MDPI

Article

Penguins are amazing

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Simple Summary: Penguins are super cool

Abstract: Penguins are a group of flightless birds that are highly adapted to living in the harsh environments of the Southern Ocean. However, these iconic animals are facing numerous threats, including climate change, which is altering their habitats and affecting their survival. In this study, we assessed the impact of climate change on penguin populations by analyzing long-term data on penguin abundance, distribution, and breeding success. Our results show that changes in sea ice extent and ocean temperature have had a significant impact on the distribution and abundance of penguin populations, with some species experiencing declines in population size and reproductive success. These findings highlight the vulnerability of penguins to climate change and the urgent need for conservation efforts to protect these charismatic and important species. We suggest that future research should focus on developing effective management strategies to mitigate the impacts of climate change on penguin populations and their habitats.

Keywords: Penguins; Cold; Antarctica.

1. Version

This Rmd-skeleton uses the mdpi Latex template published 2019/02. However, the official template gets more frequently updated than the 'rticles' package. Therefore, please make sure prior to paper submission, that you're using the most recent .cls, .tex and .bst files (available here).

2. Introduction

Penguins are awesome. They are birds but too cool to fly, so they rather swim. You can find a nice reference to what just said here [1] and here [2].

3. Materials and Methods

We collected data on three morphological traits of penguins: body mass, flipper length, and bill length. We measured these traits in a total of 200 individual penguins from three different species: Adelie, Gentoo, and Chinstrap.

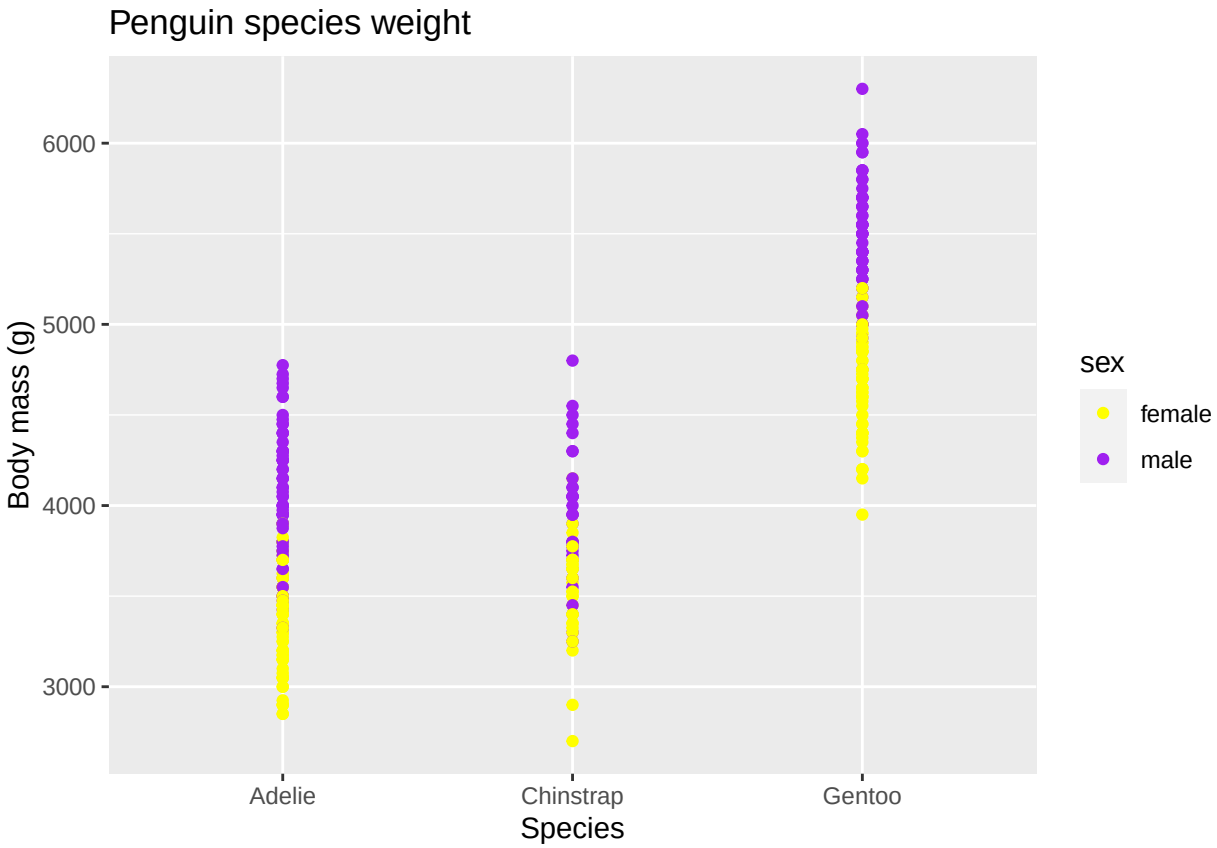
```
## tibble [344 x 8] (S3: tbl_df/tbl/data.frame)
##  $ species          : Factor w/ 3 levels "Adelie","Chinstrap",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ island           : Factor w/ 3 levels "Biscoe","Dream",..: 3 3 3 3 3 3 3 3 3 3 ...
##  $ bill_length_mm   : num [1:344] 39.1 39.5 40.3 NA 36.7 39.3 38.9 39.2 34.1 42 ...
##  $ bill_depth_mm    : num [1:344] 18.7 17.4 18 NA 19.3 20.6 17.8 19.6 18.1 20.2 ...
```

```
##  $ flipper_length_mm: int [1:344] 181 186 195 NA 193 190 181 195 193 190 ...
##  $ body_mass_g      : int [1:344] 3750 3800 3250 NA 3450 3650 3625 4675 3475 4250 ...
##  $ sex              : Factor w/ 2 levels "female","male": 2 1 1 NA 1 2 1 2 NA NA ...
##  $ year             : int [1:344] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 ...
```

