

The Ratio of Total Aerosol Carbon to Sulfate in the Free Troposphere at MLO

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There are very few locations from which to make time-series measurements of free tropospheric aerosols, so MLO's location has a unique value. We have measured inorganic aerosol anions and cations and nitric acid vapor nightly at MLO for two decades. We find that Total Carbon (TC) maximizes in the springtime, just as sulfate, nitrate, and calcium do. This is attributed to Asian outflow. However, the TC concentrations at MLO are considerably smaller than those measured in the FT from aircraft during ACE-Asia, suggesting that chemical transport models might not be underestimating OC by as much as Heald et al. (2005) suggest. The ratio of TC to SO_4 is usually well below one at MLO, in sharp contrast to the higher values just off the Asian coast. Every week or so in the winter we see peaks as large as $0.5 \mu\text{g TC}/\text{sm}^3$, but monthly average concentrations (Figure 1) are less than $0.1 \mu\text{g TC}/\text{sm}^3$ in all months but April (0.25) and August (0.15).

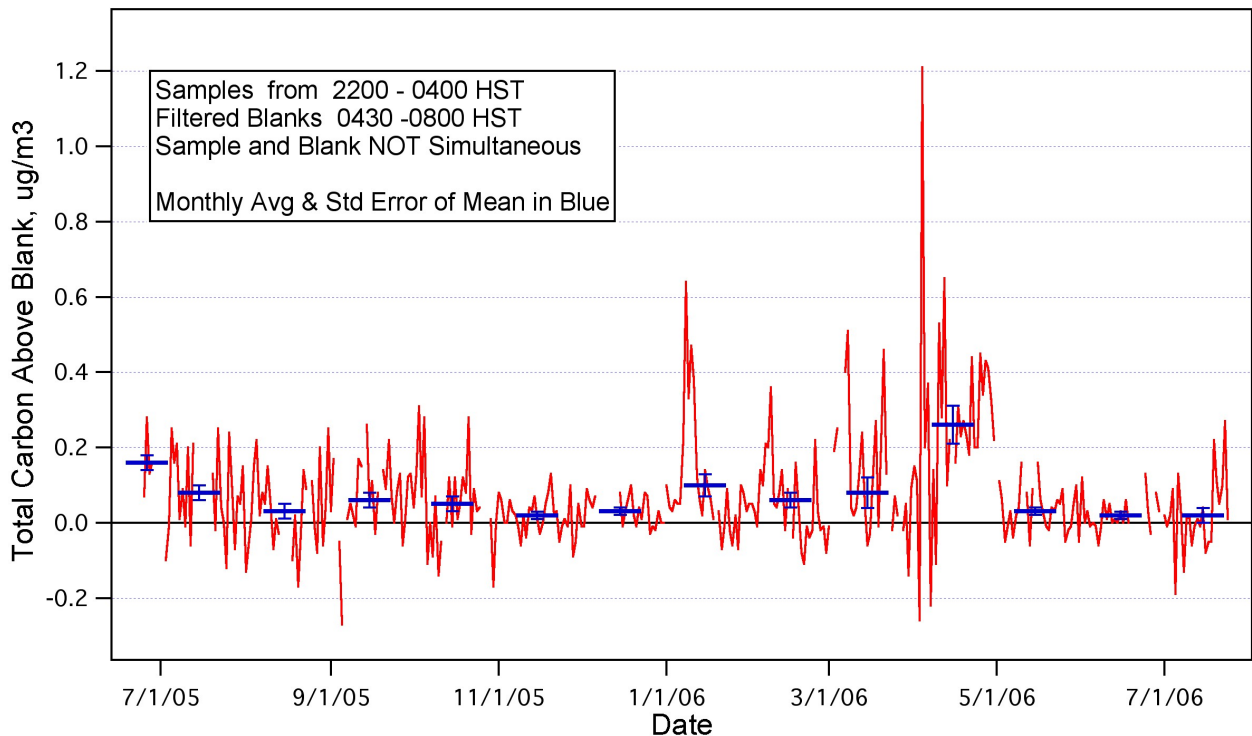


Figure 1. Daily (including noise) and monthly-averaged concentrations of Total Carbon at MLO.