

## ***Interactive comment on “Analysis of the diurnal development of the Ora del Garda wind in the Alps from airborne and surface measurements” by L. Laiti et al.***

**Anonymous Referee #2**

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A) General comments:

The paper deals with a case study about a subject that has extensively been studied earlier (as can be seen in the references) and largely confirms the results of earlier studies. The major critique is due to the lack of new research goals or new findings, that would be expected from a case study like this. Such a goal / finding are suggested in the abstract (19123, line 7 ff, air quality forecasts, comparison with high resolution modelling) but their discussion is missing throughout the rest of the paper. Furthermore the structure of the paper (especially section 5 – discussion of results) must be advanced. It is suggested to reorganize the paper substantially and to perform a major

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revision.

B) Specific comments:

1. Abstract is rather extensive and to some extent contains a lot of detail. Specific research goals or specific findings are not or only very briefly formulated. There is no discussion of the last paragraph in the abstract throughout the paper. Accordingly this section should go to some other section (most likely to the conclusions).

2. Introduction is extensive and mainly composed by a review of literature and a discussion of earlier results. Only a very small section is focusing on the specific paper (19125, line 17-24) and how it is organized (last paragraph of introduction). Additionally, the specific goals of the research work (and this paper) should be well formulated in this section. Also section 2 (about the Ora del Garda wind) could be incorporated into the introduction as it contains a literature review again and it is dealing generally with this type of Alpine valley wind. Another suggestion is to combine it with section 3.3 (Weather Conditions) as it is truly a typical wind system that is only active during these specific weather conditions. Section 3.3 could as well go to Section 5. results when dealing with the synoptic situation during the measurement campaign.

3. Section 4 is shortly explaining the post-processing techniques, that are already described in the earlier papers (Laiti 2013a and Laiti 2013b). They should either be expanded in a full explanation (especially the RK method) or be shortened to the essence of the reference (Laiti 2013b).

4. Structure of Section 5: Results and Discussion should be separated and the subdivision into diurnal cycle (5.1), dominant (5.2) and fine scale (5.3) structure is not ideal. It is irritating to jump up and down the valley. In the current state a lot of the observed phenomena are explained repeatedly a couple of times in a different context. I'd rather suggest to show the results for each of the areas together (Lower Sarca, Lakes, Adige ...). Thus it might be easier to coherently explain the observed development status of the Ora del Garda propagation and the specific structures of ABL and at specific loca-

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tions. Additionally, there is an extensive amount of detail explained in all the section 5, that are shown in the figures. This makes the text heavy to read. I suggest to concentrate on the important features at each location, making the text more fluent. The Discussion could be another Section.

5. Section 6, Conclusions, is extensive as well and contains to a large amount of information already found in the Abstract and Introduction. The last 2 paragraphs (especially the very last one) could be extended and improved, the first paragraph could serve as a starting point for the section Discussion.

#### C) Minor and technical comments

1. Sentences are frequently long and convoluted. This makes a fluent reading hard.
2. Section 1, page 19124, line 16: explain "thermotopographically driven"
3. Section 1, page 19124, line 22. further (farther)
4. Section 2, page 19127, line s 24 ff: what is the importance of the small lakes. Btw. They are mentioned later again, but there is no discussion of their influence or importance to the paper.
5. Section 2, page 19128, line 6: the formation of potentially colder air is not explained here.
6. Section 3.2. page 19139, line 7: too much detail about stations
7. Section 3.2. page 19139, line 19: rephrase to something like: ... the station at Roncafort was equipped with an ultrasonic anemometer ... + why Roncafort and not RON
8. Section 4. page 19131 ff. Methods for pseudo-soundings and RK are explained, but not for eddy-correlation technique. This seems inconsistent.
9. Section 5.1, page 19133, line 19. The discussion of the phenomena seen from data ...
10. Section 5.1.1, page 19134, line 11: "high resolution" (higher resolution is misleading)
11. Section 5.1.1., page 19134, line 24: what is "standard"? In the Sarca valley the standard diurnal cycle associated with fair weather is characterized by Ora.
12. Section 5.2.1, page 19138, line 18: can the subsidence be seen somewhere from data or is it a possible explanation?
13. Section 6, page 19145, line 22: explain "typical textbook pattern"
14. Figure 1, add a symbol for Udine
15. Figure 6: Dashed lines are not distinguishable, grey might be hard to recognize.

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