

We would like to thank the reviewer Tarmo Soomere for his carefully reading and the very constructive criticism. We respond to all comments below.

**RC1 (T. Soomere):**

Specific major aspects

1. No information is presented about statistical significance of the presented correlations. Even though this way of categorisation of links between different quantities is basically formal and may provide false positive or negative conjectures, it is important to amend the material so that the strength of correlations is characterised by some other kind of measure with clear interpretation. Also, in some occasions other measures such as root mean square deviation or similar would be helpful to clarify the context.

We included new figures where a '\*' marks significant correlations.

We used RMSE to compare the results derived from the linear regression model and the actual values from coastDat2.

2. The formulation of the main outcome (the existence of positive/negative correlations) is interpreted in a manner that is not really supported by the presented analysis. This first of all applies to wording like "validation" of the results. Even though the correlations in question are interesting and potentially valuable, essentially no validation is provided in the manuscript.

We don't understand this comment. Our validation measures are included in Table 1 where the results of the linear regression model are compared with actual values from coastDat2. We acknowledge that the length of the record is short, and this is why we cannot split the data set in a calibration and independent validation period. This is the reason why we used the leave-one-out method. This comparison is to our knowledge an accepted (see tree ring record validations) validation measure.

3. It is questionable whether it is acceptable to rely so strongly on a source (Ludwig et al. 2016) that is currently not yet published and has thus not fully undergone quality control of the peer-review process. A partial solution would be to make this source available, e.g., via ArXiv.org or similar channels.

This is currently not possible. The manuscript is still under revision in Aeolian Research. This unfortunately precludes the publication in another platform.

4. The use of English is generally fine but the use of several specialised terms is questionable and in some locations help from a native speaker might make the presentation more transparent and compact. The text contains numerous unnecessary repetitions, redundant words and phrases. The examples below highlight only a small selection of these, so the text should be thoroughly and entirely polished. The Abstract is far too long and contains several exact sentences from the body of the manuscript. The Discussion is basically a reformulation of work done, including assumptions, and contains no proper discussion. The list of references systematically ignores capitalisation of proper names.

We carefully re-read the text and hope to make the necessary adjustments to avoid redundant repetitions. The abstract was rephrased and shortened. We reworked the discussion and changed capitalizations in the references.

## Technical issues and recommendations for Sections 1 and 2 (pages 1–5)

Page 1, sentences on lines 3–4, 6–8, and 9 should not be part of Abstract and the rest of Abstract should also be compactified.

We rephrased and shortened the abstract.

Line 18: the expression "that this type of dunes can be validated with dendrochronological methods and derive acceptable validation values" requires complete rewriting.

Old version: "Thus, our study verifies that this type of dunes can be validated with dendrochronological methods and derive acceptable validation values as a wind proxy."

New version: "Thus, our study indicates that statistical methods that have been applied in dendrochronological studies can also be applied to analyze the records derived from migrating dunes as a wind proxy, yielding similar statistical validation skill."

Line 20: "from the meteorological reanalysis" is redundant.

We changed this accordingly.

Lines 21–24: the two sentences are redundant (or packed into a few words) without any loss to the content.

We reworked the abstract in large parts and these sentences are no longer included.

Page 2, line 2: remove "Future" as the statement is valid also for the past and present

We changed this accordingly.

Line 13 "during migration" is redundant.

We removed "during migration".

Line 15: "This kind of dunes do not only exist at the Polish coast, but also ..." should be rephrased.

Old version: "This kind of dunes do not only exist at the Polish coast, but also e.g. ..."

New version: "Comparable dune systems can also be found at other coasts e.g. ..."

Line 20: it is questionable whether it is appropriate to appraise here a source that is not yet published.

Old version: "The novelty of the Ludwig et al. (2016) study lies in the focus on seasonal to annual resolution."

New version: "The reconstruction by Ludwig et al. (2016) is the first attempt to use dunes as wind proxies on seasonal to annual resolution."

Line 23 "measure device" should be corrected; also probably "step-like" is meant.

Old version: "...changes in the location of the measure device may result in very large stepchanges in the mean wind and wind variability."

New version: "...changes in the location of the measuring device may result in very large abrupt artificial changes in the mean wind and wind variability."

Page 3, lines 1–2: "instead of direct station observations" is redundant without any loss of content.

We deleted "instead of direct station observations"

The sentence on lines 7–9 is weakly (if at all) connected with the text and could be deleted without any harm to the core message.

Maybe we did not phrase this sentence clearly enough. It is meant to be connected to the previous sentence which demonstrates the disadvantage of the reanalysis. The following sentence should, on the other hand, present the clear advantage of reanalysis data (homogeneity) compared to station data. We tried to rephrase it:

Old version: "Due to their use of observations, these kind of data may span a limited period in which the records can be considered homogeneous. However, the connection to observations is an advantage, as, in theory, meteorological reanalysis being close to the available - possibly sparse and incomplete - observation records, provide a multivariable data set that is complete in space and time."

New version: "Due to their use of observations, the time span in which reanalysis data can be considered homogeneous is limited. On the other hand, this connection to observations is advantageous because meteorological reanalysis data is closely linked to real observational data, in contrast to free-running model simulations that do not include data assimilation. Thus, meteorological reanalysis provides a multivariable data set, that follows the time evolution of observations and, that is complete in space and time."

Line 10: "statistical link" sounds strange.

We changed "links" to "relationship".

