

## 6.210 Dynamic and Thermodynamic Forcing of Bioaerosol Spore Production.

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Abstract:

The Wideband Integrated Bioaerosol Spectrometer (WIBS) measures the equivalent optical diameter (EOD) and the fluorescence of individual particles in three spectra bands when the particle is excited at two wavelengths: 280 nm and 370 nm. Here we describe measurements made using the WIBS during an 18-day period from May 20-June 6, 2015 in the city of Leon, Spain. Hourly filter samples were also taken for pollen count analysis. A time series of wind speed, relative humidity (RH) and the fluorescence fraction (FF), defined as the ratio of all fluorescing particles to the total particles detected, show a clear diurnal cycle of all three parameters but out of phase with one another. The maxima in FF always occurs near midnight following the decrease in wind speed to near zero. The FF and RH are increasing at the same time but the FF maximizes before the RH. The cross correlational analysis shows that the FF reaches its maximum approximately two hours after the decrease in wind speed and three hours before the maximum in RH. Fluorescing particles are classified into seven types based on previous analysis and compared with a library of bacteria, fungi and pollen. Those particles that don't match library types are classified as "other". An analysis of the bioaerosol components shows that the increase in FF is partially due to the decrease in the total particle concentration but that the total bioaerosol concentration increases by about 60%, dominated by the increase in pollen-like and "other" bioaerosols. The bacteria remains constant throughout the day indicating that it is not dependent on wind speed or RH. We also observe that bacteria, fungi and pollen are 16%, 20% and 25% of the total bioaerosol population, respectively. The other remaining 37% of the bioaerosols remain to be identified.