

(46-220415-C) **Observations of the Lower Stratospheric Environment from Solar Balloons in the Southwest US**

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The lower stratosphere from about 17-25 km above sea level is a border between the denser weather-bearing troposphere and upper atmospheric levels. This region of the atmosphere has climatological impacts by containing high concentrations of ozone, mesospheric clouds in the poles, and a holding place for gas and aerosols from Plinian eruptions. Based on these characteristics, the lower stratosphere is also a potential site for intentional stratospheric aerosol injections to reflect sunlight and cool the lower tropospheric atmosphere. Data from this region is based on weather balloon soundings, a few aircraft field campaigns, and both ground-based and space-based radiometric measurements. A novel method for data collection to the stratosphere has emerged through uncrewed solar-powered balloons (heliotropes) capable of floating for numerous hours and hundreds of miles. We present preliminary results taken from instrumentation carried to the lower stratosphere by the heliotropes and compare that to global reanalysis data sets. We compare these observations to ground-based and space-based measurements when and where available. Lessons-learned during the data collection will be shared, as these build on the foundations of experience and analytical work of heliotrope functionality in Bowman et al (2020). Linkages to other data streams and analysis collected by this project will be given.



Figure 1. Launch of a solar balloon from Belen, New Mexico, carrying atmospheric sensors for temperature, pressure, and aerosols.