

NSA Radiometer IOP

- **Purpose:**
 - **Revise/develop methodology to correct for IR loss in historical shaded PSP diffuse SW data and on-going global SW PSP data**
 - **Investigate the effects of heaters on BB radiometer measurements**
 - **Of interest to community for polar measurements**

Radiometers

- Fielded total of 8 PSPs (two shaded), 2 B&Ws (1 shaded), 1 PIR, 1 NIP
- Various configurations of fans and heater coils



PSP-1

BW-1

PSP-2



PSP-4

PSP-6

PSP-8

BW-2

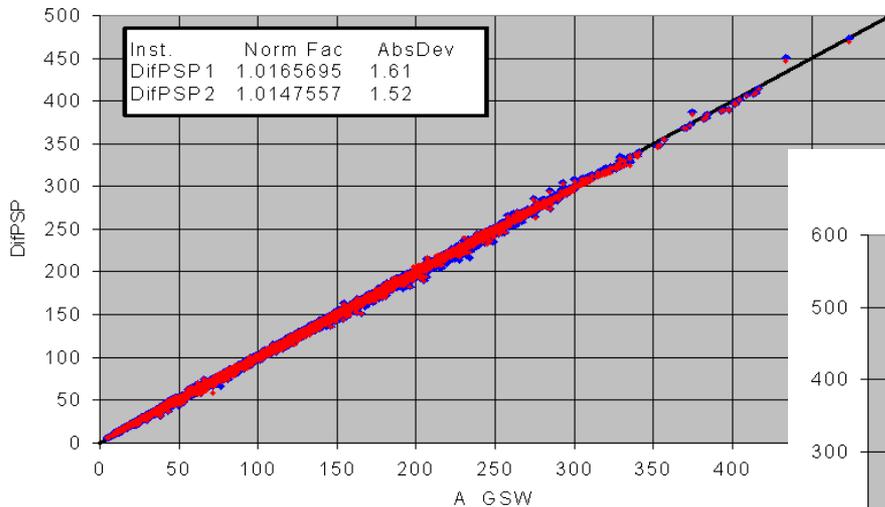
Radiometer installations on tracker (left) and table (right).

[North →]

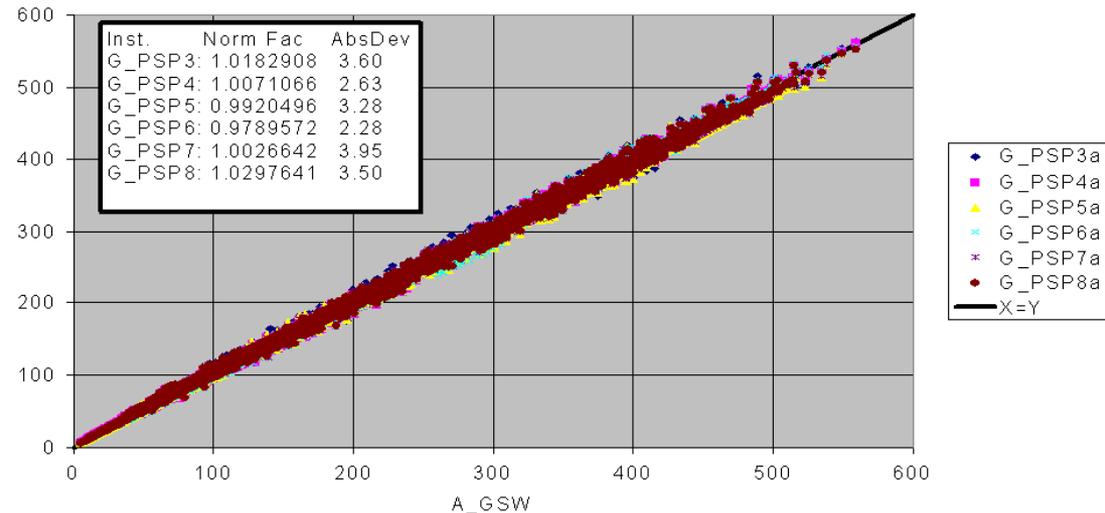
Instrument Normalization

- Normalization data from Aug 19 - Sept 7
 - (Normalization report available)
- All PSPs and B&Ws normalized to operational ARM instruments

