Review Report for

Aeolian activity in foredune notches: Evidence from multiannual wind observations

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Round 1 Review

Comments by reviewer 1 ("anonymous")

Completed: 2025-11-24 08:56 AM

Recommendation: Minor revisions

Reviewer Comments

For author and editor

Please see my attached reviewer report

General comments

The study presents a wind data measured in there excavated foredune notches during several years to provide empirical evidence for notch activation model proposed in previous work. I think this is a well-presented manuscript and dataset could contribute substantially to both coastal dunes and aeolian geomorphology literature. I have several comments to hopefully, improve the scientific quality of the paper as below

Specific comments

1. Line 8: The wind observation undertaken in this study was in near-bed in the notches, thus it was not the incident wind conditions, but the secondary wind. So might consider to revise that statement to make it clear for the readers.

2. Line 9: "Multiannual" is a bit general, it is better to state more specific observational period (e.g. from… to.. here).

3. Line 10 – 11: This is an important finding that relate to the previous work. It is not clear the wind directions (130 – 150o) is incident wind direction (i.e. relative to the true north) or wind angle (i.e. relative to the notch axis or shoreline), so it would be good to provide more clarifications on this finding.

4. Line 21. Also please more provide specific time rather than "several years".

5. Line 27. Might consider to add some keywords to indicate this is a long-term wind measurement study.

6. Line 38 – 43. It is strongly recommended that the authors could introduce the recent collection of published work below on aeolian processes and coastal dunes management in this review

Farrell, E. J., Delgado Fernandez, I., Smyth, T., Li, B., & Swann, C. (2023). Contemporary research in coastal dunes and aeolian processes. Earth Surface Processes and Landforms. https://doi.org/10.1002/esp.5597

7. Line 67 – 76. The authors could review more updated findings from recent work in this paragraph. There is a number of recent studies that examines aeolian activities in the notches/blowouts as below. It is good to provide the readers to current understanding with more recent work

Hesp, P. A., Hilton, M., & Konlecher, T. (2017). Flow and sediment transport dynamics in a slot and cauldron blowout and over a foredune, Mason Bay, Stewart Island (Rakiura), NZ. Geomorphology, 295, 598–610. https://doi.org/10.1016/J.GEOMORPH.2017.08.024

Mir-Gual, M., Pons, G. X., Delgado-Fernández, I., & Smyth, T. A. G. (2023). Field-Measurement of Surface Wind and Sediment Transport Patterns in a Coastal Dune Environment, Case Study of Cala Tirant (Menorca, Spain). Journal of Marine Science and Engineering, 11(12). https://doi.org/10.3390/jmse11122361

Nguyen, D., Hilton, M., & Wakes, S. (2022a). Aeolian sand transport thresholds in excavated foredune notches. Earth Surface Processes and Landforms, 47(2), 553–568. https://doi.org/10.1002/esp.5271

Nguyen, D., Hilton, M., & Wakes, S. (2022b). Wind flow dynamics and sand deposition behind excavated foredune notches on developed coasts. Earth Surface Processes and Landforms, 47(7). https://doi.org/10.1002/esp.5341

René, C., Robin, N., Smyth, T. A. G., Hesp, P. A., Lamy, A., Raynal, O., & Heurtefeux, H. (2025). Dynamics and sediment transport in a path-induced blowout in opposing wind conditions. Science of The Total Environment, 978, 179340. https://doi.org/https://doi.org/10.1016/j.scitotenv.2025.179340

Zhang, S., Qiu, X., Fu, S., Fu, J., Chen, S., Tian, W., Huang, D., & Dong, Y. (2022). Evolution of blowouts in artificial foredunes on Pingtan Island, China. Earth Surface Processes and Landforms, 47(10). https://doi.org/10.1002/esp.5397

8. Line 75 – 76. It is well understood the relationship between wind speed and sand transport. However, I don't think we know much about the relationship between the wind turbulence (indicated by Reynolds stress) or helicoidal flow on the sand transport, so please careful on this statement. The authors might use the findings from the recent work below for your review.

