

Body Size Change in Alaskan Red Squirrels Over Decadal Timescales



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Introduction:

- Significant changes in body size over the past century, frequently attributed to climate change, have been observed in several species of Alaskan mammals, but no rodents have been studied to date
- This study explores patterns of ecogeographic variation in red squirrels from interior Alaska over decadal timescales

Methods:

- Over 1,900 Alaskan red squirrel specimens housed in 20 N. American museums were screened
- 350 adults were identified based on dental wear, reproductive stage, and collecting date
- Total body length and two measures of skull length (Fig.1) were recorded and subjected to linear regression models against year

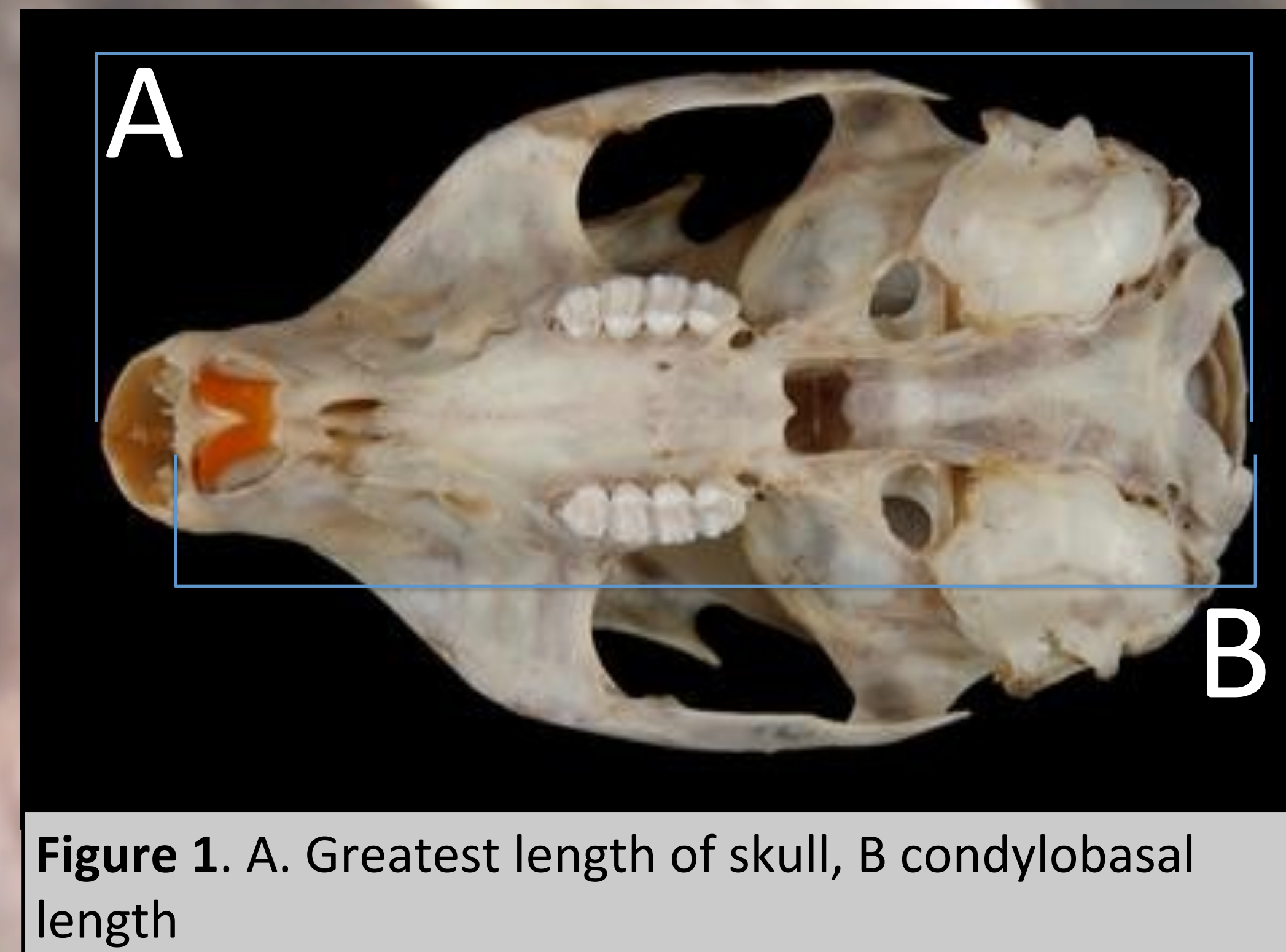


Figure 1. A. Greatest length of skull, B condylobasal length

Results

- No statistically significant change in any measure of size (Figs. 2-4)
- No significant sexual dimorphism
- *Variance* may fluctuate temporally