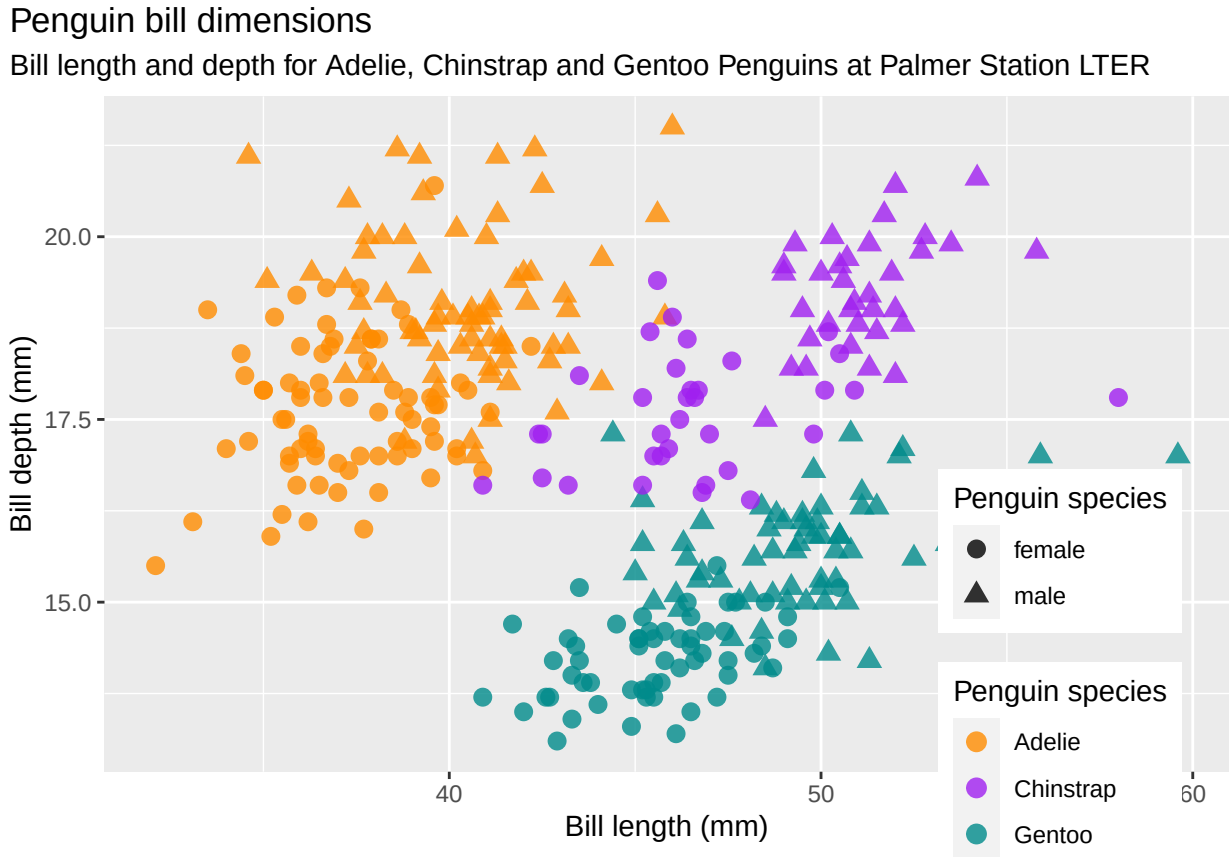
```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   0.3.5
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.5.0
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
## # A tibble: 3 x 2
##   species       n
##   <fct>     <int>
## 1 Adelie      152
## 2 Chinstrap    68
## 3 Gentoo      124
```

```
## # A tibble: 333 x 10
##    species island    bill_~1 bill_~2 flipp~3 body_~4 sex    year fl_b_~5 bill_~6
##    <fct>   <fct>       <dbl>   <dbl>   <int>   <int> <fct> <int>   <dbl>   <dbl>
##  1 Adelie  Torgersen    39.1    18.7     181    3750 male   2007  0.0483    2.09
##  2 Adelie  Torgersen    39.5    17.4     186    3800 fema~  2007  0.0489    2.27
##  3 Adelie  Torgersen    40.3    18       195    3250 fema~  2007  0.06      2.24
##  4 Adelie  Torgersen    36.7    19.3     193    3450 fema~  2007  0.0559    1.90
##  5 Adelie  Torgersen    39.3    20.6     190    3650 male   2007  0.0521    1.91
##  6 Adelie  Torgersen    38.9    17.8     181    3625 fema~  2007  0.0499    2.19
##  7 Adelie  Torgersen    39.2    19.6     195    4675 male   2007  0.0417    2
##  8 Adelie  Torgersen    41.1    17.6     182    3200 fema~  2007  0.0569    2.34
##  9 Adelie  Torgersen    38.6    21.2     191    3800 male   2007  0.0503    1.82
## 10 Adelie  Torgersen    34.6    21.1     198    4400 male   2007  0.045     1.64
## # ... with 323 more rows, and abbreviated variable names 1: bill_length_mm,
## #   2: bill_depth_mm, 3: flipper_length_mm, 4: body_mass_g, 5: fl_b_ratio,
## #   6: bill_length_depth
```

