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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Dynamical analysis of sea-breeze hodograph rotation in Sardinia" *by* N. Moisseeva and D. G. Steyn

Anonymous Referee #3

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The authors conducted a modeling study to understand the terms controlling the clockwise and anticlockwise rotation of seabreezes. The terrain seems to have a significant role in determining SB hodograph rotation, which may have been fairly important in determining the different patterns of SB hodograph rotation around the island. Moreover, how those 12 stations around the island are positioned relative to the synoptic circulation pattern in that case study and hence how that might've affected SB hodograph rotation is worth looking into. A case in point is pages 22891 lines 9-10, where the authors stated, "The synoptic gradient acts largely in opposition to the surface gradients, likely due to the formation of SB return flow near 850mb level". Wouldn't it be easier to illustrate the synoptic circulation pattern over the island and be quantitative about it, which they did in Fig. 5, so as to be more definitive than "likely"? BTW, what

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did the authors mean by “surface gradient”? If they were referring surface pressure gradient, they should stick to the term. The presentation of their analysis can be more quantitative than it is.

Another comment is it is not clear why the authors conducted the idealized case study. The island has three mountain ranges. In the idealized case, they reduced it to one among a few other assumptions. If they aimed to narrow down the causes for those CR and ACR patterns by comparing the idealized with the real case, it seems to be pretty difficult, as there were a few other factors that were also different.

Page 22894 lines 2-3: the authors stated, “Regions of CR and ACR are arranged on opposite coasts to that of the real Sardinia, and similarly to Corsica from the real simulation and the Attic Peninsula from Steyn and Kallos (1992).” Again, wouldn’t it be helpful to show the synoptic system for that day? It seems to work in opposite directions on the west and east coast SBs. Comparing this result with Steryn and Kallos (1992) is not really that meaningful, unless they had also pointed out the terrain there was similar to the idealized terrain in this study and the synoptic flow was quite the same etc. On the same page, lines 12 -14: “This may be an indication of a model response to the morning switch in the direction of surface heat flux, which in some cases produces a spike in model fields.” Again, this can easily be quantitative by showing the diurnal cycle of modeled surface heat flux to back up this point, instead of leaving it qualitative and speculative.

Overall, this paper can use some revision to make their analysis more quantitative and detailed.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 22881, 2014.