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Status of The Micro Pulse Lidar: Transition to Polarization Capability

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What: Replace present MPLs with new or upgraded MPLs that have polarization capability

Why: To enable, in principle, the determination of water and/or ice within clouds and, coincidentally, the “sphericity” of aerosols

Where: SGP-CF, NSA-Barrow, TWP-Manus-Naaru-Darwin, AMF-wherever

When: As soon as possible, i e., “as we speak”

Operational Characteristics

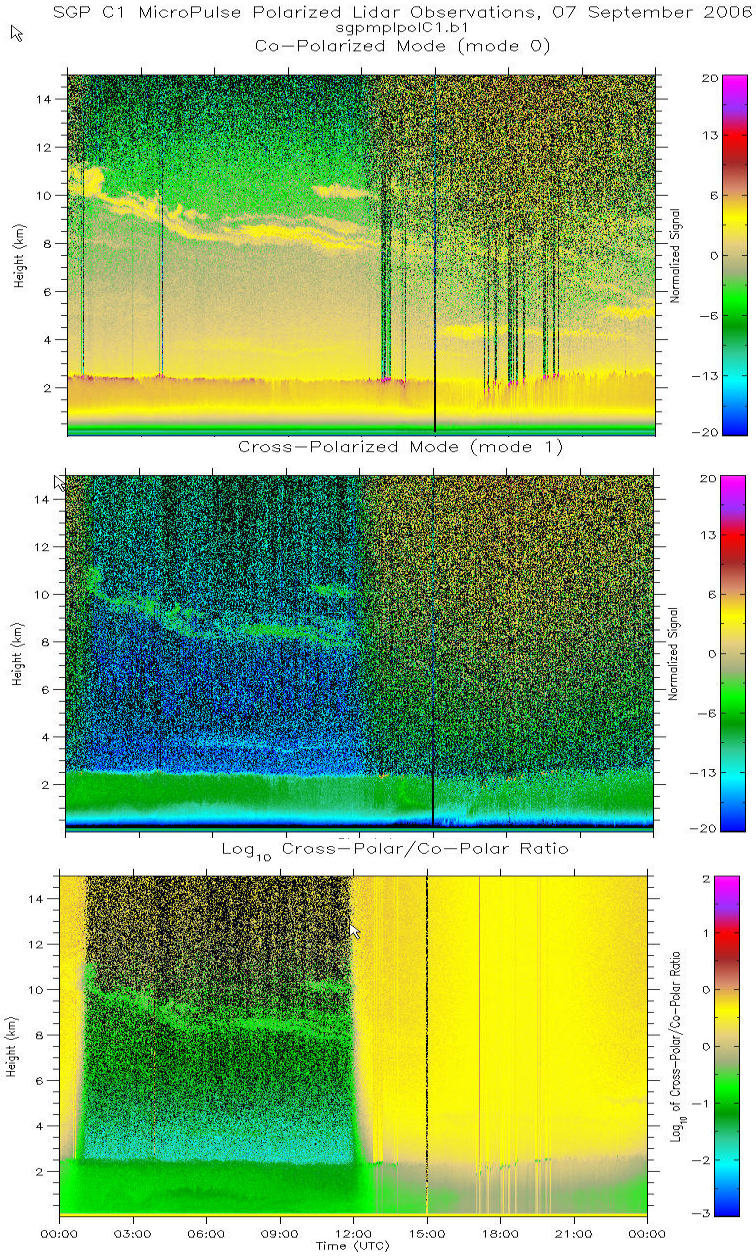
- 532 nm, eyesafe
- 100 μrad FOV, expanded beam
- Alternate polarization states, circular- and cross-polarized
- 3 sec average
- New VAP ('mplpolave') to produce 30 sec, coincident averages at each polarization state [is ready for implementation]

