

CALIBRATION REPORT
Portable Radiation Package

SERIAL NUMBER 02

DataSet Configuration: mlo99
Calibration date: 1999-04-20
Document date: December 12, 1999

Configuration File: hd:projects:prp:prpcal:prp:02:cfg02-mlo99.dat

PRP serial number 02 configuration -- MLO experiment P01/P02 plates switched
Configuration date (yyyyMMdd)
19990720
DataLogger/Preamp
DL99_3
PSP serial number -- agree with a file in the PSP folder
32386F3
PIR serial number -- agree with a file in the PIR folder
32388F3
Head serial number
431



PRP INFO FILE

Dataset = MAUNA LOA OBSERVATORY 99
Calibration of PRPs and MicroTops on MLO
Operator: Smith, Reynolds, Miller
Dates: 20 July to 10 Aug 1999 approx
file identifier = mlo99
PRP 02 CONFIGURATION (19990720)
CALIBRATION INFO FOR HEAD 431:
This file : 431.CAL
Data valid from date : 10/05/1998
MFRSR system owner : PNL / S/O 240
YESDAS system password: Langley!
Supervisor password : Irradiance!
System Datalogger ID : \$0000 (Hex), 0 (Dec)
Instrument Head ID : \$277E (Hex), 10110 (Dec)
Instrument Head S/N : 431
DATALOGGER CALIBRATION: ProcLoggerCal (version 101) Run date: 30-Apr-1999 17:47:14
DATALOGGER S/N DL99_3, PREAMP 1
CALIBRATION DATE: 990420 -- 990430: recal PSP and PIR
TECHNICIAN: EDWARDS
VOLTAGE REFERENCE: VOLT-A-VIDER (cal: ???)
PSP CALIBRATION: S/N 32386F3
Factory calibration: 1998-02-12
8.990
PIR CALIBRATION - S/N: 32388F3
Factory calibration: 1998-01-13
3.670

