**Supplementary results**

The model including body temperature as the response variable, with ambient temperature and individual ID as interacting explanatory variables was significant for both segments (below 29°C: F9,215 = 122.8, p < 0.001; above 29°C: F9,100 = 33.03, p < 0.001). In both cases, ambient temperature, individual ID and the interaction term was significant within the models (Supplementary Table 2). The slope of the negative relationship between body temperature and ambient temperature at ambient temperatures below 29°C ranged from 0.10 (penguin #4) to 0.24 (penguin #1) (Supplementary Figure 1). The slope of the positive relationship between body temperature and ambient temperature at ambient temperatures above 29°C ranged from 0.07 (penguin #3) to 0.25 (penguin #5) (Supplementary Figure 2).

A diagram of different colored lines

Description automatically generated

Supplementary Figure 1: Body temperature of individual African penguins (*Spheniscus demersus*) at ambient temperatures below 29°C. Plotted regression lines are based on a simple linear regression analysis, as described by the equations provided in the figure.

A diagram of different colored lines

Description automatically generated

Supplementary Figure 2: Body temperature of individual African penguins (*Spheniscus demersus*) at ambient temperatures above 29°C. Plotted regression lines are based on a simple linear regression analysis, as described by the equations provided in the figure.

Supplementary Table 2: Analysis of variance summary table for the model including body temperature as the response variable, with ambient temperature and individual ID as interacting explanatory variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Explanatory variable | DF | SS | MS | F-value | P-value |
| Response: Tb (Ta < 29°C) | | | | | |
| Ta | 1 | 55.977 | 55.977 | 882.936 | < 2.2e-16 |
| ID | 4 | 9.924 | 2.481 | 39.135 | < 2.2e-16 |
| Ta:ID | 4 | 4.147 | 1.037 | 16.352 | 1.037e-11 |
| Residuals | 215 | 13.631 | 0.063 |  |  |
| Response: Tb (Ta > 29°C) | | | | | |
| Ta | 1 | 9.543 | 9.543 | 227.609 | < 2.2e-16 |
| ID | 4 | 1.506 | 0.377 | 8.982 | 3.072e-06 |
| Ta:ID | 4 | 1.415 | 0.354 | 8.440 | 6.578e-06 |
| Residuals | 100 | 4.193 | 0.042 |  |  |