

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-100

Anonymous Referee #2

Referee comment on "An analysis of an extreme wind event in a clear air condition associated with a low-pressure system during ICE-POP 2018" by Chia-Lun Tsai et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-100-RC2>, 2021

General comment:

The manuscript described two different wind intensification cases in a mountain area from one event, using the reanalysis data, Doppler lidar data, and wind profiler data. The authors performed many analyses using the limited datasets, and the manuscript included many figures. However, the manuscript lacked important descriptions about the novelty of this study, validations of the data used, and the generality of the observed case(s), as commented below.

Major comments:

- If I understand the study correctly, the manuscript described two different wind intensification cases from one event. The first part of the manuscript described characteristics of a wind intensification observed at the lee side of the mountain range, and the latter part described another intensification in a valley. The title of this manuscript included "downslope," therefore, I did not know why the latter part was needed. I could not understand the relationship between the two intensification cases. The introduction also lacked information about the relationship.
- It seems that a large part of the analysis of this study relies on the reanalysis data (LDAPS), which are not pure observational data. Were the observations assimilated enough to resolve the local wind intensifications (time? spatial resolution?)? The authors should provide more details about the dataset and evaluate the dataset in terms of how the data can resolve the local wind intensifications.

- This manuscript presented a case study of one case only and lacked descriptions/analysis about the generality of the event. How frequent did the wind intensifications happen? Is the mesoscale pressure pattern common? Did the mesoscale pressure pattern always produce the wind intensifications? Are the analyzed phenomena unique in this area?
- It was unclear what is the new finding(s) of this study. What are different compared with the previous studies?
- It was tough to follow the manuscript, because I felt a difficulty to identify a downstream/upstream site through the manuscript. I was confused about which site corresponded to a downstream/upstream in each sentence. I think that major reasons of my confusion are:
 - Observation sites had similar names (e.g., DGW, GWW, GWU).
 - Fonts of the site names in each figure are too small.
 - In the first part of the study, DGW was referred as an upstream site, while it was referred as a downstream site in the later part. I would suggest reorganizing the paragraph or rewording sentences to make the reader easy to identify the downstream/upstream sites.

- It was unclear that how the pressure gradient force was produced by adiabatic warming at the lee side of the mountain. Was there precipitation in the mountain area? It was also unclear that how/why the pressure gradient force was intensified in the DGW site.
- Language:
 - There were so many "can" and "could" used in the manuscript, especially in Section 2. This obfuscates the sentences. I was confused by this, and it was unclear that the things were actually done or not.
 - Sentences with past forms and those with present forms were mixed inconsistently in the same paragraphs, even in the same sentences.
 - There were many sentences that used parentheses to state inverse things (e.g., lines 405, 420, and many others). I needed to read the sentences back and forth. This technique should not be used so frequently in a manuscript.
- "East Sea": Because I did not know "East Sea," I googled it and found that there is "Sea of Japan naming dispute." I recommend using "Sea of Japan," which has been most commonly, historically used in the world, or putting down with "East Sea," like "Sea of Japan (a.k.a. East Sea in Korea)." Alternatively, do not use both names in the manuscript to avoid the unnecessary argue.

Minor comments:

- Line 49: GDW was first used here.
- Figure 2: Use consistent formats for x- and y-axis labels.

- Line 323: What is 184 for?
- Figure 4: What does the wind burb direction represent? Horizontal wind direction, direction along the cross section, or others?
- 10 and 11: Are the labels of terms consistent? I was confused.
- Line 470 "sub-cloud warming": Did clouds form? Where? Maybe this manuscript needs more descriptions about the weather condition including clouds (and precipitation).
- Introduction highlighted and stated that wind intensification influences precipitation, while this case did not produce precipitation. This could be a reason that the value of this study was ambiguous.
- Lines 366-367: I did not understand how/why the propagation of the upper wind toward the low level was related to the wind intensification.
- Figure 11: I did not see any wind intensification near the surface at the DGW site. This is inconsistent with Fig. 13. Why?
- Line 564: What does "an almost out of phase" mean?
- Lines 572-576: I could not understand this sentence. This is too long. Please also check the grammar.
- Lines 626-630: The sentences did not make sense to me. The second sentence did not follow the third sentence. Maybe need more descriptions.
- Line 651: I could not find the high wind speed area.