Discussion

- Overall size has not changed, despite changes in temperature and other climatic indices
- Are squirrels physiologically counteracting environmental change?
- Future directions:
 - Find the best explanatory environmental variable responsible for squirrel size
 - See if coefficient of variation for each measurement (and others) is changing over time

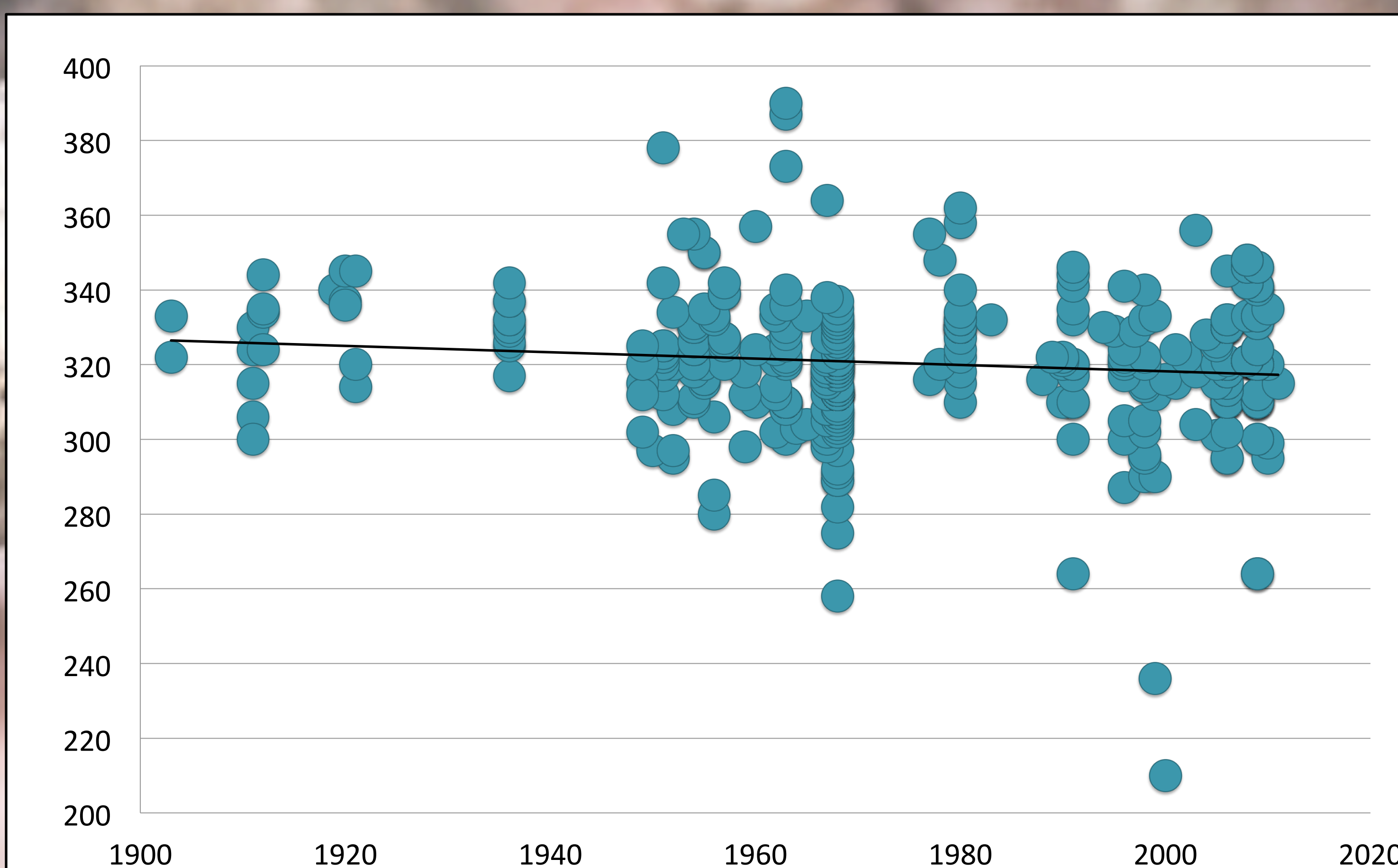


Figure 2. Total Body Length (mm) against Year

Total Length = $-0.0851(\text{year}) + 488.33$, $R^2 = 0.01322$.