Chapman, C. A., Walker, I. J., Hesp, P. A., Bauer, B. O., & Davidson-Arnott, R. G. D. (2012). Turbulent Reynolds stress and quadrant event activity in wind flow over a coastal foredune. Geomorphology, 151–152, 1–12. https://doi.org/10.1016/j.geomorph.2011.11.015

Chapman, C., Walker, I. J., Hesp, P. A., Bauer, B. O., Davidson-Arnott, R. G. D., & Ollerhead, J. (2013). Reynolds stress and sand transport over a foredune. Earth Surface Processes and Landforms, 38(14), 1735–1747. https://doi.org/10.1002/esp.3428

Nguyen, D., Wakes, S., & Hilton, M. (2025). Controls on geomorphological stage of trough blowout evolution: Evidence from computational fluid dynamics (CFD) airflow modelling. Earth Surface Processes and Landforms, 50(7), e70095. https://doi.org/https://doi.org/10.1002/esp.70095

Wiggs, G. F. S., & Weaver, C. M. (2012). Turbulent flow structures and aeolian sediment transport over a barchan sand dune. Geophysical Research Letters, 39(5). https://doi.org/10.1029/2012GL050847

9. Line 88 – 89: It is good to provide the readers the critical wind angle thresholds in Hesp and Pringle (2001) and Pease and Gares (2013), rather than only presenting the citations.

10. Line 91 – 95. This is the "knowledge gap and motivation" which is the most important part of the Introduction. It is strongly recommended the authors to provide stronger arguments and the significance of your work here. For example, it might be useful to introduce your two novelties (different geometry and longer period compared to previous work) separately. Secondly, the readers could expect to know why we need longer term observations period as normally secondary wind observation often takes place during the wind event only. To address this, it is useful to look at the conceptual model of flow – form – sand transport cycle in the paper below

Walker, I. J., & Hesp, P. A. (2013). Fundamentals of Aeolian Sediment Transport: Airflow Over Dunes. In

11. Line 156 – 158. The description of notch geometry and effectiveness here is great, but mostly has been mentioned in previous work. The readers might expect to know more new information. For example, it is known that the geomorphological state and ecological stage might be not linear but occur simultaneously. If the authors could provide more observations on the vegetation development inside the notches, similar to the work below, that would be useful.

Smyth, T. A. G., Pagon, T., & Walker, I. J. (2025). Exploring wind flow dynamics in foredune notches using Computational Fluid Dynamics (CFD). Coastal Engineering, 195, 104646. https://doi.org/https://doi.org/10.1016/j.coastaleng.2024.104646

12. Line 176. The authors selected the height of 0.9 m for near-bed wind measurement to avoid sand sedimentation (the logistical justification). It is useful to compare your selections with other similar studies for further justifications.

13. Line 220 – 229. I think this data analysis is interesting. Because the response of secondary wind is not 100% consistent with incident winds during the long period, using a grid created by multiple incident wind speed and angle ranges (10o and 1 m/s intervals/bins) and calculating the probability (> or < 50%) that secondary winds inside a cell is greater or lower than sand transport thresholds to label active/inactive notches, is a novel method. I am just afraid that the current presentation is difficult for the readers can understand. It is much better if the authors could add a Figure visualising the procedure/method here. Also, how can the authors generate the contours of colours in Figure 6? Was it generated automatically by the colours of the cells which was determined by the probability value on it? This is important for other researchers could replicate your data analysis method. And I don't understand much how the authors calculate the fraction in Figure 6e and 6f, so please provide more explanation for its in this data analysis section.

14. Line 271 – 353. The results are intriguing; however, the presentation could be improved as different results should be presented in different sub-section. For example, section 3.1 presents well the notch activation results (Figure 6). The next ones should present separately wind speed-up (Figure 7), wind steering (or direction) (Figure 8), wind turbulence (Figure 9), sand transport (Figure 11), and comparison between the notches (Figure 10). If so, it would be much easier for the readers can understand your big dataset! Also, it is not recommended to discuss the results (e.g. compare your findings with previous work), better to leave it to the Discussion.