ZENITH ANGLE ERROR PLOTS

Head S/N: 431

Cal date: 10/05/1998

Now: 21-Apr-1999 06:34:00

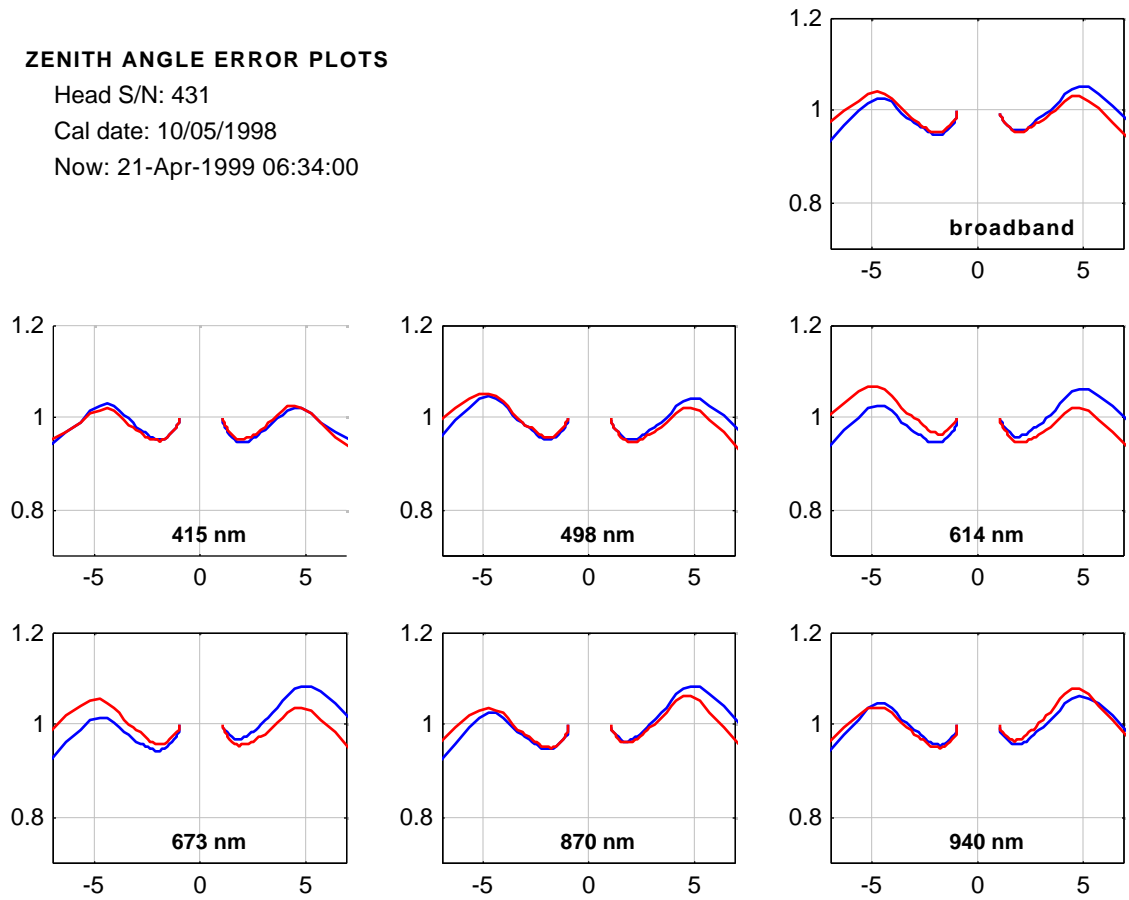


Figure 1: Zenith Angle Error

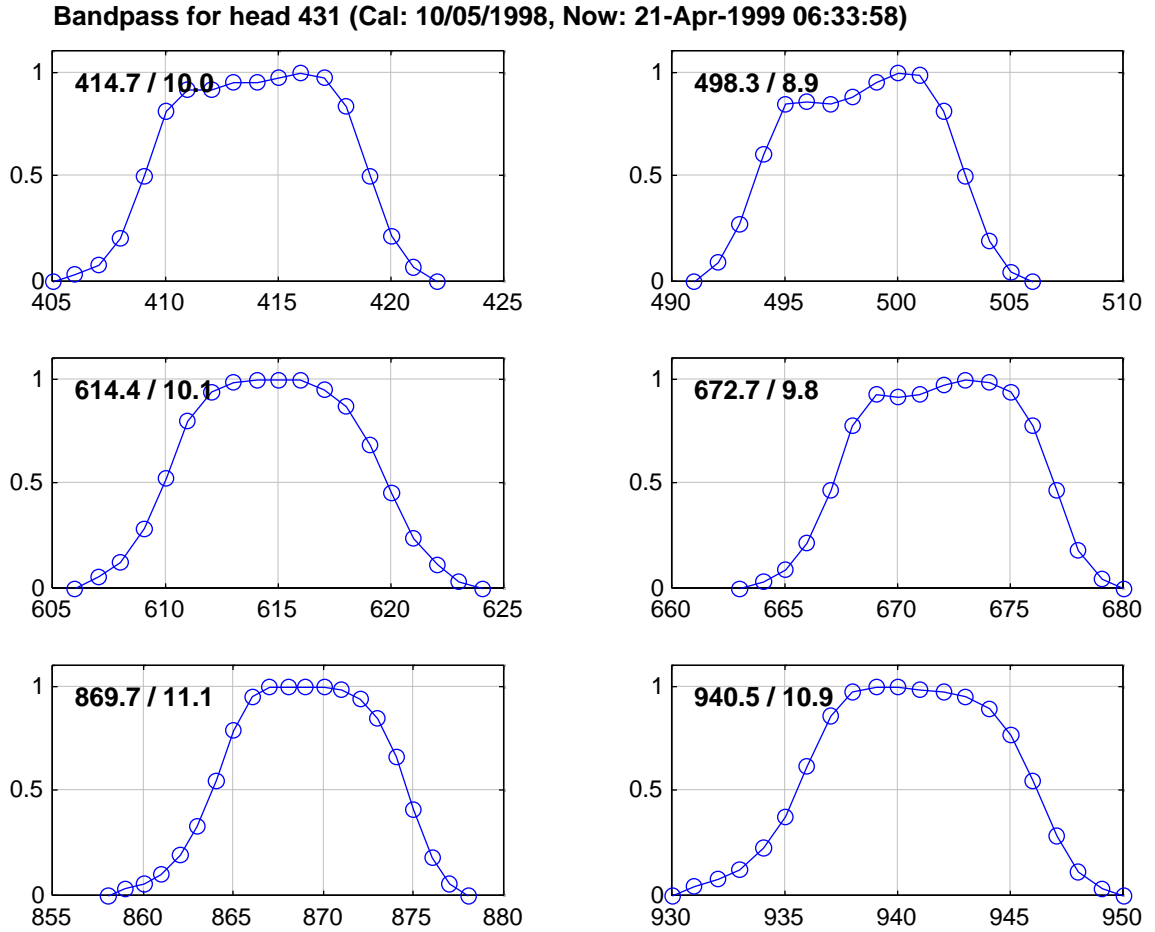


Figure 2: Zenith Angle Error

HEAD 431 TOA IRRADIANCES BASED ON ASTRONOMICAL SOLAR SPECTRUM