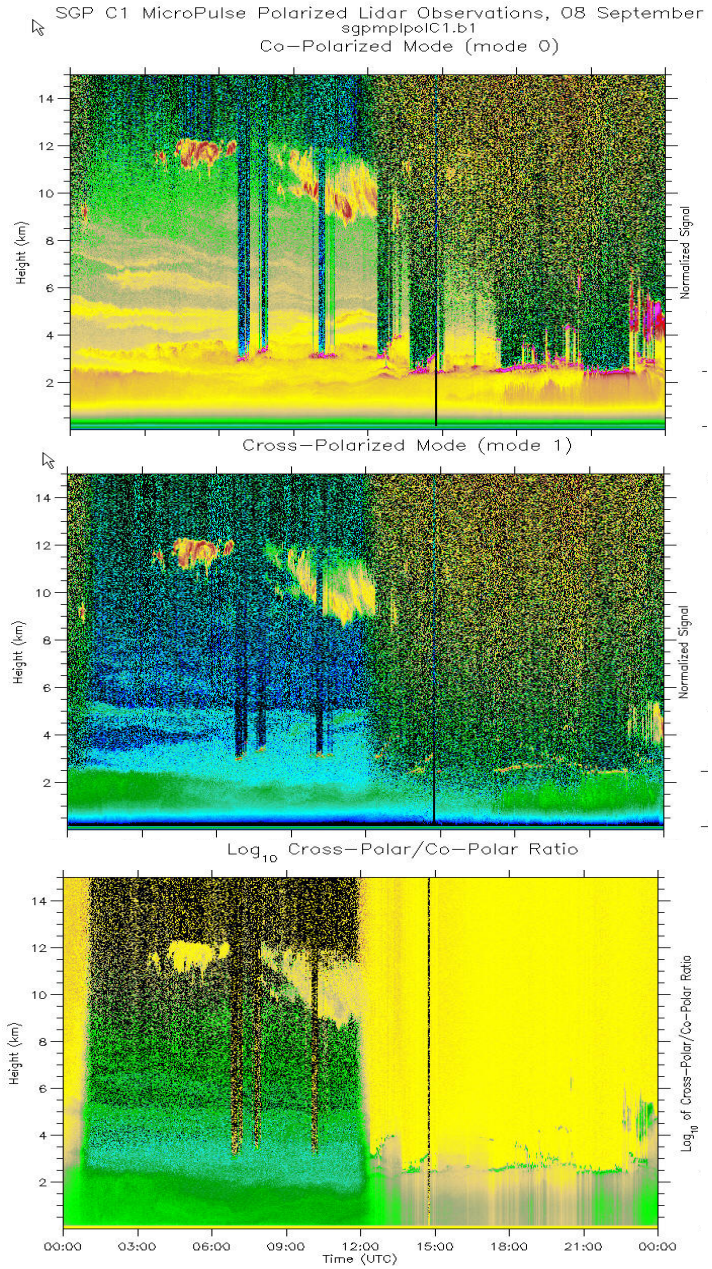
Current Disposition:

S/N	Location	Date	Status
104	SGP-CF	08/01/2006	OK
105	NSA-Barrow	10/07/2006	OK
106	TWP-Darwin	08/25/2006	OK
108	TWP-Naaru	11/22/2006 (?)	Shipped
107	AMF-Niamey(?)	“ASAP”	‘Testing (SGP)’
101	TWP-Manus (?)	“ASAP”	‘Testing (SGP)’
102	SGP-CF	Spare(?)	‘Photodiode’

Problems:

- Reset of Polarization Control
- Automatic Restart after power failure
- Temperature Sensitivity


SGP C1 MicroPulse Polarized Lidar Observations, 07 September 2006
sgpmplpolC1.b1
Co-Polarized Mode (mode 0)
Cross-Polarized Mode (mode 1)
Log10 Cross-Polar/Co-Polar Ratio
Height (km)
Normalized Signal
Log10 of Cross-Polar/Co-Polar Ratio
Time (UTC)
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00