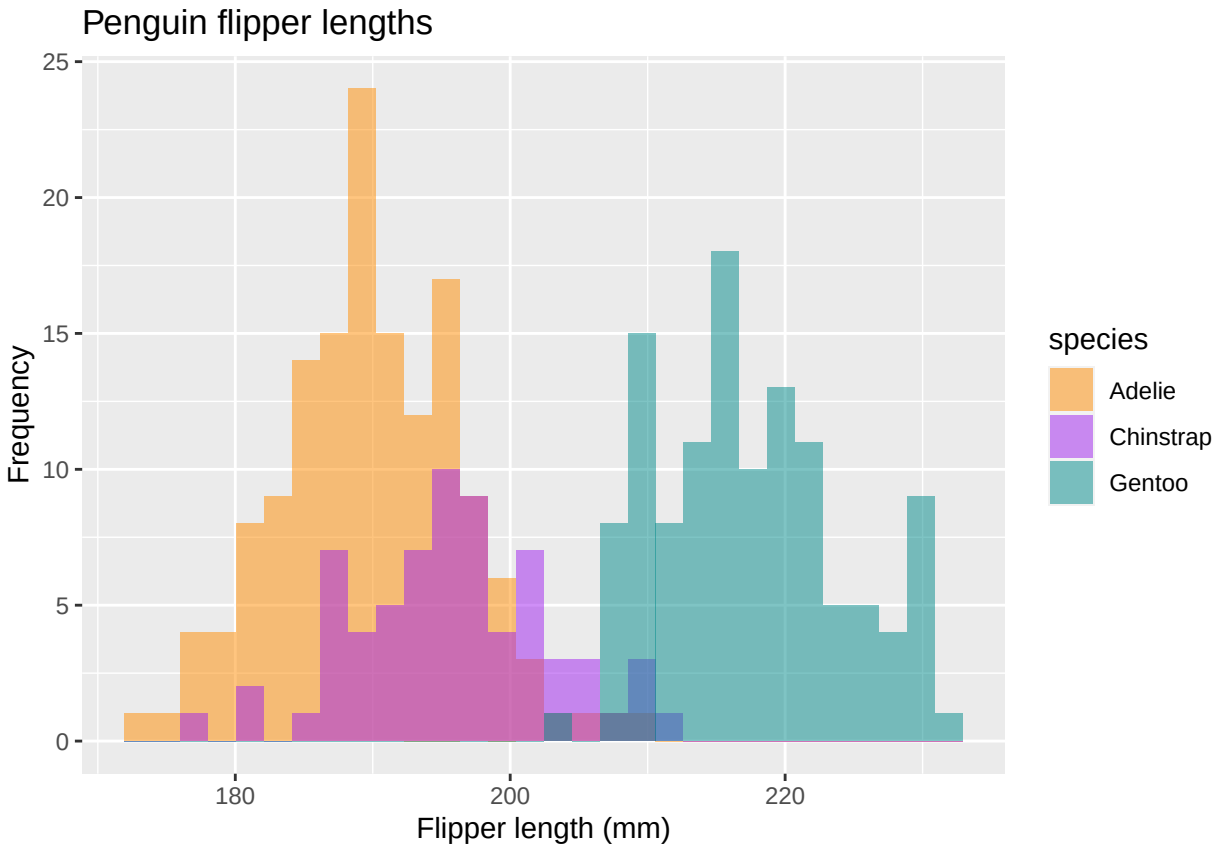


64



65

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



4. Results

Our data show significant differences in body mass, flipper length, and bill length among the three penguin species. Adelie penguins were found to be the smallest in body mass, flipper length, and bill length, while Chinstrap penguins were the largest in these traits. Gentoo penguins were intermediate in size for all three traits.

4.1. Differences between species

Different species are quite different

4.1.1. Species 1

This is the biggest species. They are

- largest
- heaviest
- cutest

This is what makes them cute

1. The tiny baby penguins
2. They cuddle up
3. They get tired of walking and float on their bellies.

The text continues here.

All figures and tables should be cited in the main text as Figure 1, Table 1, etc.

Figure 1. This is a figure, Schemes follow the same formatting. If there are multiple panels, they should be listed as: (**a**) Description of what is contained in the first panel. (**b**) Description of what is contained in the second panel. Figures should be placed in the main text near to the first time they are cited. A caption on a single line should be centered.

Table 1. This is a table caption. Tables should be placed in the main text near to the first time they are cited.

Title 1	Title 2	Title 3
entry 1	data	data
entry 2	data	data

This is an example of an equation:

$$\mathbb{S} \tag{1}$$

Example of a theorem:

Theorem 1. *Example text of a theorem.*

The text continues here. Proofs must be formatted as follows:
Example of a proof:

Proof of Theorem 1. Text of the proof. Note that the phrase 'of Theorem 1' is optional if it is clear which theorem is being referred to. □

The text continues here.

5. Discussion

Our findings suggest that the observed differences in penguin morphological traits may be related to differences in foraging behavior and habitat use among the species. Adelie penguins, for example, feed primarily on krill, which may require a smaller body size and bill length for efficient feeding. Chinstrap penguins, on the other hand, feed on a more diverse range of prey, including fish and krill, which may explain their larger size and longer bill length. Our study highlights the importance of considering species-specific adaptations and behaviors when studying penguin morphology and ecology.