| WAVELENGTH (nm) | | | IRRADIANCE (W/m ² /nm) | | |
|-----------------|--------|-------|-----------------------------------|--------|-------|
| LOWER | CENTER | UPPER | LOWER | MEAN | UPPER |
| 405, | 414, | 422, | 1.650, | 1.737, | 1.824 |
| 491, | 498, | 506, | 1.837, | 1.934, | 2.030 |
| 606, | 615, | 624, | 1.623, | 1.708, | 1.794 |
| 663, | 672, | 680, | 1.451, | 1.527, | 1.604 |
| 858, | 869, | 878, | 0.903, | 0.950, | 0.998 |
| 930, | 941, | 950, | 0.779, | 0.820, | 0.861 |

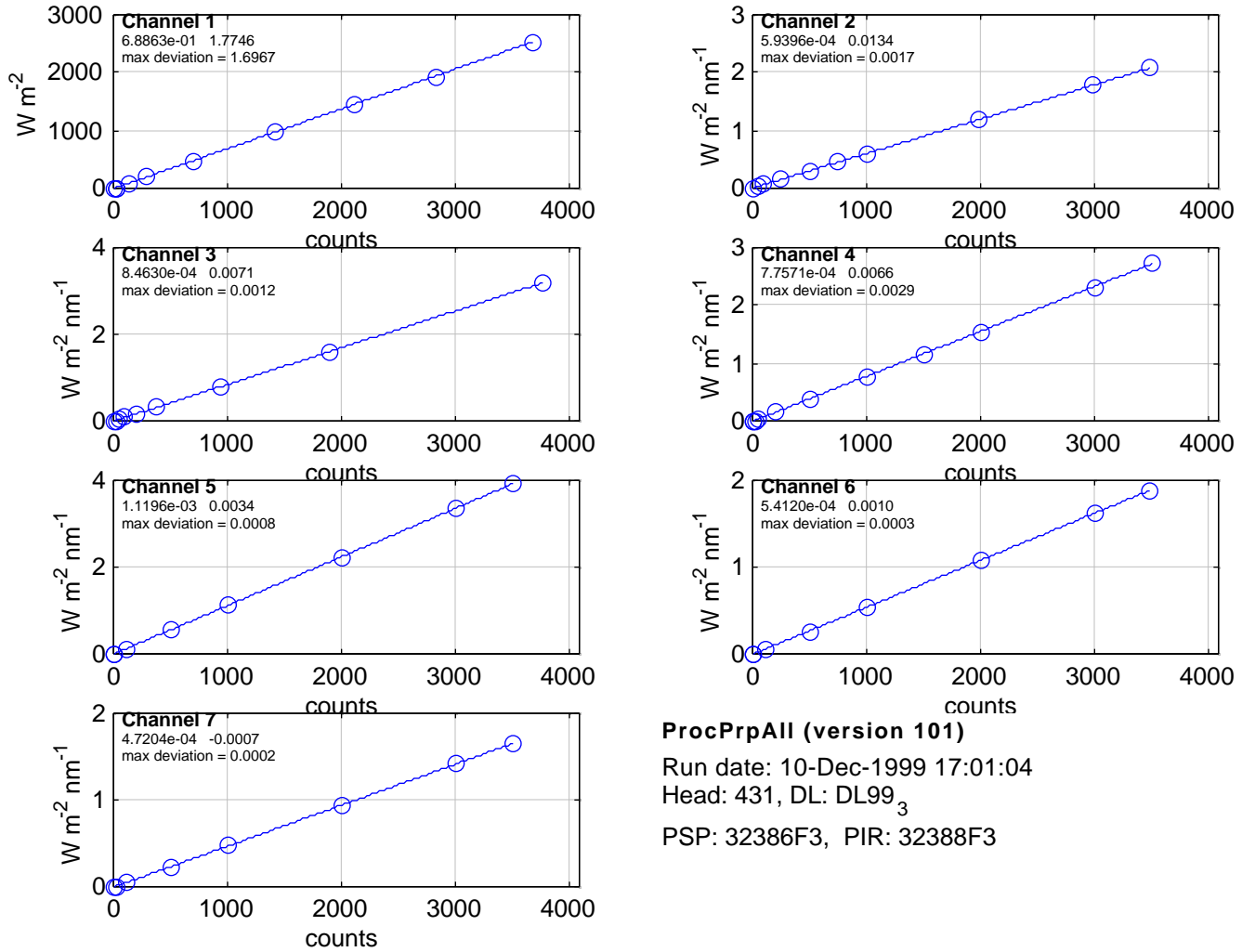
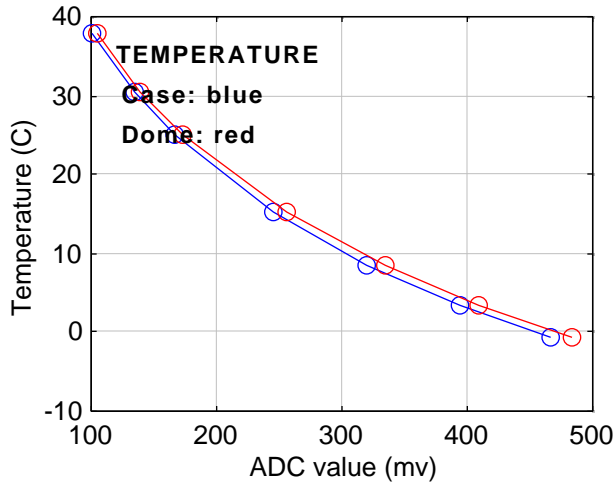
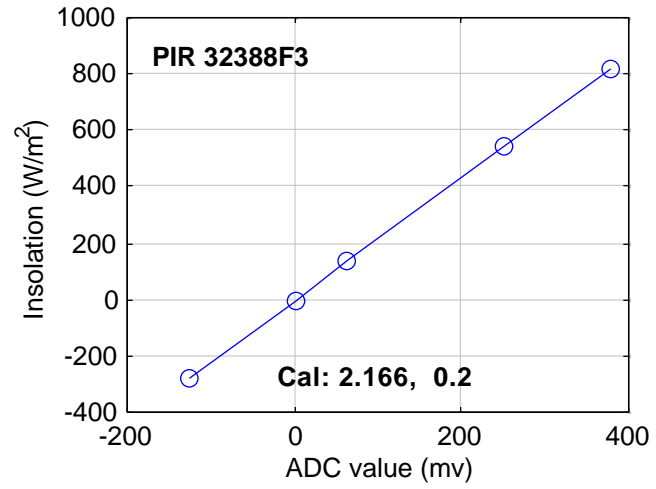
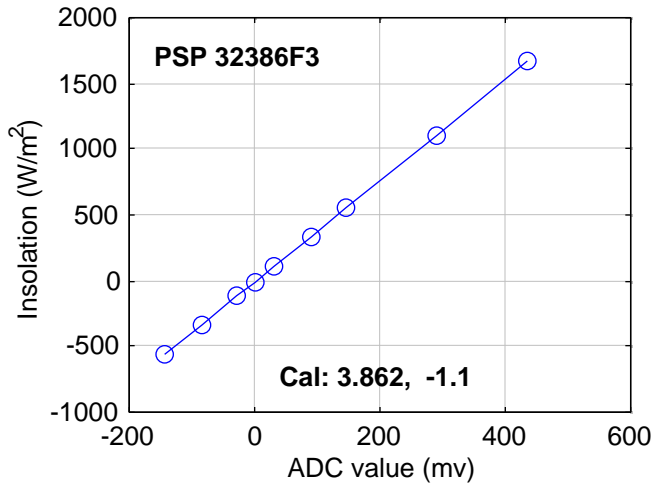


