

Stratospheric Aerosol from Pole to Pole: Balloonborne *In Situ* Observations

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Dave Hofmann and Jim Rosen pioneered *in situ* observations of stratospheric aerosol using balloonborne aerosol counters built at the University of Wyoming. They began their measurements in 1971, beginning one of the longest stratospheric aerosol records in existence, Figure 1. In the late 1980s, Dave initiated work to change the scattering angle and increase the flow rate of the instrument, thus extending the measurements to larger sizes and lower concentrations. This “new” instrument has been used to measure: the growth and decay of aerosol from Pinatubo, Figures 1, 2a), and 2b), the present long volcanically quiescent period, Figure 1, the size distributions of the different types of polar stratospheric cloud particles, in both the Antarctic, Figure 2d), and Arctic, Figure 2e), and, most recently, unusually large aerosol particles in the tropical upper troposphere / lower stratosphere, Figure 2c). Efforts are underway to develop a replacement instrument; however, at the moment, this “new” instrument remains nearly the only option to measure aerosol size distributions above 20 km. This talk will describe briefly the development of the “new” instrument and highlight some of the scientific observations made.

Figure 1. History of stratospheric aerosol above Laramie at 0.15 and 0.25 μm for altitude columns between 15-20 and 20-25 km. Volcanic eruptions in the low latitudes are shown in the green and high latitudes in blue. Solid symbols are eruptions with VEI > 4.

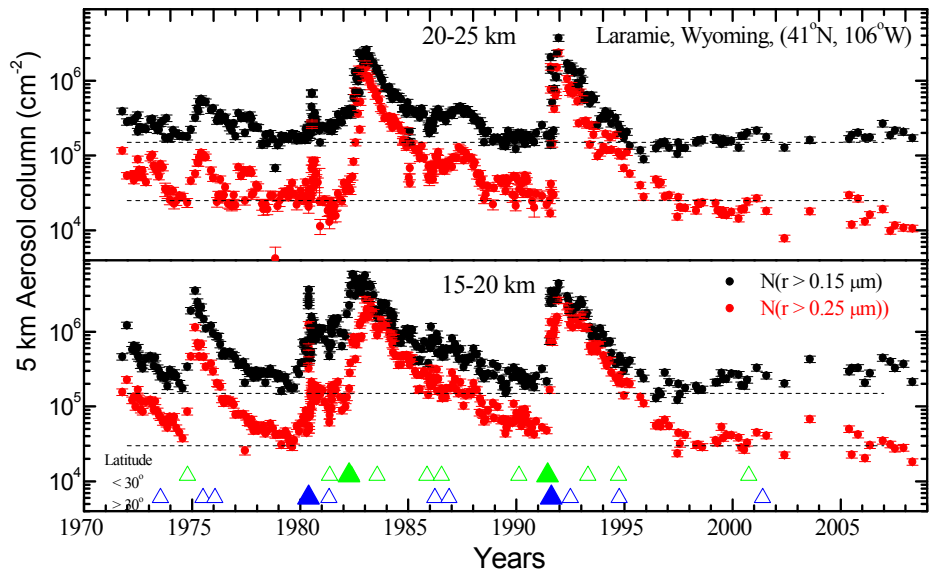


Figure 2. Example aerosol profiles from: mid latitudes a) 1992 and b) 2008, c) tropics, d) Antarctic, and e) Arctic.

