I. ALLOMETRIC SCALING

We collected 16 dental measurements for each of 52 extant primate species. For each dental measurement, we fit an allometric scaling model [1] that provides a statistical estimate of a species body mass from its dental measurement. We then applied these models to dental measurement data for fossil primate species to obtain estimates of their body masses. These 16 measurements included width and length measurements of the first, second, and third upper and lower molars along with the fourth upper and lower premolar. In gathering these measurements we preferred trigon breadth to talon breadth measurements and anterior breadth to posterior breadth measurements when buccolingual measurements were not available. Applying allometric scaling techniques yields 16 models each of the form $\log(M) = \alpha \log(D) + \beta$ where M is the estimated body mass in grams, D is the dental measurement relevant to the particular model, and α and β are the slope and intercept of the best fit (least squares) line through the transformed data. The equations of these lines along with R^2 values and sample sizes are listed below (Table I) for each dental measurement. We also show the lines corresponding to these fits for each measurement (Figure 1).

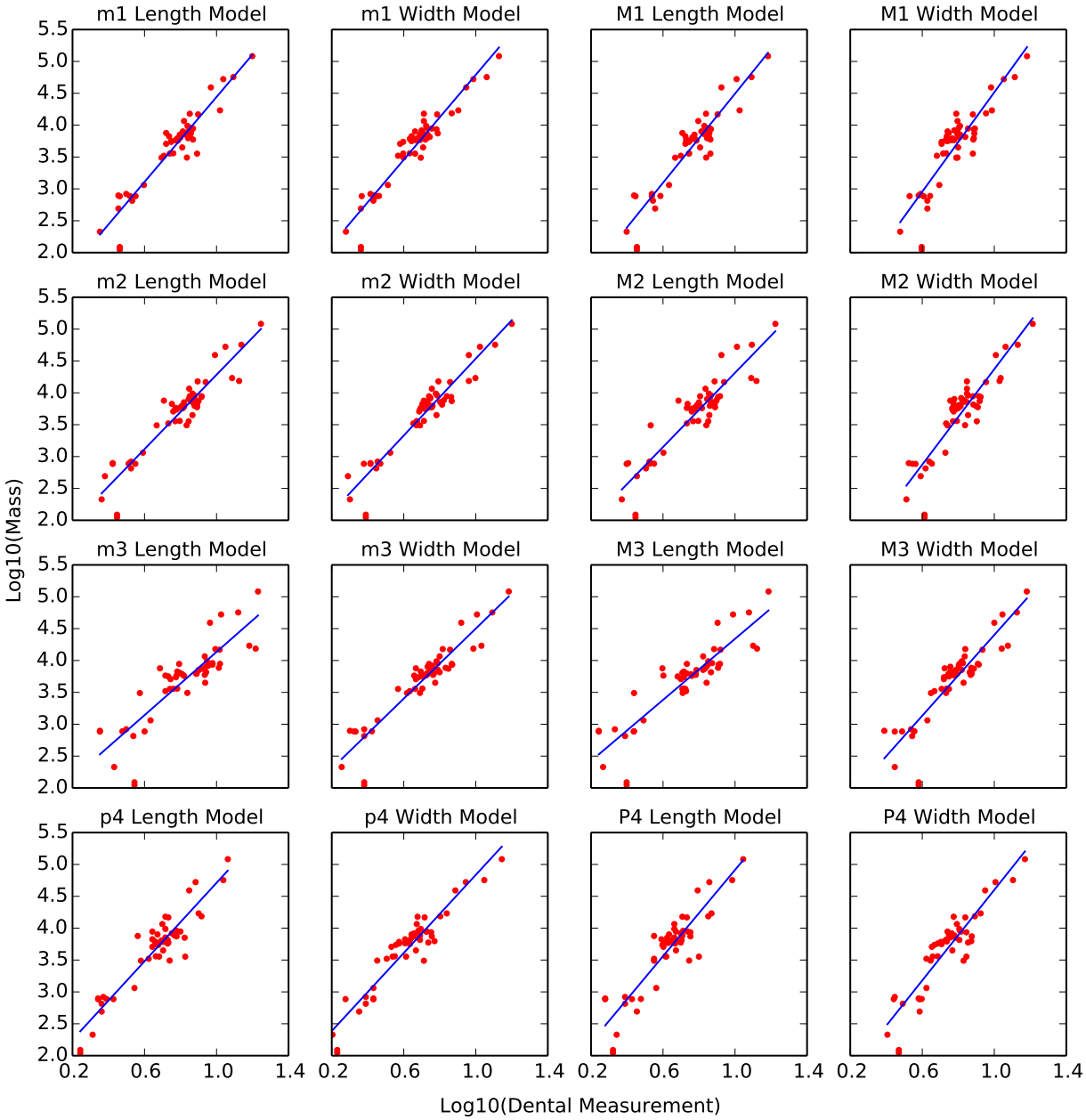

FIG. 1: Lines of best fit for each dental measurement. These are of the form $\log(M) = \alpha \log(D) + \beta$.

Dental Measurement (D)	α	β	R^2	Sample Size (N)
m1 Length	3.3318	1.1104	0.89	51
m1 Width	3.3315	1.4585	0.90	52
M1 Length	3.4964	0.9978	0.87	51
M1 Width	3.8988	0.6167	0.78	52
m2 Length	2.9158	1.3673	0.88	52
m2 Width	3.0168	1.5200	0.91	52
M2 Length	2.9115	1.4026	0.83	52
M2 Width	3.7439	0.6271	0.81	52
m3 Length	2.4806	1.6538	0.73	51
m3 Width	2.7470	1.7538	0.88	51
M3 Length	2.3959	1.9439	0.79	51
M3 Width	3.1690	1.2317	0.79	51
p4 Length	3.0771	1.6337	0.87	52
p4 Width	3.0633	1.7730	0.89	52
P4 Length	3.3852	1.5290	0.82	52
P4 Width	3.5514	1.0491	0.82	52

TABLE I: Equations for the lines of best fit, of the form $\log(M) = \alpha \log(D) + \beta$, for each dental measurement along with R^2 values and the number of points used to generate the fit.

