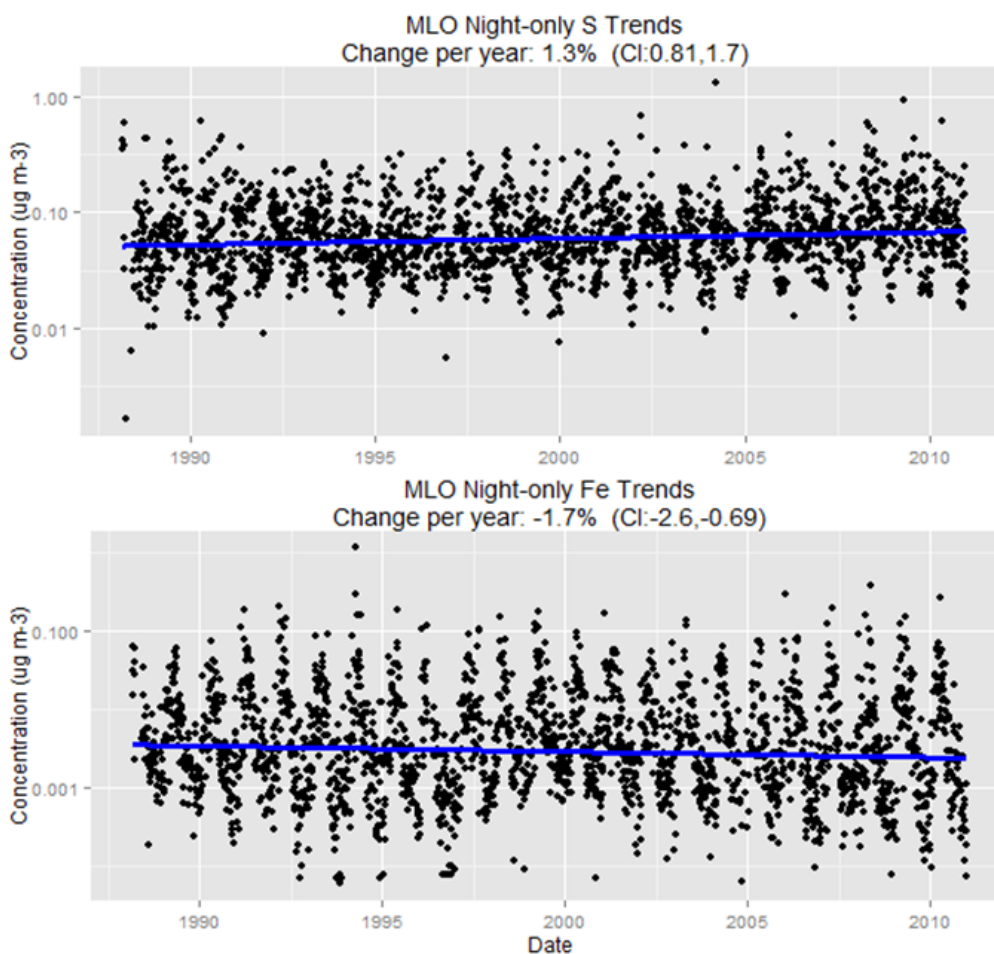


## A 23-year Record of Twice-weekly Aerosol 1 Composition Measurements at Mauna Loa Observatory

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This abstract introduces a newly compiled data set of atmospheric particulate matter (PM) measurements from 1988 through 2010 at Mauna Loa Observatory (MLO), Hawaii, USA. The data are from two samplers: one running only during the nighttime hours over multiple days and the other running continuously over the same days. The objective of the night-only sampler was to capture continental-scale background air masses transported in the free troposphere with minimal contamination from local and marine emissions, and the data suggest this objective was achieved. Elements characteristic of soils (e.g., iron) generally exhibit similar concentrations between the continuous and night-only samples, which suggests Pacific background air masses are responsible for the majority of the fine soil aerosol observed at MLO. Sulfur concentrations in the continuous samples often substantially exceed those in night-only samples, suggesting that marine and local sources contribute significantly to the daytime S concentrations at MLO. Trends were estimated from Thiel-Sen regression curves. Over the 23-years, sulfur concentrations in the night-only samples increased by 1.3% per year while iron concentrations decreased by -1.7% per year. These trends were statistically significant at the 95% confidence levels, and the continuous samples yielded similar trends in these elements.



**Figure 1.** Sulfur and iron concentrations measured at MLO along with trend estimates based on Thiel-Sen regression curves. 95% confidence intervals (CI) are listed in parentheses.