15. Line 375. The authors could discuss the finding “the wind in N3 and N4 is redirected to the along axis” to the depth-width ratio of the notch, which was reported in Smyth et al. (2020), and refer your suggestions “maybe the flow separation over the upwind lateral walls in our study site during oblique conditions” to CFD modelling in Nguyen et al. (2025)

Smyth, T. A. G., Delgado-Fernandez, I., Jackson, D. W. T., Yurk, B., & Rooney, P. (2020). Greedy parabolics: Wind flow direction within the deflation basin of parabolic dunes is governed by deflation basin width and depth. Progress in Physical Geography, 44(5), 643–660. https://doi.org/10.1177/0309133319899306

Nguyen, D., Wakes, S., & Hilton, M. (2025). Controls on geomorphological stage of trough blowout evolution: Evidence from computational fluid dynamics (CFD) airflow modelling. Earth Surface Processes and Landforms, 50(7), e70095. https://doi.org/https://doi.org/10.1002/esp.70095

16. Line 436. I don’t think the basin slope in Nguyen et al., (2025) is 10 – 50o, please double check. Also, the authors could attribute the different findings between studies to the different foredune height (and then the notch depth). The foredune in the current study is much higher than in Nguyen et al. (2025), thus increasing the bed slope does not significantly decrease the foredune depth. Therefore, the slope-induced acceleration increases but the depth-induced acceleration does not significantly decrease when the bed slope increases etc.

17. Finally, I think this is a valuable dataset and could be used to contribute substantially to both coastal dunes and aeolian geomorphology literature, so strongly suggest that the authors could provide further discussion on the following points. Firstly, there is currently a debate on the efficacy of the foredune notching on the coastal dune management (Delgado-Fernandez et al., 2019), as some notches appear to be short-lived. Can the authors use your long-term dataset to contribute to that debate? Secondly, Walker et al. (2017) classified the studies on geomorphology and evolution of beach – dune systems to be plot scale (several days observations), landform scale (months to years observations), and landscape scale (decades and more observations). As far as I know, most of reported aeolian activities on foredune notches are plot scale, and this data is valuable to provide landform scale. If the authors could provide some findings from this dataset that the other plot scale dataset can not, that would be very impactful. For example, all the data presented in Figure 6 – 10 is combination, not the time-series ones. Can we see any changes of aeolian activities over the years?

Delgado-Fernandez, I., Davidson-Arnott, R. G. D., & Hesp, P. A. (2019). Is ‘re-mobilisation’’ nature restoration or nature destruction? A commentary.’ In Journal of Coastal Conservation (Vol. 23, Issue 6). https://doi.org/10.1007/s11852-019-00716-9

Walker, I. J., Davidson-Arnott, R. G. D., Bauer, B. O., Hesp, P. A., Delgado-Fernandez, I., Ollerhead, J., & Smyth, T. A. G. (2017). Scale-dependent perspectives on the geomorphology and evolution of beach-dune systems. Earth-Science Reviews, 171, 220–253. https://doi.org/10.1016/J.EARSCIREV.2017.04.011

I hope my comments are useful and thanks for giving me opportunity to review your work.

Comments by reviewer 2 (Libby George)

Completed: 2025-11-29 03:42 PM

Recommendation: Minor revisions

Reviewer Comments

For author and editor

The research presented in this study uses a novel dataset to examine annual landward sand transport at multiple excavated foredune notches, in reference to incident wind angle and direction, and flow acceleration as captured by anemometers. The results presented are novel, and important for the international application of foredune notches as a Nature-based Coastal Solution. More importantly, the field-based measurements contradicted multiple CFD modeling studies, as noted by the authors. The paper was well written, I have very few comments, all of which are attached in the associated pdf. I look forward to referencing this study once published with minor revisions.