Intercept: Standard Error = 77.8174 LCL=306.4 UCL=670.2 P-value=1.04E-09

Year: Standard Error = 0.0394, LCL=-0.17714 UCL=0.00702 P-value = 0.03154

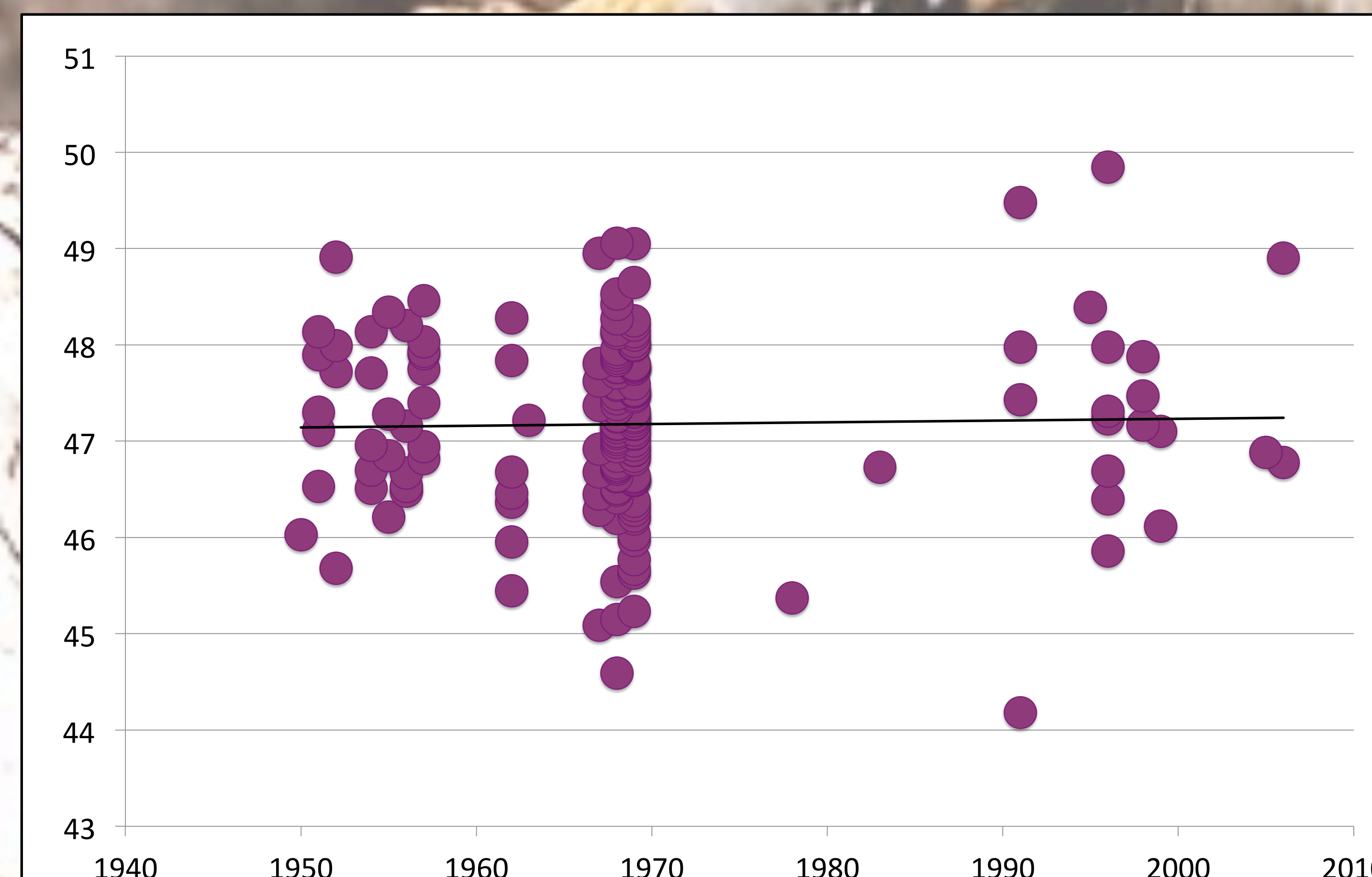


Figure 3. Greatest Length of Skull (mm) against Year.