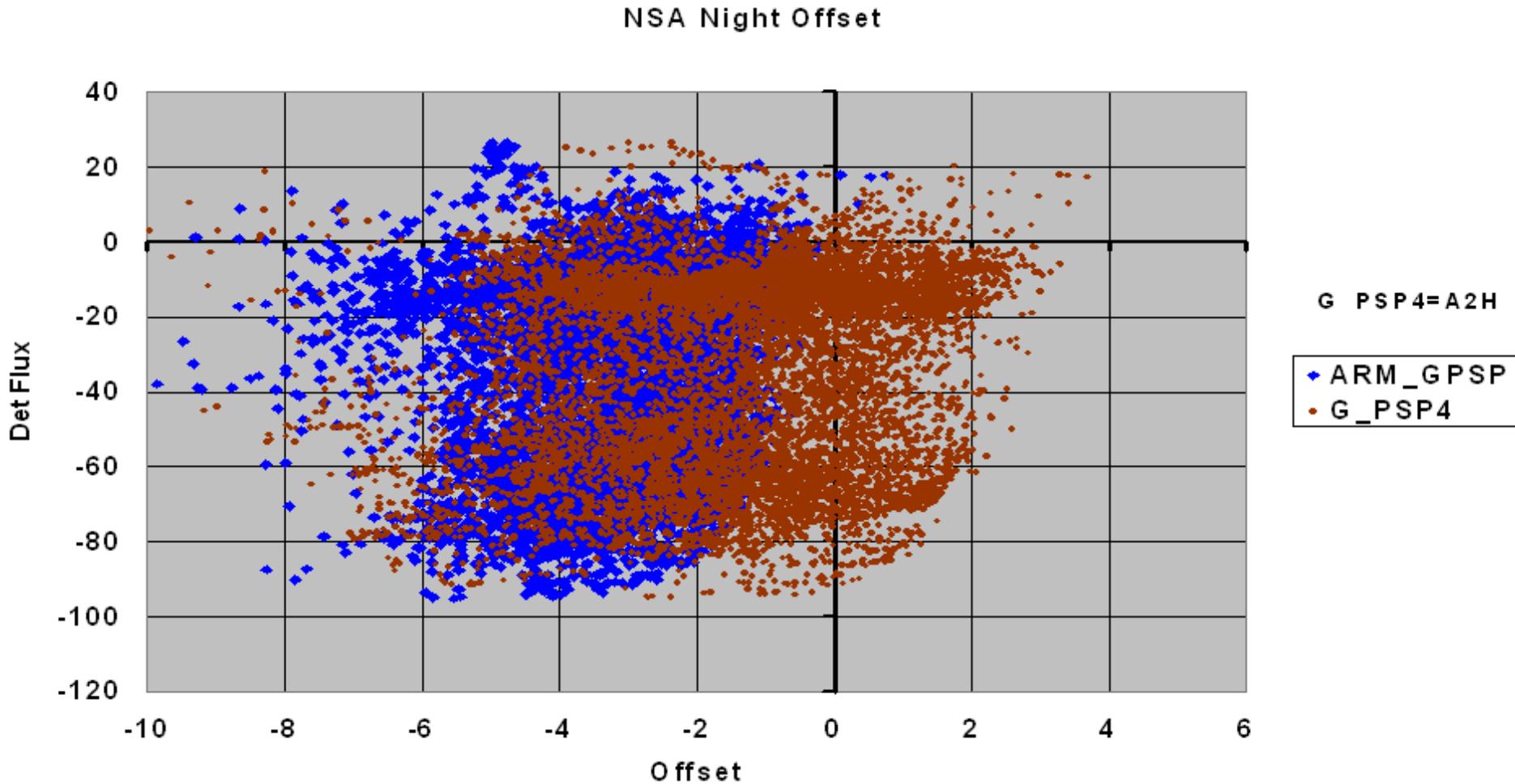
Dif PSP Normalization



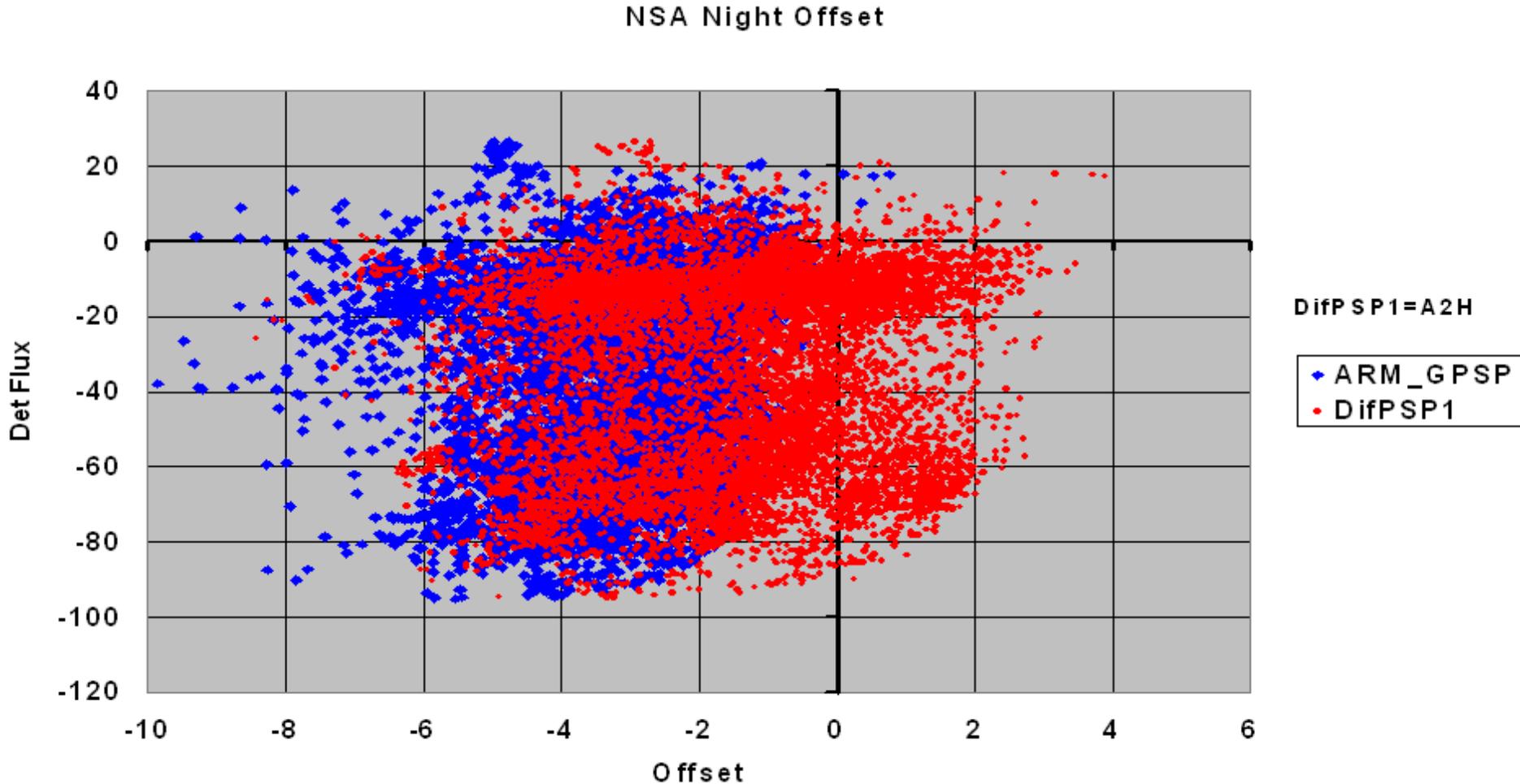
Global PSP Normalization



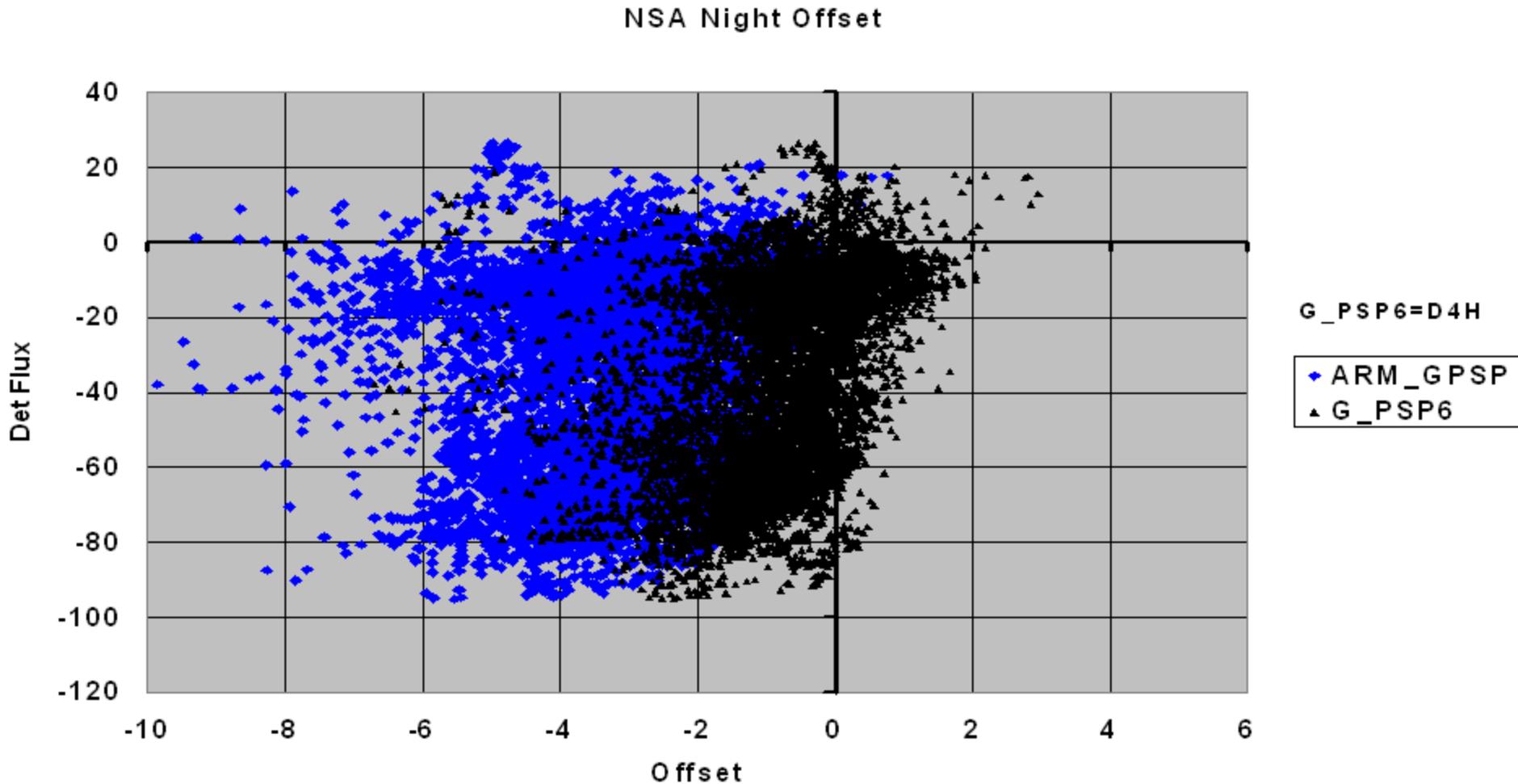
Night Offsets



