

Reply

## Reply to Lofgren, B.M.: Comment on Hicham Bahi, et al. Effects of Urbanization and Seasonal Cycle on the Surface Urban Heat Island Patterns in the Coastal Growing Cities: A Case Study of Casablanca, Morocco. *Remote Sens.* 2016, 8, 829

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### Response to the Comment

First, we would like to thank Lofgren [1] for his comments [2]. The aim of our research is to evaluate the effect and the impact of both urbanization and the season cycle on the variation of the Surface Urban Heat Island (SUHI) in the Casablanca region, Morocco. The SUHI experiences a significant emergence in the urban zone of our study area during winter while it experiences a reciprocal effect during summer. However, some wintry days can differ from this trend and show a significant cooling effect in the urban core. In our analysis, we notice that there are some climate conditions that are more conducive to this reciprocal effect of the SUHI, such as cold/low air temperature and precipitation. For example, in Figure 17, we show the strength of the link between the spatial distribution of precipitation and the Surface Urban Cool Island (SUCI) pattern and how the urban areas coinciding with the highest precipitation contribute significantly to the enhancement of the SUCI. On the other hand, we mentioned that winter cool/low air temperature values allow the control of the SUCI. Once the air temperature exceeds the threshold of approximately the mean winter temperature, we observe a significant emergence of the SUHI while the SUCI occurs in the other case. Figure 5d accentuates this fact and illustrates a weak SUHI due to the important decrease in air temperature compared to the threshold mentioned above. Some research shows that the presence of low outdoor temperature keeps moisture in the soil as long as possible [3–5] and then contributes in controlling the cooling effect. Hence, it was concluded that air temperature controls soil moisture and the response of soil moisture to air temperature is more sensitive than precipitation [3]. Soil moisture is one of the prime environmental variables related to land surface climatology and is directly connected with the process of evapotranspiration and I agree with you that it is controlled by the Surface Energy Balance. However, and as you evoked in your comment, air temperature can be considered as a factor or part of this complex process. In our paper, we did not deeply study this complex process because it is not the goal of our work but we have been limited to show the impact of low temperature and soil moisture on decreasing the SUHI effect. Our statement, accompanied by the citation of Lofgren's paper [1], has been mentioned in this perspective. Also, our expected results do not depend on the topic of potential evapotranspiration and its physical drivers in detail.

**Conflicts of Interest:** The authors declare that there is no conflict of interest.

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