SGP C1 MicroPulse Polarized Lidar Observations, 08 September
sgpmplpolC1.b1
Co-Polarized Mode (mode 0)
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Log10 Cross-Polar/Co-Polar Ratio
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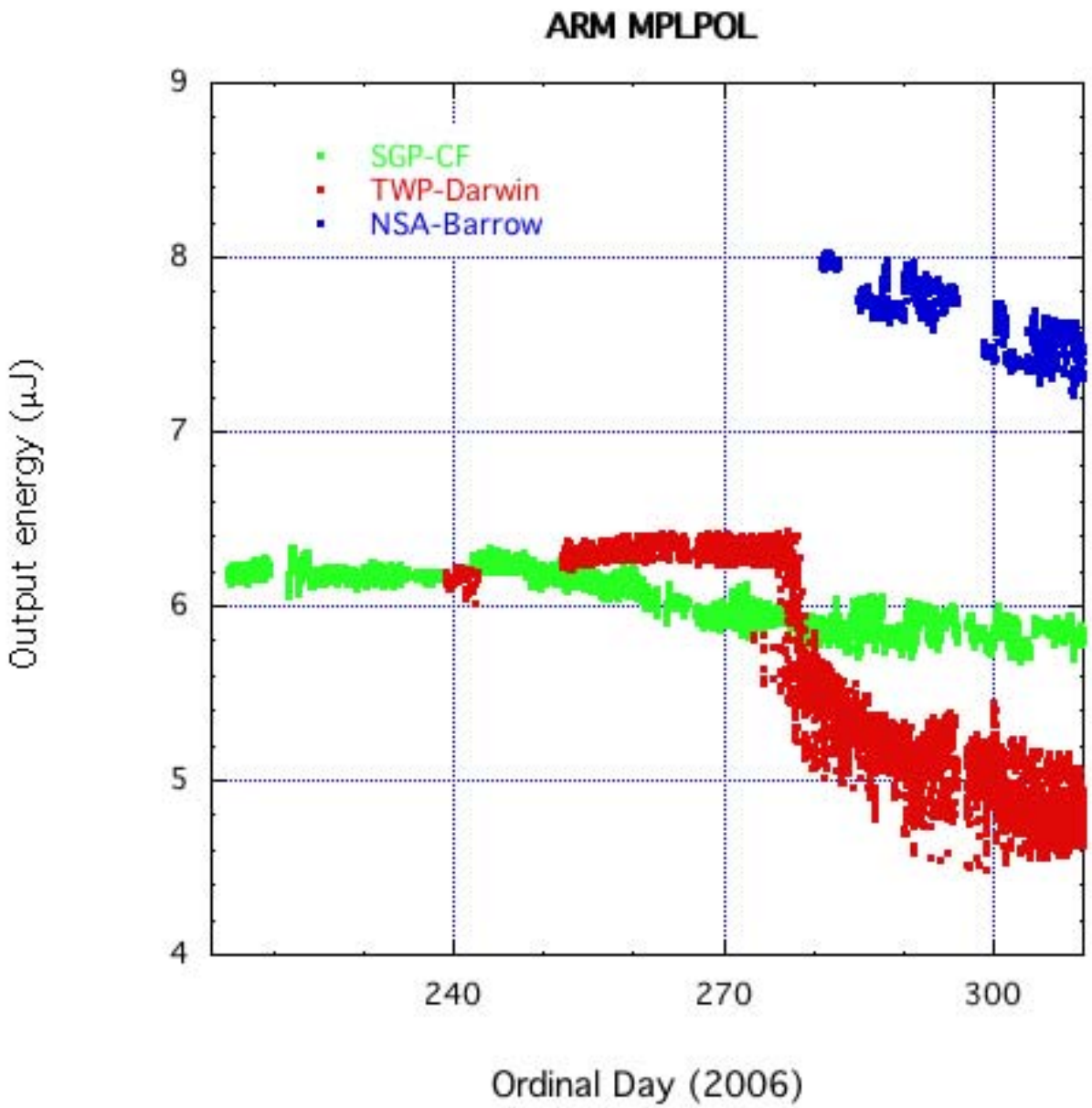
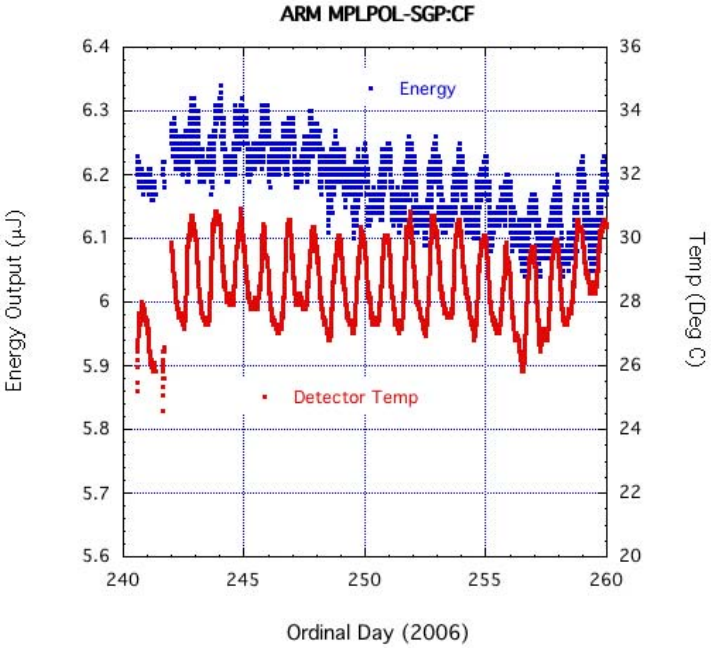
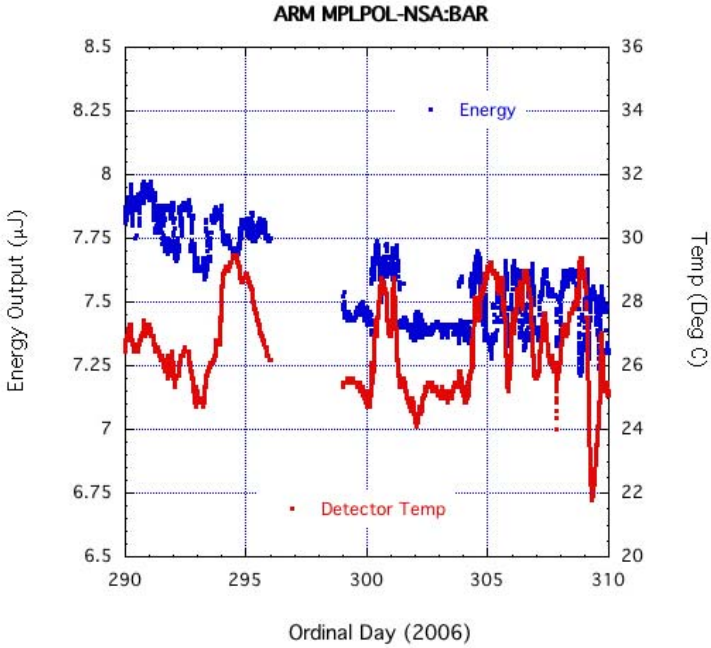
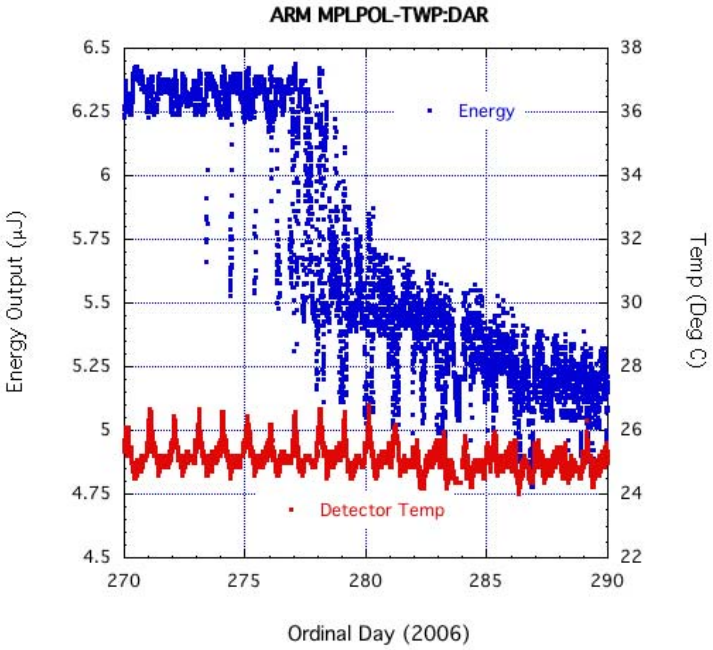