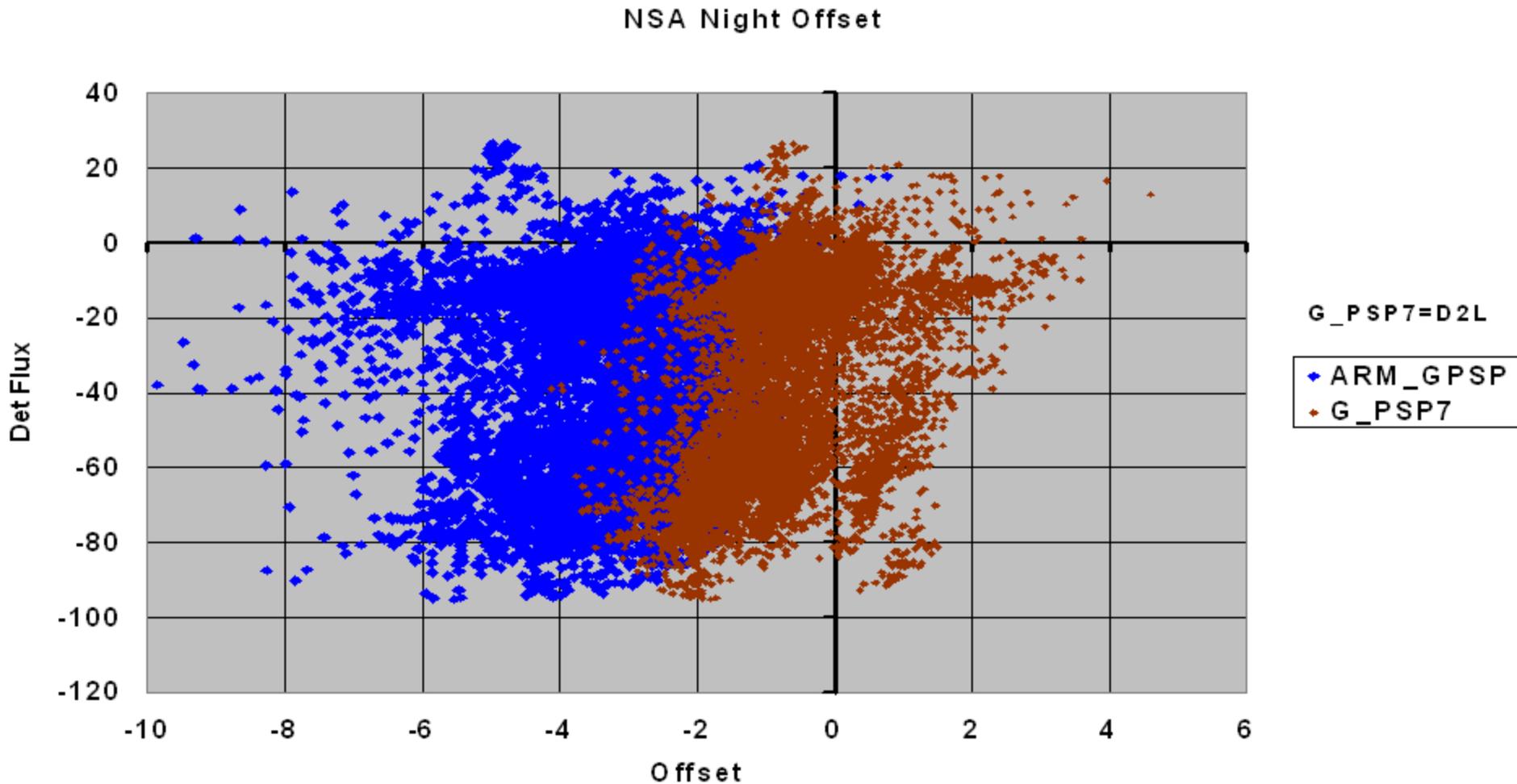
Night Offsets, AC Fans



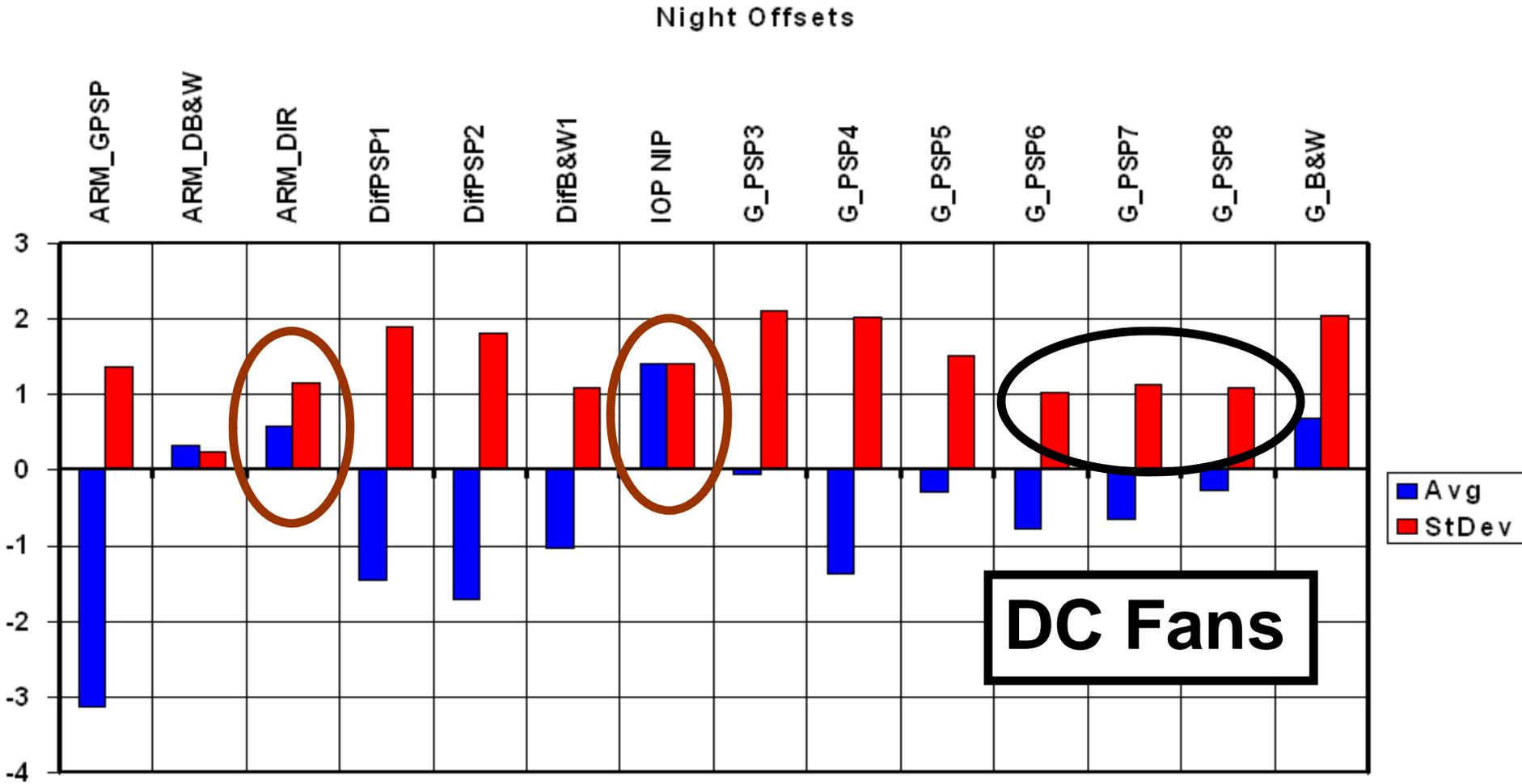
Night Offsets, DC Fans



Night Offsets, DC Fans



