Secrets of San Lorenzo Valley's Atmosphere: Vertical Meteorological Measurements, Part Two

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Our purpose is to determine the affect of atmospheric inversions on ground particulate matter 2.5 (PM 2.5) levels and to account for the health effects PM 2.5. We used radiosondes, 200g balloons, helium, parachutes, dereelers, an i-Met 3050 Sounding System, and data from Environmental Beta Attenuation Monitors. In the 2012/2013 season we collected atmospheric data over a period of three months and in the 2013/2014 season we collected atmospheric data when inversions were forecasted to occur. To account for the possible effect of vapor pressure upon both the inversions and particulate matter 2.5 levels, we have introduced the use of virtual potential temperature into our project for this year. Particulate matter 2.5 clearly was affected by atmospheric inversions, and increased greatly on inversion days. In some cases, PM 2.5 levels were “unhealthy” on inversion days and “healthy” on non-inversion days (derived by our modified Air Quality Index table). Also, the topography of San Lorenzo Valley clearly had much influence upon PM 2.5 levels. Various vapor pressures did not have an obvious effect on atmospheric inversions. Inversions dramatically affect levels of particulate matter 2.5, and due to this San Lorenzo Valley experienced many unhealthy days for particulate matter 2.5.

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