COMPOSITION OF COMETS

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Comets are known to live in two populations – the Oort Cloud and the Kuiper Belt. As these comets approach the Sun, they heat up, sublimate, and release gas and dust. This gas and dust can tell us about the composition of the comet's nucleus. The composition of the nucleus may depend on where the comet formed in the pre-solar nebula. In order to truly understand the difference in these cometary volatiles, researchers look at the differences between periodic vs. non-periodic comets (comets that orbit around the sun vs. those that follow a parabolic orbit) and dynamically new vs. dynamically old (comets that have encountered perihelion once vs. those that have been around the sun multiple times). We developed a program in Python to delve into NASA's Planetary Data System to analyze the cometary production rate data. The program is able to read the data and plot the ratio of CN (cyanide), a prevalent gas in comets, to Af(rho), a unit of measurement describing the brightness of the cometary dust. It was hypothesized that the standard deviation between the the ratio as a function of heliocentric distance would not be significant, indicating that the ratio did not significantly change as a function of heliocentric distance for all comet types. As plots were made, the hypothesis was supported. The dataset comprising the ratio of CN to Af(rho) for periodic and non-period comets as well as dynamically new and dynamically old did not have large standard deviations, meaning that the ratio of CN to Af(rho) did not differ as a function of heliocentric distance. A few outliers were found and will be discussed in the poster.

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