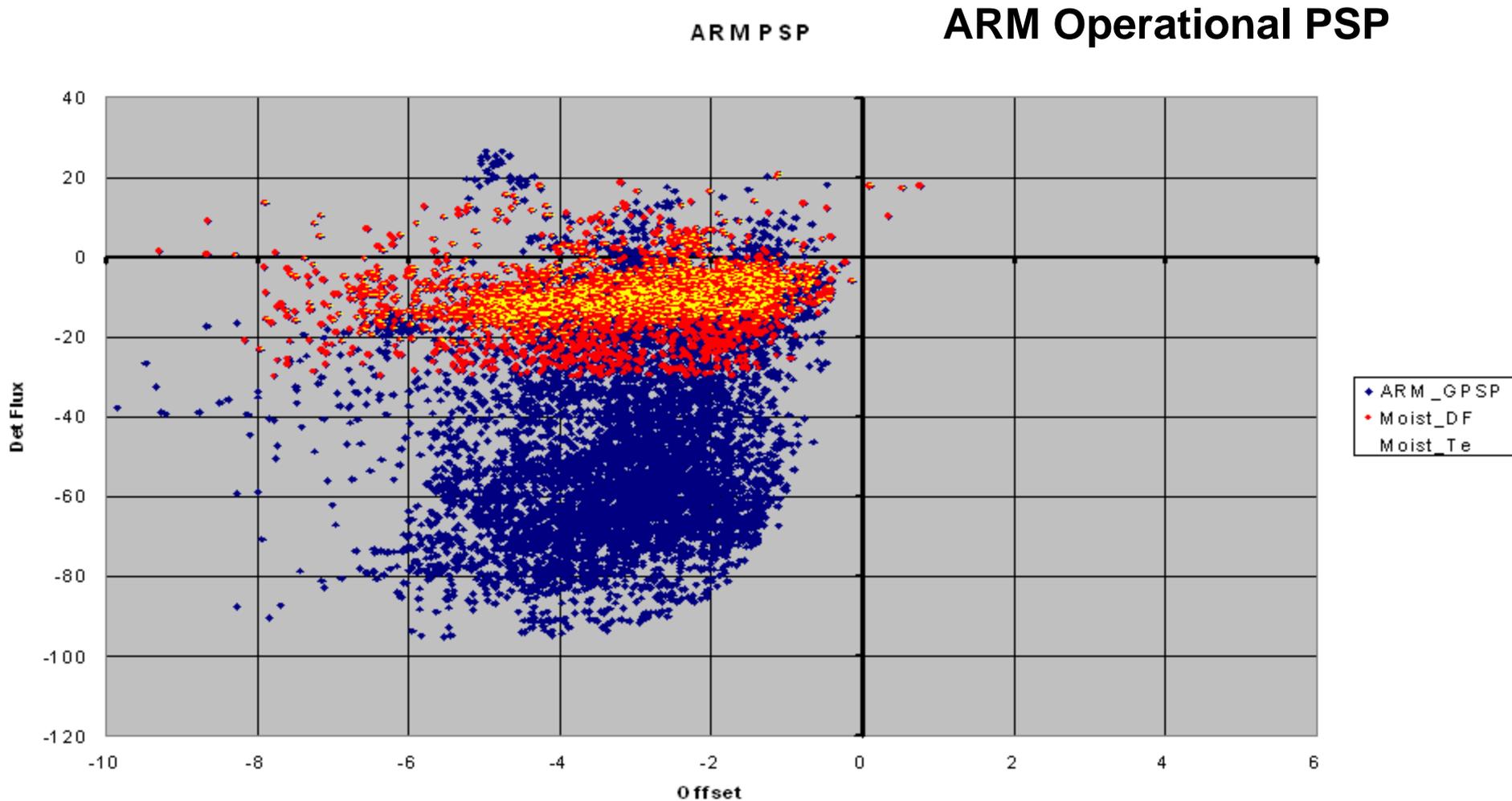
Average Night Offset



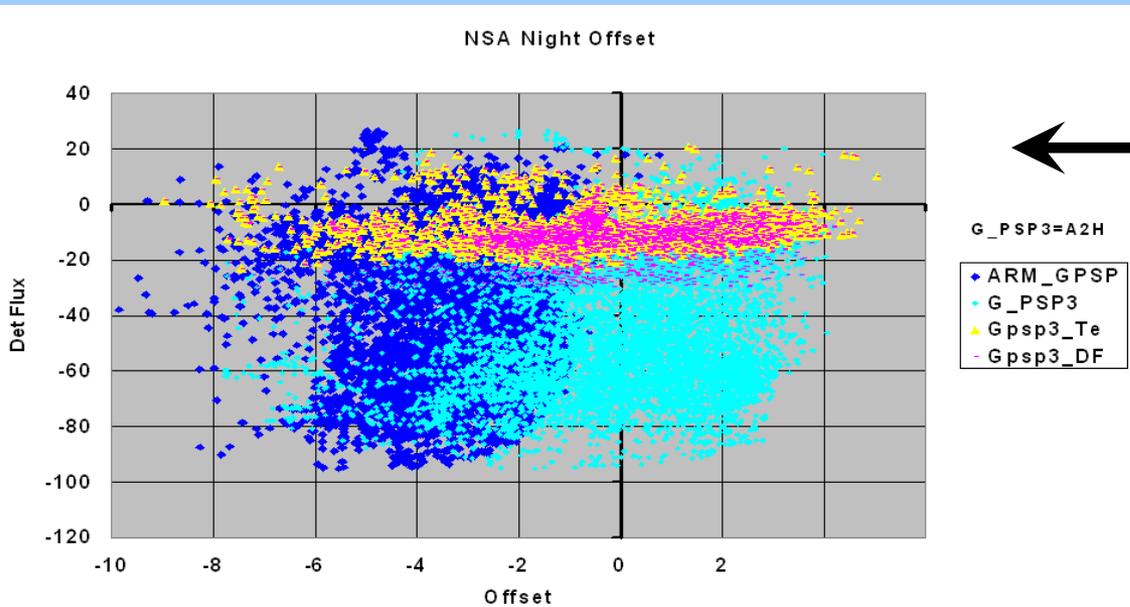
Results 1

- NIPs have slight positive offset
- Heated PSPs (except for ARM operational) have both positive and negative offset
- Use of DC fans for ventilation results in significantly less scatter in night offset than AC fans.
 - Worth testing this result for other ARM sites.