Recommendation by Associate Editor 2 (Driss Chahid)

Completed: 2025-12-12 09:04 AM

Recommendation: Minor revisions

Reviewer Comments

For author and editor

Dear all,

The authors are congratulated for producing such a valuable piece of work that will meaningfully advance the scientific knowledge in this field.

This article proposal is well-written and well-structured. The reviewers' reports are valid, and their minor comments will help the authors improve the final version. I endorse the reviewers' assessment for minor corrections.

Best regards

Decision by Editor-in-Chief (Alice Lefebvre)

2025-12-12

I would like you to undertake a **minor revision** of your manuscript. As this is a minor revision decision, we will assess the revised version internally and we are unlikely to need to consult more widely before a final decision is made.

I also pass along the comment from the associate editor handling the paper, with which I completely agree:

"I might add that although the reviewers (especially reviewer 1) have included a number of suggested citations, the authors should only include/add ones that are necessary by their judgement."

Authors' responses to review comments

2026-02-06

Response to reviewer 1

We are grateful for the reviewer's positive opinion of our work. Below we repeat the reviewer's comments and provide our response in italic. Line numbers in our response refer to the manuscript version with the track-changes included. All references in our answers can be found in the Reference list of the manuscript.

Specific comments

1. Line 8: The wind observation undertaken in this study was in near-bed in the notches, thus it was not the incident wind conditions, but the secondary wind. So might consider to revise that statement to make it clear for the readers.

We thank the reviewer for pointing this out. We see that the phrase "incident" is confusing as we talk about wind data in the notches in the next sentence. The phrase "incident" referred to the notch activation model that we test in the model, in which notch activity is a function of the incident wind speed and direction (e.g., Figure 1). That is not obvious in the Abstract, so the word "incident" is indeed confusing. We deleted "incident" from Line 8. As a consequence, we rewrote the next sentence to better reflect the main result from the notch activation model that we test in the paper (Lines 9 - 11).

2. Line 9: "Multiannual" is a bit general, it is better to state more specific observational period (e.g. from... to.. here).

Adjusted as requested, Line 9.

3. Line 10 – 11: This is an important finding that relate to the previous work. It is not clear the wind directions (130 – 150o) is incident wind direction (i.e. relative to the true north) or wind angle (i.e. relative to the notch axis or shoreline), so it would be good to provide more clarifications on this finding.

The range is centered on the notch axis, extending 65–75° to either side. This has been added to Line 11.

4. Line 21. Also please more provide specific time rather than "several years".

"Several" years was replaced by "seven" years. Line 22.

5. Line 27. Might consider to add some keywords to indicate this is a long-term wind measurement study.

We think that this is well-covered by the second part of the title of our work, “Evidence from multiannual wind observations”.

6. Line 38 – 43. It is strongly recommended that the authors could introduce the recent collection of published work below on aeolian processes and coastal dunes management in this review (Farrell et al., 2024).

Farrell et al. (2024) introduces a special issue (in Earth Surface Processes and Landforms) with papers that together show a wide range of human interventions in coastal dunes. We agree that the paper is a useful reference in our Introduction section, and we included it in Line 42. We note that the reference does not show up in the text as “added” (blue and underlined) because of a (known) conflict between the changes and natbib packages in LaTeX.

7. Line 67 – 76. The authors could review more updated findings from recent work in this paragraph.

There is a number of recent studies that examines aeolian activities in the notches/blowouts as below. It is good to provide the readers to current understanding with more recent work.

We thank the reviewer for this suggestion. We agree that we should have referred to recent papers that confirm the airflow-sand transport implications proposed by Hesp and Hyde (1996). This confirmation can be found in Lines 82-86.

8. Line 75 – 76. It is well understood the relationship between wind speed and sand transport. However, I don’t think we know much about the relationship between the wind turbulence (indicated by Reynolds stress) or helicoidal flow on the sand transport, so please careful on this statement. The authors might use the findings from the recent work below for your review.

