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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A case study of sea breeze blocking regulated by sea surface temperature along the English south coast" *by* J. K. Sweeney et al.

Anonymous Referee #3

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General comments: The authors investigated the effect of the stability over the sea and coastal orography on the sea breeze circulation by using a non-hydrostatic numerical model with a spatial resolution of 1 km. They indicated that colder SST made the atmosphere more stable, and led to the broader "calm zone" along the coast through flow blocking with orography, although the difference in SST did not change the overall strength of the sea breeze so much. Their indication is novel and valuable for practical weather forecasting. This manuscript is written concisely and clearly, and worth publishing with minor revisions.

Specific comments: 1) The authors mainly described the wind speed and direction in

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this manuscript, but how about the effect of SST and the calm zone on the inland air temperature? How much does the air temperature over land change? It seems that the cold air over the sea invaded land more in the colder SST case than in the warmer SST case (Fig.8). This is not surprising, but the authors should mention the impact on the inland air temperature quantitatively, too. Does the formation of the calm zone affect the air temperature?

2) It seems to me that the calm zone starts being formed just when the sea breeze front is going inland from the coastline (Fig.4). The authors did not mention the formation process of the calm zone, but I understand that the formation of the calm zone is the core of this study. The process should be described.

3) The authors showed in situ wind data for only the one specific day (Fig.5), but I guess that there will be much more in situ wind data available at Portland Harbour and Lyme Bay. Can the authors compare wind speeds at these two sites for other days when the sea breeze circulation was formed? This will more convince readers that certainly the calm zone is formed in reality.

4) The in situ wind data agreed well with that in the warm SST case, rather than the control case (Fig.5). Is there any reason for it? Is this a kind of bias that the model inherently has?

5) Some previous study(s) should be cited for the phenomenon that the sea breeze front is advanced farther inland in the experiments with orography than those without orography, to explain its reason (Fig.7).

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 24785, 2013.