Line 11 and in many occasions below: the term "dune intervals" is, to my knowledge, not widely used in coastal science. Its classic (but perhaps partially outdated) notion is the distance between crests of two subsequent dunes. Its use in the context of this manuscript may collide with the use of "interval" in a completely different sense as intervals between glacial cycles. Thus, I strongly recommend to consider another term, and if "dune intervals" is generally used in this field of science, to bring a thorough explanation and references in order to avoid misinterpretation.

We changed "dune interval" to "dune layer".

Line 11: "the relationships between the reconstructed wind and wind characteristics" is incomprehensible.

Old version: "...the relationships between the reconstructed wind and wind characteristics..."

New version: "...the relationships between the reconstructed and actual wind characteristics, derived from the reanalysis..."

Line 12: say just "speed" instead of "wind speed".

We changed this accordingly.

Lines 20–22: such short introductions to chapters are basically fine, but they also serve as partial repetitions of the material in Introduction and could be merged with the information on lines 17-18.

We agree with the reviewer. This might be merged into the last part of the introduction. Nevertheless, we personally think that a short "introduction" to the second section may be helpful to lead the readers, especially as this section includes several subsections with important information.

Line 25: the sentence is pure repetition of material on lines 3-4 and should be omitted.

We removed this sentence.

Line 29: "changes" requires "are".

We changed this accordingly.

Lines 30–31: the length of the coastDat2 does not make it homogeneous, so please reformulate the claim.

Old Version: "In our case, the coastDat2 data set covers the period from 1948 onwards. Thus, it can be considered to be largely homogeneous."

New Version: "In our case, the coastDat2 data set covers the period from 1948 onwards. This period is covered by an almost stable number of observations. Hence, it can be considered to be largely homogeneous."

Line 32: the text says already fourth time here that coastDat2 is used in the presented manuscript.

Old Version: "In this study, the analysed data set is coastDat2, a result of..."

New Version: "CoastDat2 is a result of..."

Page 4, line 1: "COSMO-CLM" should appear only once.

We changed this accordingly.

Line 3: a comma before the equality sign should be deleted, and one should say "levels".

We changed this accordingly.

Line 5 " on hourly temporal resolution": say simply "hourly".

We changed this accordingly.

Line 8: delete " (used to generate coastDat2)" as this information was already provided.

We changed this accordingly.

Line 10 and several other occasions: "comparable" is not a good adjective to characterise the match of two quantities; please use some more exact quantification.

We changed "comparable" in the mentioned occasion to "equal" and in the other cases to "similar".

The sentence on lines 18-20 seems not to carry any new information and could be deleted.

We deleted the mentioned sentence.

Line 20: consider replacing "And although there exist" by "Although there exists".

We changed this accordingly.

Line 22: consider replacing "be dependent" by "depends".

This is just personal taste. We would prefer to keep "be dependent".

Lines 23-24: remove " Regarding temperature," and " Regarding precipitation".

We changed this accordingly.

Line 25: remove " obtained with coastDat2 data" as it is clear from the context from where the results stem.

We changed this accordingly.

Page 5, lines 5–6: consider replacing the unclear phrase " which mostly occur and are strongest" by "which are most frequent and strongest".

We changed this accordingly.

Lines 7–8: delete "due to sediment deposition on its lee side" as this is clear from the first part of the sentence.

We deleted "due to sediment deposition on its lee side".

Lines 11–12: the claim " Nevertheless, winds are the most important drivers of aeolian processes in general" is true by definition (Aeolus was the Greek god of the winds) and should be removed from here.

The sentence was removed.

Line 12: remove "amount".

We changed this accordingly.

Line 15: please provide standard deviations of the seasonal and annual temperatures; otherwise the claim that the area undergoes only small annual temperature variations is not justified.

We included standard deviations.

Lines 18–19: as above, please consider whether "interval" is the appropriate term here; also rephrase "intervals with interspersed intervals of heavy minerals".

All "intervals" were replaced.

Old version: "...intervals with interspersed intervals of heavy minerals "

New version: "...layers with interspersed deposits of heavy minerals."

Lines 21–22: the sentence almost exactly repeats material on lines 6–7.

Yes, it is a little repetition about the sand movement direction. However, this sentence also adds two new pieces of information. One is that both sand materials are transported together. The second is that it provides the main wind directions of transport and the seasons in which they occur. Therefore we would like to keep the sentence as it is.

Lines 24–25: remove " GPR has already been used to analyse dunes by ".

We changed this accordingly.

Line 27: it is not clear what "its thickness" means (of layers, not the code?).

Old version: "This alternating pattern is termed sedimentary bar code (Fig. 1), and its thickness varies from year to year."

New version: "This alternating pattern is termed sedimentary bar code (Fig. 1), and the thickness of the individual bars varies from year to year."

Line 28: either "not linear"(without a hyphen) or "non-linear"; please notice that these categories are different.

We changed this to "not linear".

Line 29: remove "rather".

We removed "rather".

Line 31: consider saying "cluster" instead of "dune complex composed".

We changed this accordingly.

Page 6: "progradation" generally cannot be "higher" but should be faster (or its rate may be higher).

We changed "higher" to "faster".

Sections 3–5 the manuscript contain a more or less similar proportion of small issues per page but I do hope that they will all be removed in the substantially revised version of the paper.

We re-read and reworked the manuscript and hope to have eliminated those small issues.