Detecting Moist/Dry Modes for IR Loss Correction



Detecting Moist/Dry Modes



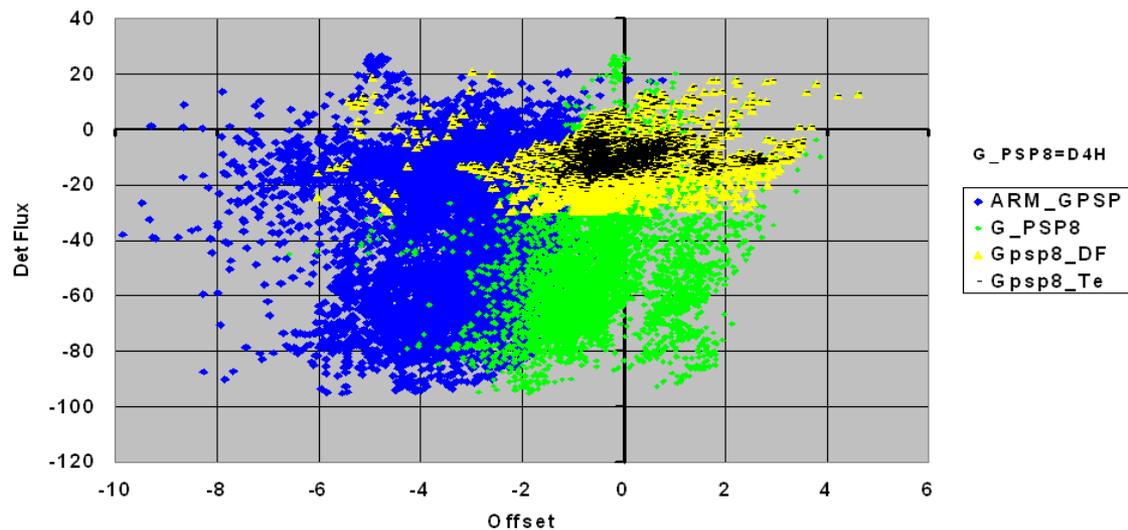
AC Fan



DC Fan

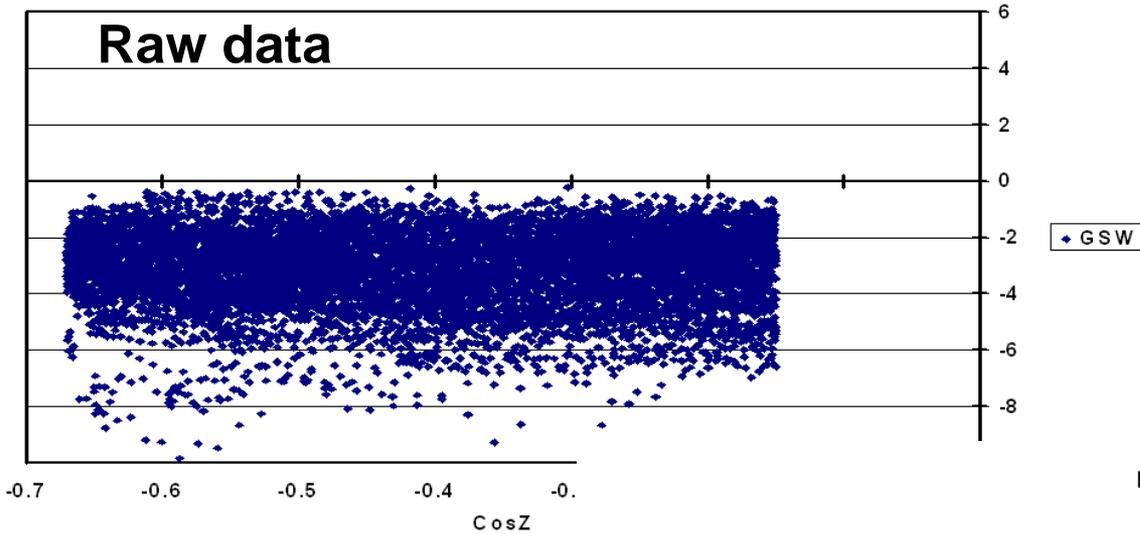


NSA Night Offset



Successful IR Loss Correction

Night APSP

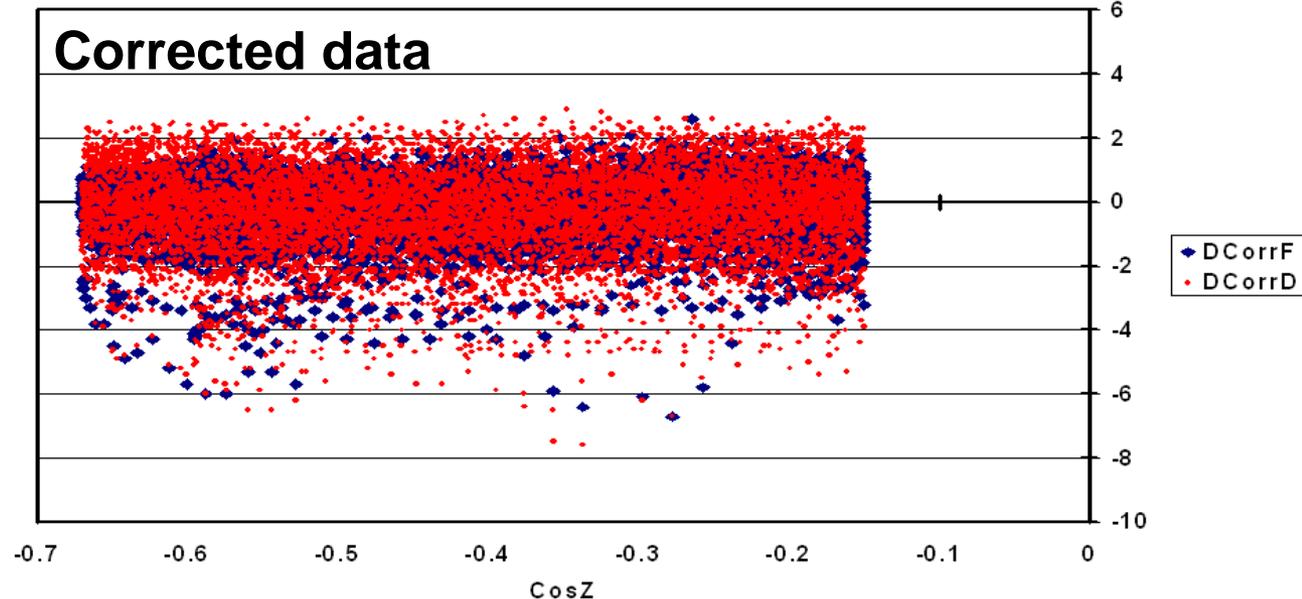


	Full	Det	Raw
Avg	-0.07	-0.29	-3.1
StDev	0.8	1.4	1.4

Night Corr APSP

	Full	Det	Raw
Avg	-0.07	-0.29	-3.14
StDev	0.82	1.40	1.36

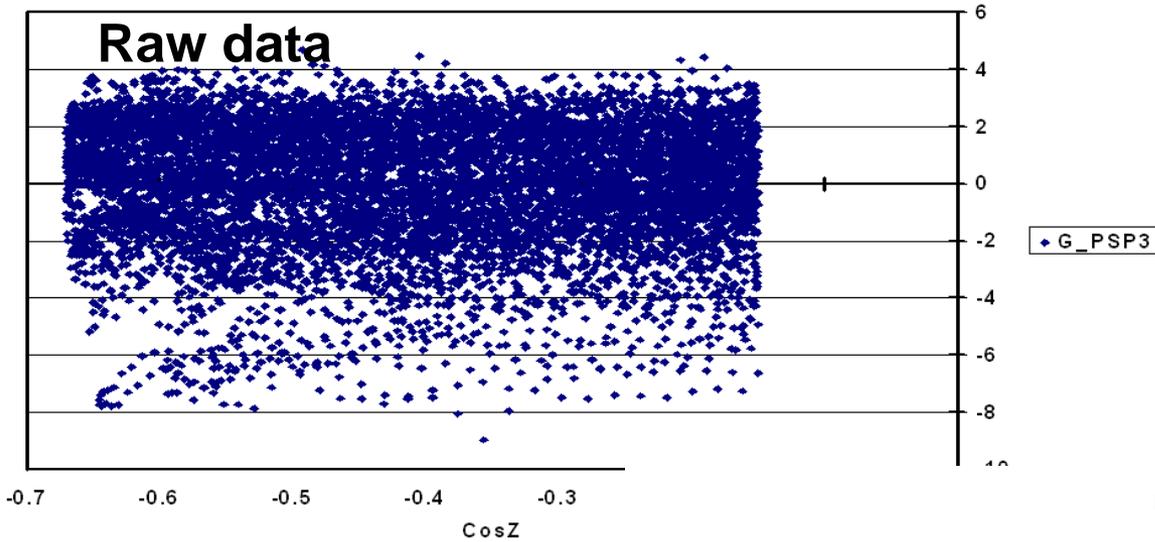
Corrected data



ARM
Operational
PSP

Successful IR Loss Correction