Greatest Length of Skull = $0.0018(\text{year}) + 43.646$, $R^2 = 0.00055$

Intercept: Standard Error = 11.5 LCL=16.7 UCL=70.6 P-value = 0.0002

Year: Standard Error = 0.00583 LCL=-0.012 UCL=0.015 P-value = 0.7589

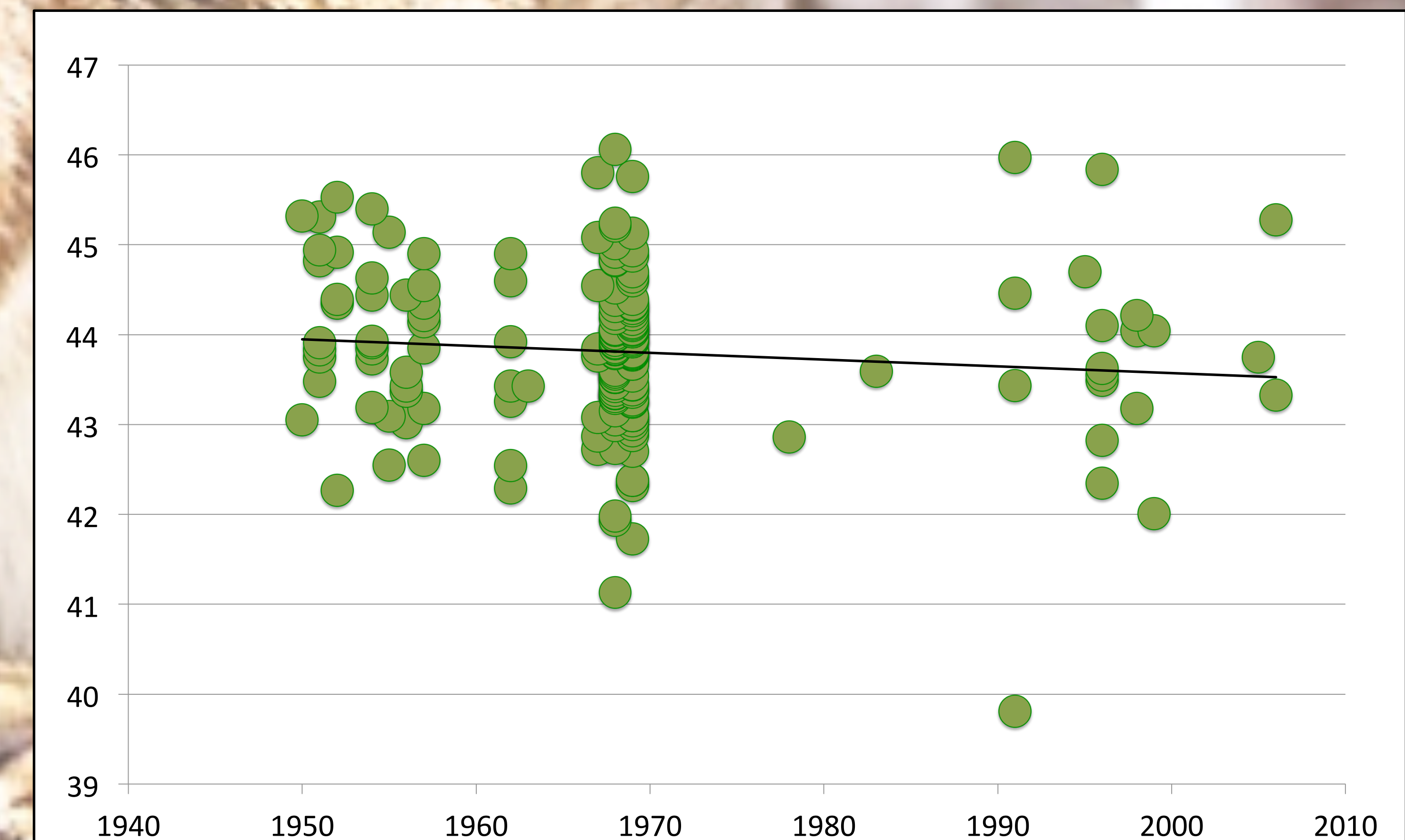


Figure 4. Condylobasal Length (mm) against Year

Condylobasal Length = $-0.0075(\text{year}) + 58.604$, $R^2 = 0.00998$

Intercept: Standard Error = 11.107 LCL=32.5 UCL=84.68 P-value=3.84E-07

Year: Standard Error = 0.00564 LCL=-0.021 UCL=0.00573 P-value = 0.1845

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