Calibration Report: Multifilter Rotating Shadowband Radiometer, MFR-7, s/n 378

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Kevin Larman & Fred Denn
Analytical Services and Materials, Inc.
Hampton, Virginia

SUMMARY

Calibration date: 1 March 1999.   Next calibration due: 1 March 2001

An analysis of clear sky data from a multifilter shadowband radiometer has been completed. A Harrison Objective Algorithm-Langley Analysis was applied to the data sets. The regressed values are total optical thickness, t , top-of-atmosphere voltage (corrected for Earth-sun distance), AUVo, and the regression deviation for each of the 5 sensor channels.   Each of these values is a mean of the sum of the 5 days yielding Harrison Objective Algorithm-Langley Regression outputs. These data were collected at Mauna Loa Observatory, Hawai'i between 4 and 11 February 1999.

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Channel, nm	Vo	AUVo	t	dev	n	U95
416	11251.61	10948.60	0.21239	0.01447	6	0.020
497	6883.32	6698.03	0.11801	0.00426	6	0.006
613	6233.27	6065.47	0.07914	0.00304	6	0.004
672	11289.90	10986.00	0.04996	0.00280	6	0.004
868	10137.00	9864.15	0.02185	0.00329	6	0.005

Application:

$$t_T = -\left[\frac{\ln(V) - \ln(AUVo)}{m}\right] \quad \text{+/- U95}$$

Where: V = Sensor output, voltage counts.
t_T = Total optical thickness, calibrated.
m = air mass.
Vo = Intercept from regression
t = Slope from regression.
$AUVo$ = Vo(Earth-sun distance, DU)^2, solar constant estimate.
dev = The standard deviation of the residual variance from the data to the regression line of the ln(voltage output).
n = The number of morning or afternoon Langley Regressions.
U95 = sqrt(2 dev^2)