Figure 3: Head and Logger combined gains



$$1/(T+T_0) = p_1 a^3 + p_2 a^2 + p_3 a + p_4$$

$$a = \ln(\text{mvadc}), T_0 = 273.15$$

Case: max err = 0.041 C

$$p_1 = 4.5617e-06, p_2 = -6.2825e-05$$

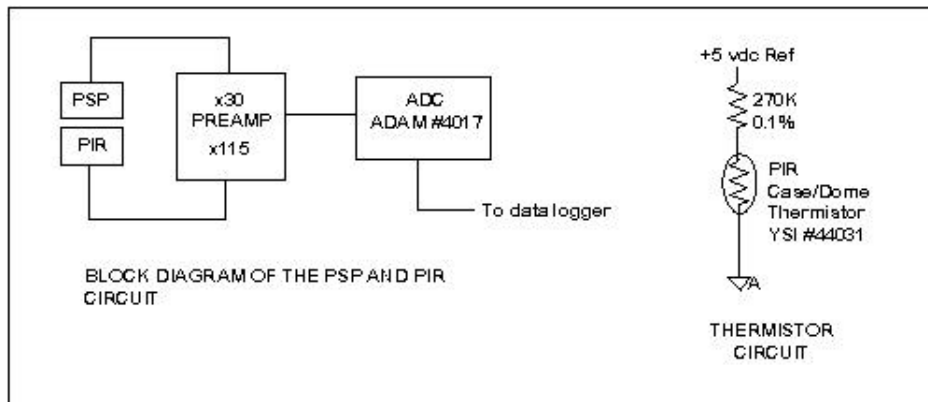
$$p_3 = 5.7424e-04, p_4 = 1.4523e-03$$

Dome: max err = 0.063

$$p_1 = 5.7765e-06, p_2 = -8.1253e-05$$

$$p_3 = 6.6567e-04, p_4 = 1.2923e-03$$

Figure 4: Head and Logger combined gains



Testing the Temperature Circuits

Table 1: Substitute a precision resistance for the case and dome thermistors and fill in the table. Read the values for case and dome temperature from the output from the PRP program.

| T (°C) | R (ohms) | Case (°C) | Dome (°C) |
|--------|----------|-----------|-----------|
| 40 | 5592 | _____ | _____ |
| 30 | 8194 | _____ | _____ |
| 20 | 12260 | _____ | _____ |
| 15 | 15130 | _____ | _____ |
| 10 | 18790 | _____ | _____ |
| 5 | 23460 | _____ | _____ |
| 0 | 29490 | _____ | _____ |
| -10 | 47540 | _____ | _____ |

TEST PLUG:

$R_{case} =$ _____ $T_{44031} =$ _____ Logger Temperature = _____

$R_{dome} =$ _____ $T_{44031} =$ _____ Logger Temperature = _____

LOGGER CALIBRATION FILE

| | | |
|--------------------------|-----------------|-------------------|
| DATALOGGER S/N DL99_3, | 500 1888 2 | 1000 1002 2 |
| PREAMP 1 | 1000 3775 2 | 2000 2001 2 |
| CALIBRATION DATE: 990420 | CHANNEL 4 | 3000 3000 2 |
| 990430: recal PSP, PIR | 0 0 1 | 3500 3499.5 2 |
| TECHNICIAN: EDWARDS | 5 6 2 | PSP, Preamp: 1 |
| VOLTAGE REFERENCE: | 10 15.5 3 | -5 -144.04 .5 |
| VOLT-A-VIDER (cal: ???) | 25 46 2 | -3 -86.52 .5 |
| CHANNEL 1 | 100 196 2.5 | -1 -29.10 .5 |
| 0 0 0 | 250 497 2 | 0 0.44 .5 |
| 5 12 2 | 500 997.5 2 | 1 30.10 .5 |
| 10 26 1.5 | 750 1499 2 | 3 87.25 .5 |
| 50 139 2 | 1000 1999 2 | 5 144.41 .5 |
| 100 280. 2 | 1500 3000 2 | 10 288.1 .5 |
| 250 704 2 | 1750 3501 2 | 15 431.93 .5 |
| 500 1411 1.5 | CHANNEL 5 | PIR, Preamp: 1 |
| 750 2118 2 | 0 1 1.5 | -1 -126.02 .10 |
| 1000 2824.5 3 | 10 10 1.5 | 0 0.00 .07 |
| 1300 3672 2 | 100 100 1 | .5 62.82 .08 |
| CHANNEL 2 | 500 500 1 | 2 251.55 .08 |
| 0 1 2 | 1000 999 1.5 | 3 377.28 .12 |
| 5 48 4.5 | 2000 1999 2 | CASE |
| 10 98 4 | 3000 2997.5 1.5 | 6000 101.01 .99 |
| 25 246.5 3 | 3500 3497. 2 | 8000 133.12 .39 |
| 50 495 3 | CHANNEL 6 | 10000 165.22 .62 |
| 75 744 3 | 0 0 1 | 15000 243.91 2.44 |
| 100 992.5 3 | 10 10 1.5 | 20000 319.70 2.40 |
| 200 1986.5 2.5 | 100 99 3 | 25000 392.7 2.96 |
| 300 2981 3 | 500 499 1.5 | 30000 464.99 3.2 |
| 350 3479 3 | 1000 999 2 | DOME |
| CHANNEL 3 | 2000 1998 2 | 6000 104.95 .86 |
| 0 0 1 | 3000 2997 2 | 8000 139.06 .77 |
| 5 18 2 | 3500 3496 2 | 10000 171.76 1.48 |
| 10 37 1.5 | CHANNEL 7 | 15000 254.29 2.28 |
| 25 94 2 | 0 2.5 2 | 20000 333.41 2.73 |
| 50 189 2 | 10 12.5 2 | 25000 408.93 1.01 |
| 100 378 2 | 100 103 2 | 30000 482.62 6.06 |
| 250 944.5 2 | 500 502.5 2 | END |