

We would like to thank the reviewer for their valuable comments. We have reworked the paper to address the relevant issues where necessary. The reviewer comments are written in plain text, our response and changes to the manuscript in bold.

General comments:

As a correlation of air masses to their origin seems to be of particular importance in this work, I wonder why trajectories were not used at all. Also, I wonder if the authors could comment on the fact if their observation are particularly important to only the location of the study, or to sea side sites in general, or even to more locations worldwide. This could be discussed in a few sentences in the summary. It would also be nice if they related their results to the points they raise in the introduction (bulleted point list) in the summary, to see how their results match with the here cited literature.

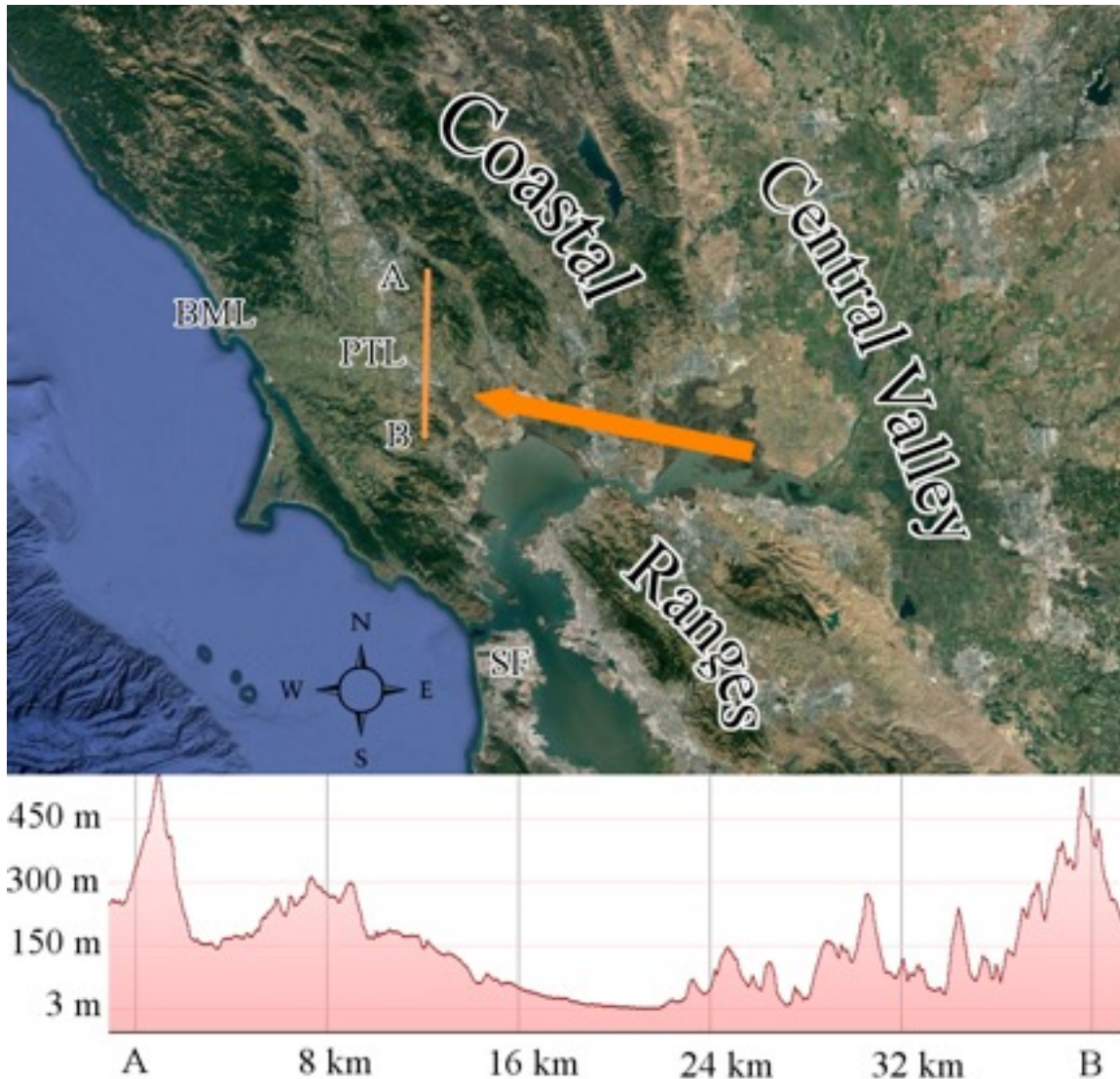
It is unclear whether Lagrangian models (e.g. HYSPLIT, FLEXPART) are able to resolve flows at the scale of Petaluma Gap Flow (horizontally ~25 km, vertically ~ 300m, temporally ~ 10 hrs), particularly if these Lagrangian models are driven by publicly available atmospheric analyses. Furthermore, previous literature has already formulated methods for determining the presence of Petaluma Gap Flow, and we do not comment on specific trace constituent sources beyond noting that they likely originate east of the Petaluma Gap. For these reasons, the use of back trajectories was not deemed necessary.