II. DATA SUMMARY

The collected data consists of $1,110$ species (498 extant and 612 extinct; 1024 primates and 86 plesiadapiformes) across 373 genera. We were able to collect body mass estimates or measurements for 653 species and, using the allometric scaling method described above, estimate the body sizes of 176 additional species. A body size estimate along with first and last appearance dates were found for a total of 742 species. These are the species represented in figures and used in our analysis. The full dataset may be found in Supplement 2.

Supplement 2 is a file containing comma separated values organized by columns as follows:

`col 1` Genus name

`col 2` Species name

`col 3` Colon separated list of genus and species synonyms

`col 4` "yes" if the species is extant, "no" if it is not, and blank if this information was not found

`col 5` "yes" if the species is a plesiadapiform

`col 6` Plesiadapiform reference

`col 7` First appearance in millions of years ago

`col 8` Last appearance in millions of years ago

`col 9` Apearance range reference

`col 10` Body size estimate in grams

`col 11` Body size reference or "estimate" if the value was estimate using allometric scaling and dental measurements

`col 12` m1 Length in mm

`col 13` m1 Width in mm

`col 14` M1 Length in mm

`col 15` M1 Width in mm

`col 16` m2 Length in mm

`col 17` m2 Width in mm

`col 18` M2 Length in mm

`col 19` M2 Width in mm

`col 20` m3 Length in mm

`col 21` m3 Width in mm

`col 22` M3 Length in mm

`col 23` M3 Width in mm

`col 24` p4 Length in mm

`col 25` p4 Width in mm

`col 26` P4 Length in mm

`col 27` P4 Width in mm

`col 28` List of dental measurement references

`col 29` "yes" if the species is a New World primate

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[1] Philip D. Gingerich, B. H. Smith, and K. Rosenberg. Allometric scaling in the dentition of primates and prediction of body weight from tooth size in fossils. *American Journal of Physical Anthropology*, 58(1):81–100, 1982.