Author response to reviewer and public comments for Brief Communication: Differences between Sundowner and Santa Ana wind regimes in the Santa Ynez Mountains, California" by Benjamin J. Hatchett et al.

Responses to reviewer comments are given in **bold**
New or changed text is given in *italics* (***bold italics*** for emphasis where noted)

Interactive Comments from Anonymous Reviewer #1

Overview: This brief manuscript presents evidence that Santa Barbara's "Sundowners" are dynamically distinct from Southern California's Santa Ana winds. The figures and text are clear and concise, and I have only very minor comments the authors should address before I recommend publication.

We appreciate the reviewer taking the time to provide constructive suggestions for our paper.

Page 1
1. l. 28: 'low relative humidity result' should be 'low relative humidity results'

Change made, thank you:
"low relative humidity *results*"

Page 3
2. l. 1-13: I think the criteria for Sundowner-only, Sundowner+SAW, and SAW-only could be explained a bit more clearly. In particular, it's not clear as written, how many days are in the Sundowner-only regime (I think it's 71 but this could be spelled out more plainly). Also, I'm curious why the definition of SAW was top 2% for SAW-only and less stringent for Sundowner+SAW – did any top 2% SAWs overlap with Sundowner days?
Thank you for requesting a better explanation, which should help the reader. We altered the text to more explicitly state the criteria and exactly how many days were identified:

"From this definition, we selected only the strong events, or those in the top 0.5% of the identified dates to be included as potential Sundowner events (n = 278 days)."

"To identify SAW-only days from the Guzman-Morales et al. (2016) SAW index, we selected dates satisfying the top 2% of SAW events (based on the median hourly SAW index for each day in the SAW index dataset; n = 248 days). These days **did not coincide** with dates identified as Sundowner-only days (n = 142)."

"For coinciding Sundowner and SAW days (hereafter Sundowner+SAW), we selected dates within the top 0.5% of Sundowner events and also required six hours of SAW index greater than zero (*n = 136 days*)."

This then yields: Sundowner Only (142) and Sundowner+SAW (136) = 278 total Sundowner days, plus the 248 SAW-only days. We hope this is a bit clearer.

With respect to the last question, we opted for a less stringent constraint since SAWs are much more frequent and we didn't only want to select the most extreme cases. For Sundowners, we wanted to be more extreme so to avoid potential heating by advection of the marine boundary layer (as noted in the original text). We have altered the text to be more clear about this choice:

"…and due to the relative frequency of SAWs…"

3. l. 16: The 'peak seasons' of April-May and December-January do not seem to be consistent with what is shown in the figures (Mar-Jun and Nov-Feb in both Figs 2 and 3).

Thank you for pointing this out. We have changed the text to correctly represent the respective seasons:
"Sundowner (*March-June*) and Santa Ana (*November-February*) regimes"

4. l. 19: Were the long-term means calculated on a seasonal, monthly, or daily basis (or some other method?)

We used daily values for the long-term means, and have added "daily" to the description:
"…1981-2010 long-term *daily* means…"

5. l. 23: I believe a reference for the August-Roche-Magnus approximation is appropriate.

Correct, we have added a reference and apologize for the oversight:
Lawrence, M.G.: The Relationship between relative humidity and the dewpoint temperature in moist air: A simple conversion and applications. Bull. Amer. Meteor. Soc., 86, 225–233, https://doi.org/10.1175/BAMS-86-2-225, 2005.

Page 4
6. l. 6: 'potential Sundowner events' – why is the word 'potential' used here? Are these CDFs for Sundowners as defined by your index?

Good point, these CDFs were produced using Sundowners as defined by the index and thus the word is not necessary. We removed "potential".

7. l. 7: I believe this refers to Fig. 2b (not 3b)

Thank you for pointing this out. Change has been made:
"…stronger (Figure *2*b)…"

Page 5
8. l. 5: 'west MSLP gradients' should read 'west MSLP gradient'

Thank you for pointing this out. Change has been made:
"…MSLP *gradient* exists…"

9. Figure 2: Are these CDFs for Sundowner-only days during each season, Sundowner+SAW days for each season, or SAW (winter) days and Sundowner (Spring) days. The caption of (a) indicates the latter, but the legend at the bottom says winter/spring Sundowner days. Please clarify. Also, begin (b) with 'As in (a) except…'

Figure 2 is for strong (top 0.5%) Sundowner days in all cases. We have changed the caption to more clearly represent how the figures were generated and to link the caption with the figure legend (bold italics for emphasis):
"Distributions are created from either all hours *(All Days)* or for the five hours following each identified possible top 0.5% Sundowner event *(Sundowner Days)* during the respective peak seasons (see Figure 1d-f)."

Change made, thank you:
"(b) *As in (a) except for* wind speed"