We did not intend to state that the increase in turbulence is the primary reason for reduced sand transport and bed-level activity. The change in flow type also involves a change from an accelerating into a decelerating flow, as illustrated in our Figure 1 (the notch activation model). To clarify this, we modified the text to better stress the change from acceleration into deceleration (Lines 78-82). With this change, it is not necessary to include the suggested papers.

9. Line 88 – 89: It is good to provide the readers the critical wind angle thresholds in Hesp and Pringle (2001) and Pease and Gares (2013), rather than only presenting the citations.

The requested information has been added in Lines 100-101. Pease and Gares (2013) reported a critical angle of about 50°. Hesp and Pringle (2001) did not specify such an angle; however, their observations likewise suggest a larger angle than observed in Nguyen et al. (2021).

10. Line 91 – 95. This is the "knowledge gap and motivation" which is the most important part of the Introduction. It is strongly recommended the authors to provide stronger arguments and the significance of your work here. For example, it might be useful to introduce your two novelties (different geometry and longer period compared to previous work) separately. Secondly, the readers could expect to know why we need longer term observations period as normally secondary wind observation often takes place during the wind event only. To address this, it is useful to look at the conceptual model of flow – form – sand transport cycle in the paper below

We thank the reviewer for the suggestion to strengthen the problem definition and its motivation. We believe that it is already clear from the description of the notch activation model in the text and the caption of Figure 1, that a single wind event in a single notch will not suffice to quantify and validate the activation model. To stress the need for long-term wind records better, we included (Lines 104-106):

"Such records are required to capture virtually all possible wind conditions throughout the lifespan of foredune notches in their (bio-)geomorphological stage, which has been observed to range from several years to several decades (Van Kuik et al., 2022)". Then, regarding the dependence on notch geometry, we included another reference to Figure 1 in Line 107, where this dependence was mentioned. The subsequent paragraph also stresses what is made possible in our work by exploring long-term records in not one, but three foredune notches (Line 113).

11. Line 156 – 158. The description of notch geometry and effectiveness here is great, but mostly has been mentioned in previous work. The readers might expect to know more new information. For example, it is known that the geomorphological state and ecological stage might be not linear but occur simultaneously. If the authors could provide more observations on the vegetation development inside the notches, similar to the work below, that would be useful.

An important conclusion from the description in Section 2.1 is that the notches were in their geomorphological stage during the measurement campaigns, and not simultaneously in the geomorphological and ecological stage. This was stated in Line 172. In Section 2.6 we described the actual erosion-deposition patterns in more detail. Here, in Lines 284-286, we added a remark on the absence of vegetation and embryonic dunes during the measurement campaigns, which, again, points to the geomorphological stage.

12. Line 176. The authors selected the height of 0.9 m for near-bed wind measurement to avoid sand sedimentation (the logistical justification). It is useful to compare your selections with other similar studies for further justifications.

We added a sentence stating that comparable heights above the bed were used in previous coastaldune field campaigns, Lines 194-195.

13. Line 220 – 229. I think this data analysis is interesting. Because the response of secondary wind is not 100% consistent with incident winds during the long period, using a grid created by multiple incident wind speed and angle ranges (10o and 1 m/s intervals/bins) and calculating the probability (> or < 50%) that secondary winds inside a cell is greater or lower than sand transport thresholds to label active/inactive notches, is a novel method. I am just afraid that the current presentation is difficult for the readers can understand. It is much better if the authors could add a Figure visualising the procedure/method here. Also, how can the authors generate the contours of colours in Figure 6? Was it generated automatically by the colours of the cells which was determined by the probability value on it? This is important for other researchers could replicate your data analysis method. And I don't understand much how the authors calculate the fraction in Figure 6e and 6f, so please provide more explanation for its in this data analysis section.

