

When an Eppley Normal Incident Pyrheliometer is calibrated against an Eppley Hickey Frieden Absolute Cavity Radiometer, the instrument systematically deviates from the absolute cavity readings. The reason for this deviation is not understood. Comparisons are made between one pyrheliometer and an absolute cavity radiometer on selected clear days over a period of 8 months in Eugene, Oregon. The ratios of the readings from the two instruments are correlated against wind speed, pressure, temperature, relative humidity, beam intensity, and zenith angle to determine if any of these parameters statistically influence the calibration process. Wind speed, pressure, beam intensity, and air mass are shown to be statistically significant factors in determining the responsivity of the normal incident pyrheliometer. The results of these tests are evaluated and discussed. Use of air mass instead of zenith angle is proposed for calibration reports.