
This paper deals with the statistical and dynamical characteristics of an interesting diurnal mesoscale phenomenon (namely the foehn that sometimes is mentioned even in the non-specialist literature of the area). This paper is well written and the mesoscale analysis, including a detailed description of the different stages of the phenomenon, is rather convincing. Therefore, I consider this paper as worth of publication in Atmospheric Chemistry and Physics, but with a minor revision, taking into account my comments below.

Page 5, section 2.5: this section should be converted into an appendix (of course keeping here only the definition of symbols used below), because it contains just a summary of the reduced-gravity theory of shallow flow over obstacles (to be referenced below in paper), with no original aspects.

Page 6, from line 6 to line 10: the Jerusalem temperature is used as representative of T at the "crest". However, Jerusalem is located at about 50 km north of the cross-section of Fig. 1. Moreover, in the same sentence a "downstream station" is mentioned with no additional specification. Below, the Masada station is probably identified as such downstream station. The entire paragraph is rather involved and needs better explanation/phrasing.

Page 6, line 13: please specify the temperature differences (T crest minus T valley?).

Page 6, lines 13-15: this sentence is unclear. Most probably, "were" should be "where", but even with this correction, still the sentence needs to be improved a little.

Page 8, line 11: please refer to Fig. 1 for the radiosonde location. Moreover, "the other side" is ambiguous – it is probably the eastern side of the DS: please clarify.

Page 9, lines 20-21 (and somewhere else): here the word "inversion" refers to the profile of potential temperature Θ (fig. 8). However, normally the word inversion is used to denote temperature T increasing with height. It is not obvious if the stable layer of fig. 8 implies an increase of T with height. There is an ambiguity across the paper in the use of the word "inversion" that should be avoided unless a real "T inversion" is implied. A similar ambiguity is also in the use of "warmer" or "cooler": such words should refer only to T and not to Θ.

Page 9, line 26: Fig. 11 is introduced here, while Fig. 10 is referenced only below in sect. 3.3.3 for the first time. This should be avoided: I think that figures should be numbered in the order of citation.

Page 10, line 18: any hint for the cause of the earlier cooling in the COSMO model?

Page 12, lines 1-3: "depends on diurnal local and mesoscale processes": please try to be more specific - for instance the MSB is mentioned below (line 30) as the main cause of the westerly flow from which the foehn takes its energy. However, in sect. 3.3 a synoptic-scale pressure gradient is invoked as being important, at least for the strongest cases. I think it is not made clear enough to what extent the MSB alone is sufficient to initiate the DS foehn.

Page 12, line 18: is "the ridge cooling" due to radiation or also to cold air advection from the Mediterranean (arrival of MSB)?

Page 13, lines 5-7: however, in a warming scenario, temperature may increase also upstream and not only within the valley, so the impact on T profile is not obvious (or perhaps it is implicitly assumed that, the MSB being important, the Mediterranean sea temperature will increases more slowly that the continental temperature?).

Figures:
Fig. 1: perhaps the left panel (the map) should be enlarged.

Fig. 3: please specify in the captions where crest and valley temperatures are measured, respectively (or refer precisely to the text where this is explained).

Fig. 12 a: this is a laudable attempt to synthesize a conceptual model in a picture. However, it is difficult to appreciate the different hatchings in the green area, unless one enlarges the page on a (large) screen. Moreover, the small rectangles in the inset below (the legend) are not sufficiently clear.

Typos in the text:

p. 2, line 4: depend.

p.2, line 9: "and MAP" in place of "or MAP".

p. 5, line 15: drop comma after "hereby".