This comment has multiple related subquestions. (1) We believe that a figure to visualize the binning approach is not necessary, as the binning procedure is detailed in Section 2.4. In each wind speed – direction bin we counted the total number of observations. For each observation we can determine whether the notch under consideration was active, given the definition of notch activity stated in Section 2.4. The value stored for each bin is the fraction of active to total observations. At the end of the binning procedure, we thus have a wind speed – direction matrix with these fractions, one for each notch. Figures 6a-c are (filled) contour plots of these matrices, including the contours for 10, 50 and 90% of activity. (2) The content of Figures 6e and f is explained in the text and the figure captions.

Panel (e): For each direction bin we know how many observations there are (irrespective of wind speed) and how many of these observations represent active conditions. Figure 6e is the ratio of all active versus the total number of observations in a directional bin. Panel (f): The number of active conditions in a direction bin is now divided by the total number of active conditions in the data set. Panel (f) thus illustrates the contribution of a particular directional bin to all active conditions. In our case, the peaks in (f) corresponds to the dominant wind direction, not to direction when the wind blows directly in the blowout. No modifications were made to the text.

14. Line 271 – 353. The results are intriguing; however, the presentation could be improved as different results should be presented in different sub-section. For example, section 3.1 presents well the notch activation results (Figure 6). The next ones should present separately wind speedup (Figure 7), wind steering (or direction) (Figure 8), wind turbulence (Figure 9), sand transport (Figure 11), and comparison between the notches (Figure 10). If so, it would be much easier for the readers can understand your big dataset! Also, it is not recommended to discuss the results (e.g. compare your findings with previous work), better to leave it to the Discussion.

(1) The results were structured in the context of the notch activation model. Following a description of the models themselves (Section 3.1 and Figure 6), we explored (Section 3.2) the shape (i.e., the parabolic line separating active from non-active) of the model (Figure 7) as well as the change in flow

type. The latter was performed by simultaneously exploring how the wind direction and turbulence changed as a function of the incident wind direction (Figures 8 and 9). The change in flow type coincides with a change from accelerating to decelerating flow. This is examined in more detail in Section 3.3 using speed-up ratios (Figure 10). The transport computations are a new element to the notch activation model, in an attempt to make the model more quantitative. Therefore, these results are presented last (Section 3.4 and Figure 11). (2) The references cited in the Results section pertain to the literature that formed the basis for the shape and structure of the activation model. We consider it useful to (briefly) highlight similarities and differences between the conceptual model and our findings, thereby preparing the reader for the forthcoming Discussion. Nonetheless, we understand that this is a personal taste. The underlying causes for the differences, as well as a number of other issues (e.g., the different wind conditions during the three campaigns), are addressed in the Discussion section. No modifications were made to the text.

15. Line 375. The authors could discuss the finding "the wind in N3 and N4 is redirected to the along axis" to the depth-width ratio of the notch, which was reported in Smyth et al. (2020), and refer your suggestions "maybe the flow separation over the upwind lateral walls in our study site during oblique conditions" to CFD modelling in Nguyen et al. (2025).

(1) Smyth et al. (2020) reported that the depth-width ratio of the deflation basin in a parabolic dune influences the character of the wind flow. We can imagine that this is also true for notches. It may contribute to the site-specific nature of the threshold angle that we reported in the Introduction and that concerned comment #9 above. For this reason, we included a reference to Smyth et al. (2020) in the Introduction section, Lines 101-102. We believe that it is more appropriate there than in the Discussion section. (2) Nguyen et al. (2025) performed CFD simulations with varying notch width, but only for a wind incidence angle of 0°. Our remark concerns varying widths under oblique angles. In other words, the results in Nguyen et al. (2025) cannot be used to support our suggestion.

16. Line 436. I don't think the basin slope in Nguyen et al., (2025) is 10 – 50°, please double check. Also, the authors could attribute the different findings between studies to the different foredune height (and then the notch depth). The foredune in the current study is much higher than in Nguyen et al. (2025), thus increasing the bed slope does not significantly decrease the foredune depth. Therefore, the slope-induced acceleration increases but the depth-induced acceleration does not significantly decrease when the bed slope increases etc.