6. Conclusion

Penguins are awesome.

7. Patents

This patent is that we are the first to find out how cute pengunis are.

Acknowledgments: Funded by Penguin Studies Foundation. Thanks to penguins.

Author Contributions: The First author decided on the cutenuss of penguins and why they should be studied. The second author agreed, measuered and weighed some penguins, basically did all the work.

Conflicts of Interest: There is no conflict of interest

Abbreviations

The following abbreviations are used in this manuscript:

MDPI	Multidisciplinary Digital Publishing Institute
DOAJ	Directory of open access journals
TLA	Three letter acronym
LD	linear dichroism

Appendix A

Appendix A.1

The appendix is an optional section that can contain details and data supplemental to the main text. For example, explanations of experimental details that would disrupt the flow of the main text, but nonetheless remain crucial to understanding and reproducing the research shown; figures of replicates for experiments of which representative data is shown in the main text can be added here if brief, or as Supplementary data. Mathematical proofs of results not central to the paper can be added as an appendix.

Appendix B

All appendix sections must be cited in the main text. In the appendixes, Figures, Tables, etc. should be labeled starting with 'A', e.g., Figure A1, Figure A2, etc.

References

1. Cimino, M.A.; Conroy, J.A.; Connors, E.; Bowman, J.; Corso, A.; Ducklow, H.; Fraser, W.; Friedlaender, A.; Kim, H.H.; Larsen, G.D.; Moffat, C.; Nichols, R.; Pallin, L.; Patterson-Fraser, D.; Roberts, D.; Roberts, M.; Steinberg, D.K.; Thibodeau, P.; Trinh, R.; Schofield, O.; Stammerjohn, S. Long-term patterns in ecosystem phenology near Palmer Station, Antarctica, from the perspective of the Adélie penguin. *Ecosphere* **2023**, *14*, e4417, [https://esajournals.onlinelibrary.wiley.com/doi/pdf/10.1002/ecs2.4417]. doi:https://doi.org/10.1002/ecs2.4417.
2. Leutnant, D.; Muschalla, D.; Uhl, M. Stormwater Pollutant Process Analysis with Long-Term Online Monitoring Data at Micro-Scale Sites. *Water* **2016**, *8*, 299. 00000, doi:10.3390/w8070299.

Sample Availability: Samples of the compounds ..... are available from the authors.