ARM MPLPOL
SGP-CF
TWP-Darwin
NSA-Barrow
Output energy (μJ)
9
8
7
6
5
4
240
270
300
Ordinal Day (2006)


ARM MPLPOL-SGP:CF
Energy
Detector Temp
Energy Output (μJ)
Temp (Deg C)
Ordinal Day (2006)
6.4
6.3
6.2
6.1
6
5.9
5.8
5.7
5.6
36
34
32
30
28
26
24
22
20
240
245
250
255
260


ARM MPLPOL-NSA:BAR
Energy
Detector Temp
Energy Output (μJ)
Temp (Deg C)
Ordinal Day (2006)
8.5
8.25
8
7.75
7.5
7.25
7
6.75
6.5
36
34
32
30
28
26
24
22
20
290
295
300
305
310


ARM MPLPOL-TWP:DAR
Energy
Detector Temp
Energy Output (μJ)
Temp (Deg C)
Ordinal Day (2006)
6.5
6.25
6
5.75
5.5
5.25
5
4.75
4.5
38
36
34
32
30
28
26
24
22
270
275
280
285
290

**********Question for CPWG et al.**********

Should we implement more rapid switching of polarization, so as to insure sampling of the same cloud element(s)? [10-50 Hz; every pulse]

Pro(s):

- Clouds/atmos unchanged between samples
- Averages calculated on the fly - smaller data files

Con(s):

- Transients
- Precise knowledge of ‘purity’ of polarization state
- Cost [~$12K each (??)]