(1) We indeed made an error in quoting the angle range in the Nguyen et al. (2025) simulations. It should have been 10 – 25° (their Figure 1c and Table 2). We corrected this in line 458. This mistake has no impact on the remainder of the text. (2) We thank the reviewer for their statement on the importance of the foredune height for the slope-induced acceleration. We included in the Discussion section, lines 463-467.

17. Finally, I think this is a valuable dataset and could be used to contribute substantially to both coastal dunes and aeolian geomorphology literature, so strongly suggest that the authors could provide further discussion on the following points. Firstly, there is currently a debate on the efficacy of the foredune notching on the coastal dune management (Delgado-Fernandez et al., 2019), as some notches appear to be short-lived. Can the authors use your long-term dataset to contribute to that debate? Secondly, Walker et al. (2017) classified the studies on geomorphology and evolution of beach – dune systems to be plot scale (several days observations), landform scale (months to years observations), and landscape scale (decades and more observations). As far as I know, most of reported aeolian activities on foredune notches are plot scale, and this data is valuable to provide landform scale. If the authors could provide some findings from this dataset that the other plot scale dataset cannot, that would be very impactful. For example, all the data presented in Figure 6 – 10 is combination, not the time-series ones. Can we see any changes of aeolian activities over the years?

We thank the reviewer for raising this point in relation to our data set. (1) Some notches are indeed short-lived, in the sense that they never develop into an efficient corridor for landward aeolian transport. The existing literature (e.g., Pye and Blott, 2016) and our own experience suggest that the deflation basins of these notches are disconnected from the sand source (i.e., sandy beach) by a gravel ridge or embryonic dunes. Also, some short-lived notches along the Dutch coast were rather narrow (e.g., Riksen et al., 2016), suggesting that wind was insufficiently steered into the notches. The notches at our study site remained in the geomorphological stage throughout the wind-measurement campaigns. The contribution of our data set to the debate is related to the geomorphological stage only, and can be found in Section 4.3 of the manuscript. (2) This is a very interesting question. However, as noted above and implemented into the manuscript (see comment 11), our notches did not alter stage during the wind measurement campaigns. We divided the data in Figures 6 – 10 in shorter intervals (1 year) and explored whether the trends were different between the years. This was not the case. Finally, we note that Figure 2c in Ruessink et al. (2024) shows that the volume of the deposition lobes increased approximately linear with time during the wind-measurement campaigns, suggesting no change in aeolian activities over the years. No modifications were made to the text.

Response to reviewer 2

We are grateful for the reviewer's positive opinion of our work. Below we repeat the reviewer's comments and provide our response in italic. Line numbers in our response refer to the manuscript version with the track-changes included. All references in our answers can be found in the Reference list of the manuscript.

Page 1 - Could be noted here how the recovery period for dunes is often weeks to years, whereas erosion can occur in hours to days. The overall influence of climate change has to do with this disparity between erosion and recovery, wherein dunes are not able to recover before the next storm, leading to further degradation . Houser et al 2015 is an example source for this.

This is an excellent addition to our remark on dune erosion. We added … "and can additionally reduce the ability of a dune to recover fully before the next erosion event because of the long (typically years) time scales involved (Houser et al., 2015; Castelle et al., 2017)." Lines 36 – 38.

As we already mentioned in the subsequent line, climate change impacts are not limited to changes in erosion (and recovery). Climate change will also effect coastal dune vegetation in various ways. Very recently a review report on this topic was published, and we decided to include it in the text. Therefore, we extended the text with "and groundwater regime" and added the reference Raman et al. (2025). Lines 38 – 41.

Page 1 - Can there be more detail provided here with regards to height? Increase in volume and height are not always coupled

We are not entirely sure what the reviewer is referring to here. We suspect that the phrase "vertical dune growth" caused some confusion, as volume growth could also result from purely "horizontal dune growth", that is, a dune field progressing landward without increasing in height. To avoid confusion, we removed the word "vertical" from line 57. Dune growth can now refer to vertical as well as lateral growth.