We've added a discussion of the relevance of this study and importance to general seaside sites to the summary (page 15, lines 29-33). We would also like to note that each hypothesis raised in the introduction is addressed individually in the Summary section starting on page 14, line 19 and concluding on page 15, line 11.

Specific comments:

page 3, line 12: Maybe include a map of the area showing the mountain range (at least some of it), the gap and the sampling location.

Added new figure 1, which is a map of the study site, relevant geographical features in CA and the Petaluma Gap Flow.



page 3, line 24: Say explicitly that some more information on the instrumentation follows below. And mention explicitly when the measurements took place (which month, and for how long).

Explicit explanations added as requested (page 3, lines 13 and 10).

page 4, line 19: “PSL” was already introduced above (line 10 on this page), but as PSLs - homogenize and use acronyms once you have defined them.

Changed all instances of PSL to PSLs.

page 4, line 19: Add values for the RH that were generally observed, and the maximum values.

Added max, min and average values of RH (page 4 starting at line 21). Also added more thorough discussion of sampling line RH over the study.

page 4, line 25: This section, short as it is, is not only “Aerosol Mass”. More correct would be “Aerosol and BC mass concentration”.

Changed section title to “Aerosol and BC Mass Concentration.”

page 5, line 2: Check the symbol in here - I guess it should have been a “kappa”, but in my version, it was a very strange symbol instead.

This appears to have been an issue with the word processing and operating system not communicating correctly. Changed to correct symbol (page 5, line 8).

page 5, line 27: A sentence or two describing the methodology of N06 would be good, as this is the basis for a crucial part of your work.

Added a couple sentences detailing Neiman et al methodology (page 5, line 35).

page 5, line 34-35: I was puzzled about the use of mPGF and PGF. Maybe explain the difference between the two explicitly in a sentence where mPGF first appears. And make sure you use both consistently in the text.

We added text explicitly discriminating mPGF from PGF on page 5, lines 26-28.

page 7, line 2: Refer to section 3.1 (otherwise it is a self-reference).

Changed to section 3.1 as recommended.

page 8, line 28: What do you mean by a “dry free atmosphere”?

Reworded to add clarity on page 9, line 36.

page 9, line 25: Some formatting error - too large spaces between words at the end of the line.

Fixed spacing issue.

page 9, line 28: What do you mean by “the difference in likely concentration”? Reformulate.

Changed “likely” to “normalized” (page 9, line 36).

page 10, line 31: The size distributions shown in Fig. 4: Are they averages for all times of CTL and PGF, or just single distributions you used as examples? Explain in the text or caption.

Changed in text to reflect that these are the average size distributions for all CTL periods and all PGF periods (page 10, line 31).

page 13, top: In the text (related to Fig. 9b), it needs to be explained how CDNC were obtained. (It is not enough to mention an adiabatic parcel model in the summary.)

We have added clarification that we are referring to the Cohard et al. method and the integrated CCN spectra as detailed in section 3.5 on page 8, lines 8-10.

page 13, line 6 ff: Mention explicitly that the “Twomey effect albedo change” is what is shown in Fig. 10 as “fractional albedo change”. I understand that in the text you try to relate the albedo measured by MODIS to the derived fractional albedo change, but I find this part of the text rather confusing. Consider rewriting this part.

Another reviewer suggested that we redact Figure 10 and simply discuss the results in more detail in the text. We have removed the figure and rewritten the section in question with this and the other request in mind (page 13, lines 14-20).

page 13, line 12: “entrain” is not the best choice of word (a cloud is not a thing that is moved from an air mass with CTL properties into an air mass with PGF properties), it is rather that the clouds form in the air mass, which has a certain aerosol in it. Reformulate.

Changed from entrain to “condense on”. See page 13, line 16.

page 14, line 13: When you first mention aged SSA, “aged” is not capitalized, but it is capitalized here and in other locations. Be coherent.

Capitalized all instances of “aged” (in reference to the Aged SS type).

page 14, line 27: Remove the extra “.”.

Removed the extra “.”.

Fig. 2 and 3: The change in color code is confusing (blue is “all” in Fig. 2, but CTL in Fig. 3, red is PGF in both, and black is CTL in Fig. 2 but local in Fig. 3). Please change this, and keep the colors for CTL and PGF for all figures where possible and applicable (e.g., Fig 4 and Fig. 9).

Changed relevant figures (3, 4, 5, and 10) to incorporate a color scheme such that:

LOCAL = BLACK

PGF = RED

CTL = BLUE

ALL = GREEN

Fig. 5: Explain that the explanation of the abbreviations can be found in Tab. 2.

Added text to caption to explain that the abbreviations can be found in table 2.