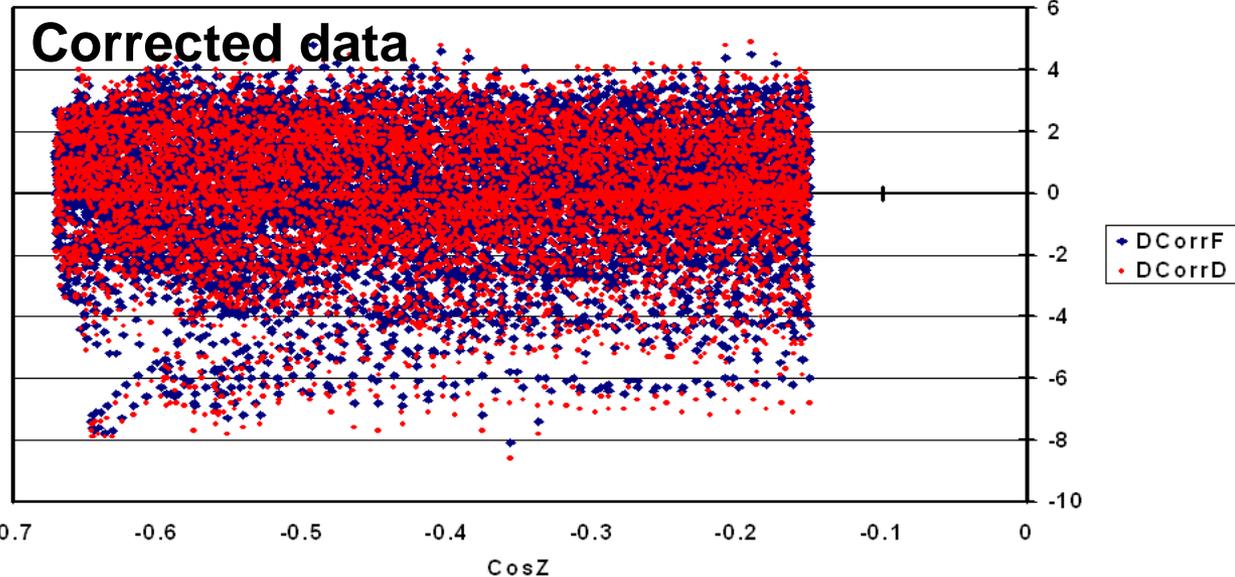
Night G_PSP3



	Full	Det	Raw
Avg	0.10	0.02	-0.04
StDev	2.0	2.0	2.0

Night Corr GPSP3

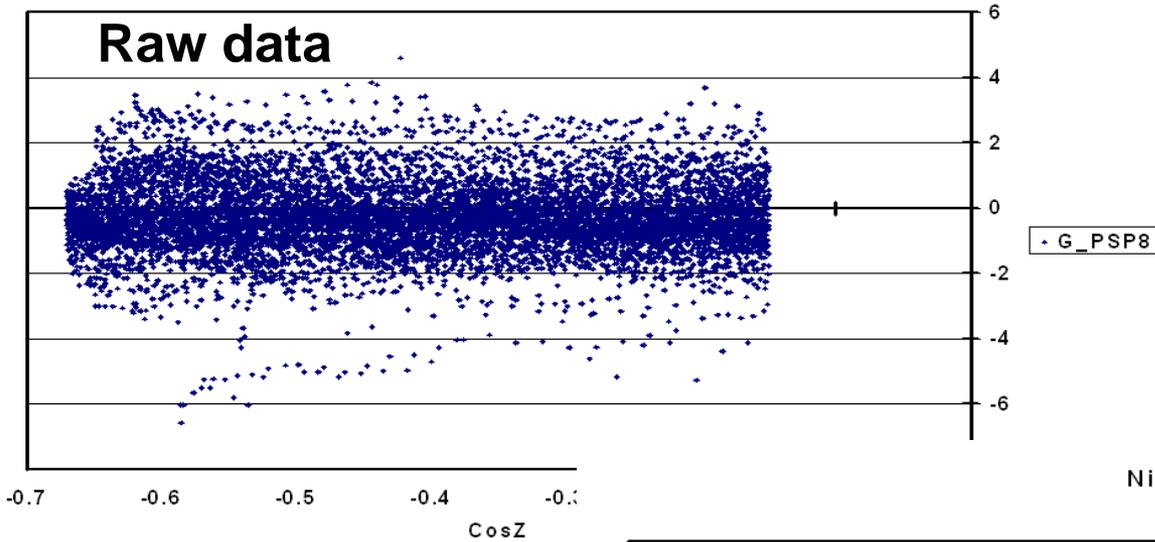
	Full	Det	Raw
Avg	0.10	0.02	-0.04
StDev	1.99	2.09	2.10



IOP PSP3
AC Fan

Successful IR Loss Correction

Night G_PSP8

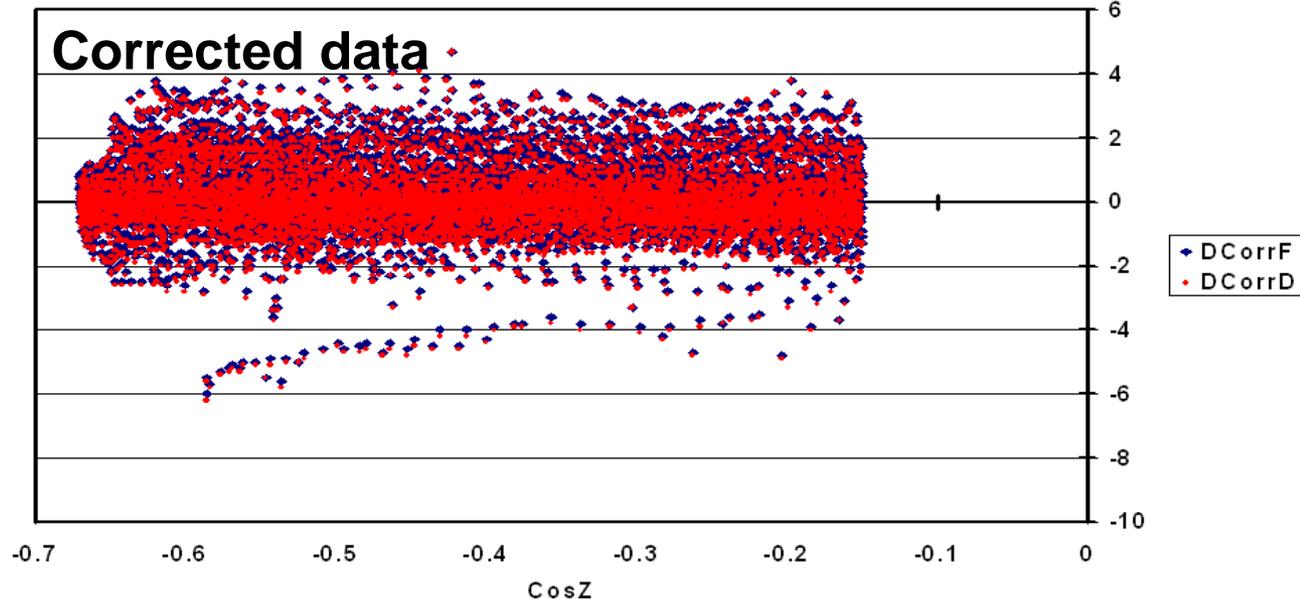


	Full	Det	Raw
Avg	0.21	0.11	-0.26
StDev	1.1	1.1	1.1

Night Corr GPSP8

	Full	Det	Raw
Avg	0.21	0.11	-0.26
StDev	1.05	1.06	1.10

Corrected data



IOP PSP8
DC Fan

Results 2

- **Confirmed that IR loss includes both positive and negative values with heated ventilation**
- **Heating mitigates magnitude of IR loss**
- **Successfully determined proper limits for detecting moist and dry modes**
- **In process of correcting NSA data through DiffCorr VAP**

Next: IOP Continues

- Missed extreme cold conditions at start of IOP
- Determine best design for mitigating frost/dew contamination
- Still experimenting with fan strength and heater configurations
 - Coil placement
 - Number of coils
 - Philipona ventilator

Brw IOP cam 2007-05-16 16:58:47



Thanks!

