

Interactive comment on “Rapid and sudden advection of warm and dry air in the Mediterranean basin” by J. Mazon et al.

J. Mazon et al.

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Line 40: Regarding the heat wave definitions, a more reliable approach is taking into consideration heat stress indices, based on human energy balance models, interpreting the equivalent temperature of the environment on humans. See the relevant reference:

Matzarakis, A., Nastos, P.T., 2010, Human-Biometeorological assessment of heat waves in Athens. *Theoretical and Applied Climatology*, Vol. 105 (1) pp. 99-106

Answer: The suggested reference is mainly devoted to analyze human discomfort. To our opinion, this is not related with the definitions analyzed in our work, which are purely based on meteorological parameters. However, we find the reference very interesting

C1833

and it has been added at line 47 of the new version of the manuscript when human related problems of heat waves are introduced.

Line 47: See also the following recent reference:

Nastos, P.T., Matzarakis, A., 2012, The effect of air temperature and human thermal indices on mortality in Athens. *Theoretical and Applied Climatology*, Vol. 108, pp. 591–599.

Answer: This reference has been added when referring to the effects of heat waves on the human body.

Line 300 and 339: check

Answer: The sentence has been checked and revised accordingly.

Line 355:

See also this event from biometeorological point of view in the following references:

Nastos P.T., Bleta A.G. and Matsangouras I.T., 2013, The Development of Fohn winds due to Saharan Dust Outbreaks and the associated human thermal bioclimatic conditions in Crete Island, Greece. *Proceedings of the 13th International Conference on Environmental Science and Technology Athens, Greece, 5-7 September 2013*, CEST2013_0396.

Nastos, P.T., Kampanis, N.A., Giaouzaki, K.N., Matzarakis, A., 2011, Environmental impacts on human health during a Saharan dust episode at Crete Island, Greece. *Meteorologische Zeitschrift*, Vol. 20, No 5, pp. 517-529

Answer: These references have been added in a new sentence, at the end of the line 355 of the new version of the manuscript.

Line 402: How can you explain the role of the topography of the island (mountain ranges of almost 2500m high) in the evolution of the atmospheric circulation? Do you

think that the high mountains, perpendicular to the southern flow, impact the descending air at the north, near Heraklion? Mountain waves? Fohn effect?

Answer: The analysis of Fig. 8a-d (lines 403-417), suggests that the large increase of the temperature in the north face of Crete is not caused by a Fohn effect (no condensation, needed to the decrease water vapor content, was simulated at any height), but associated to a strong descend of a warm and dry air mass from mid-levels.

The mountains ranges of Crete, perpendicular to the southern flow, play an important role in this event, contributing to enclose the relatively cold and wet Mediterranean air mass at the southern coast of the island, between the warm and dry air mass from North Africa (cold front moving from South) and the mountains. The warm and dry air mass coming from North Africa is lifted over the colder Mediterranean air mass several kilometers offshore. Lately, once the mountain range is overpassed, it descends in the north face. Consequently, the enclosed and colder Mediterranean air mass avoids that the warm and dry Saharian air mass affects the south part but largely increase the temperature at the north side of the island.

The paragraph has been revised in order to clarify this explanation.

In the supplement the new .pdf manuscript version has been submitted.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/1/C1833/2013/nhessd-1-C1833-2013-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 3735, 2013.