**Determinants of extinction in the fossil record by Shanan E. Peters and Michael Foote**

This is another article that looks at how the stratigraphic record affects our knowledge of paleobiology, in this particular case extinction rates. The authors believe that the rock record can distort rates of extinction and origination near stratigraphic boundaries and in relation to the amount of exposed outcrop that is available to sample from. To test these hypotheses, they used several statistical tests to find the extinction rates in each stratigraphic unit and the change in the amount of rock available in each unit. They also generated two mathematical models, one with variable stage lengths and declining extinction rates and the other with constant stage lengths and extinction rates, and correlated them with the observed extinction rates. They generated null distributions of the correlation coefficients by using randomized data in each model, and what resulted were two approximately normal distributions with the variable model having a mean larger than zero due to the timescale used to calculate it and the observed extinction rates. When comparing the observed correlation coefficients with the null distributions, the observed correlation coefficients lie well outside of the distributions, so this shows that the observed time series has a statistically significant capability of predicting extinction rates or, perhaps, apparent extinction rates. The ultimate conclusion of the paper was that some of the volatility in extinction rates due to apparent mass extinctions may be illegitimate, but that is not to say that there were not mass extinctions. They may just appear more severe, or possibly less severe, due to our access to and the preservation of the fossil record.

I enjoyed this article to an extent. I had to read through it several times, but, fortunately, it was short. As far as I can tell, all the statistical arguments seem valid, but I have only had one semester of introductory statistics. I understand correlations well, and I am aware that correlation does not imply causation, and I think it is good that the authors addressed that in the paper. I took some time to read through the methods, and I believe I have a tenuous grasp on the mathematics that were used in the study. I recognized integrals from Calc. 2, and this actually has made me more curious about the methods used rather than being off put.

The only thing I did not like is actually related to what I did like, and that is the density of quantitative information. I just feel like I want to have a better grasp on statistical methods and the jargon used. I have never heard of a product-moment correlation coefficient, and I am still unsure as to what exactly it is that is being measured, but I have become more receptive to this type of situation since the class began.

The figures, overall, corroborated well with the information laid out in the paper and followed a very logical sequence, for the most part. Figure 1 makes the most sense to me because it is fairly basic. Figure 1c is the most interesting part of Figure 1 just because it shows a stronger correlation than the other two graphs. Figure 2 was slightly confusing just based on its format. I just feel like the graphs should be in a different order since 2a and 2c correspond to the variable model and the other two to the constant model. Maybe I am just being nitpicky, but I feel like that would have made what was being shown more clear, and I would not have had to read about it three times. I do not really know what is going on in Table 1 mostly because I do not know what a product-moment correlation coefficient is. Figure 3 made sense at a glance to me, but I really had to read quite a bit to figure out what exactly it was representing, and somehow I get it, but my grasp on the exact methods used is still tenuous at best.