Page 6 - Are there any post-construction photos that could be added to the figure? For the reader to get an idea of scale of the excavation from the beach

Such photographs have been provided in an earlier publication, Ruessink et al. (2018) in Aeolian Research, their Figure 5, and are therefore not reiterated here. An idea of the scale can also be obtained from Figure 2. In particular panel c provides a clear impression on the width and depth of the excavation. We made no modifications to the text.

Figures 6 and 11 - I would suggest adding another legend to the top right panel to help differentiate. This colour scheme is also a bit hard to interpret because the shades are similar, could shapes be used in combination with shades?

We thank the reviewer for bringing this to our attention. The colour scheme was altered into blue (N4), orange (N3) and medium gray (N2). These colours can also be distinguished by people who are colour blind.

Figure 10 - Why not include 3/2 instead of going straight to 3/1?

We choose to define flow speed-up as the ratio between the wind speed at a sensor (SA02 or SA03) relative to the most seaward sensor (SA01), and hence the ratio of the wind speed at SA03 to that at SA02 was not included in the paper.

Page 19 - A figure demonstrating flow speed up and alpha reference angles on a map would be really interesting, does not necessarily need to be added but I think it would complement the paper as much of the results are graphical.

We explored the option to present data on top of a map, like Figure 2b, during the writing phase of the initial submission, for example, in the form of wind-rose like graphs. We found that we had to reduce these graphs substantially to fit them next to each other through a notch. As a consequence, details got lost. While perhaps less appealing, we found that Figure 10 is a better way to illustrate the main points from our data analyses of flow speed-up. Also, Figure 10 is more consistent with earlier figures showing other aspects of the data (e.g., Figures 7-9).

Page 20 - CFD modeling in the future to further examine the impact of vortices and lateral wall flow separation

We incorporated this in the manuscript in Lines 402-403. As a consequence, we also slightly changed Line 452, as the first mentioning of CFD was brought forward to Lines 402-403.

Page 20 - Missing values

The phrase refers to missing values of wind speed USA. The reasons for missing values are stated in Section 2.3 in the description of how the collected uvw time series were processed.

We rewrote the text in Line 411 as "To assess the percentage of active conditions, missing USA values at sensors 01, 02 and 03 (Section 2.3) were ..."

Page 20 - Predicted values

The prediction approach is outlined in the Appendix. We apologize for not referring to the Appendix in this sentence. This is now corrected, see Line 415.

Page 20 - Sand traps

There are indeed sand traps at the field site. The collected data are described and analyzed in Van Hateren et al. (2020). None of these traps are, however, located in a blowout or on a depositional lobe (see, for example, Fig. 1b in Van Hateren et al.). What is more, most sand traps (series B, C and D in Van Hateren et al.) were located landward of the depositional lobes to obtain an estimate of the amount of (very fine) sand in suspension, commonly referred to as grainfall. Our computations relate to the saltation transport of the (coarser) sand through the blowouts. This coarser sand is deposited on the lobes and hence does not reach the more landward located traps. As a consequence, the traps cannot be used to validate the computations. We made no modifications to the text.

Page 22 - Future field observations

We incorporated the need for future field observations in Lines 467-468.

Round 2 Review

Recommendation by Associate Editor 2 (Driss Chahid)

Completed: 2026-02-09 02:48 PM

Recommendation: Accept

Reviewer Comments

For author and editor

Dear all,

The authors have taken the reviewers' comments seriously, despite them being minor revisions. Their responses are detailed for each point, and the current version of the manuscript is significantly improved. I would like to thank the authors for their hard work and rigor.

We wish you the best in your future endeavors and look forward to seeing your work again in a future project. Thank you for choosing and trusting our journal with your research.

Best regards

Decision by Editor-in-Chief (Alice Lefebvre)

2026-02-10
Congratulations! I am pleased to inform you that your manuscript entitled "Aeolian activity in foredune notches: Evidence from multiannual wind observations" has been accepted for publication in Geomorphica.