should be addressed in the paper somehow.

**Minor points** – The authors are invited to consider the following papers on Crete Island (in Greece) that is also standing as a barrier to the flow like Madeira. Namely the deceleration zone upstream Crete island is discussed when the wind flow is perpendicular to the island mountain ranges. The role of the topography on the definition of the wind flow is similar to what the authors are putting in evidence with Madeira island: Kotroni V., K. Lagouvardos and D. Lalas, 2001: The effect of Crete island on the Etesian winds over the Aegean Sea. Quarterly Journal of Royal Meteorological Society, 127, 1917-1938. Koletsis I., K. Lagouvardos, V. Kotroni and A. Bartzokas, 2009: The interaction of northern wind flow with the complex topography of Crete Island – Part I: Observational study, Natural Hazards and Earth System Sciences (NHESS), 9, 1845-1855 Koletsis I., K. Lagouvardos, V. Kotroni and A. Bartzokas, 2010: The interaction of northern wind flow with the complex topography of Crete Island – Part II: Numerical study, Natural Hazards and Earth System Sciences, 10, 1115-1127

– Section 3.2.1, line 392-395: some verb is missing. Could be changed to: “Given the effect that a different topography dataset produces in the flow properties. . .”

– Line 711: change to “in simulating processes forced by the topography”