

Comparison of Nighttime DLF at Polar Sites

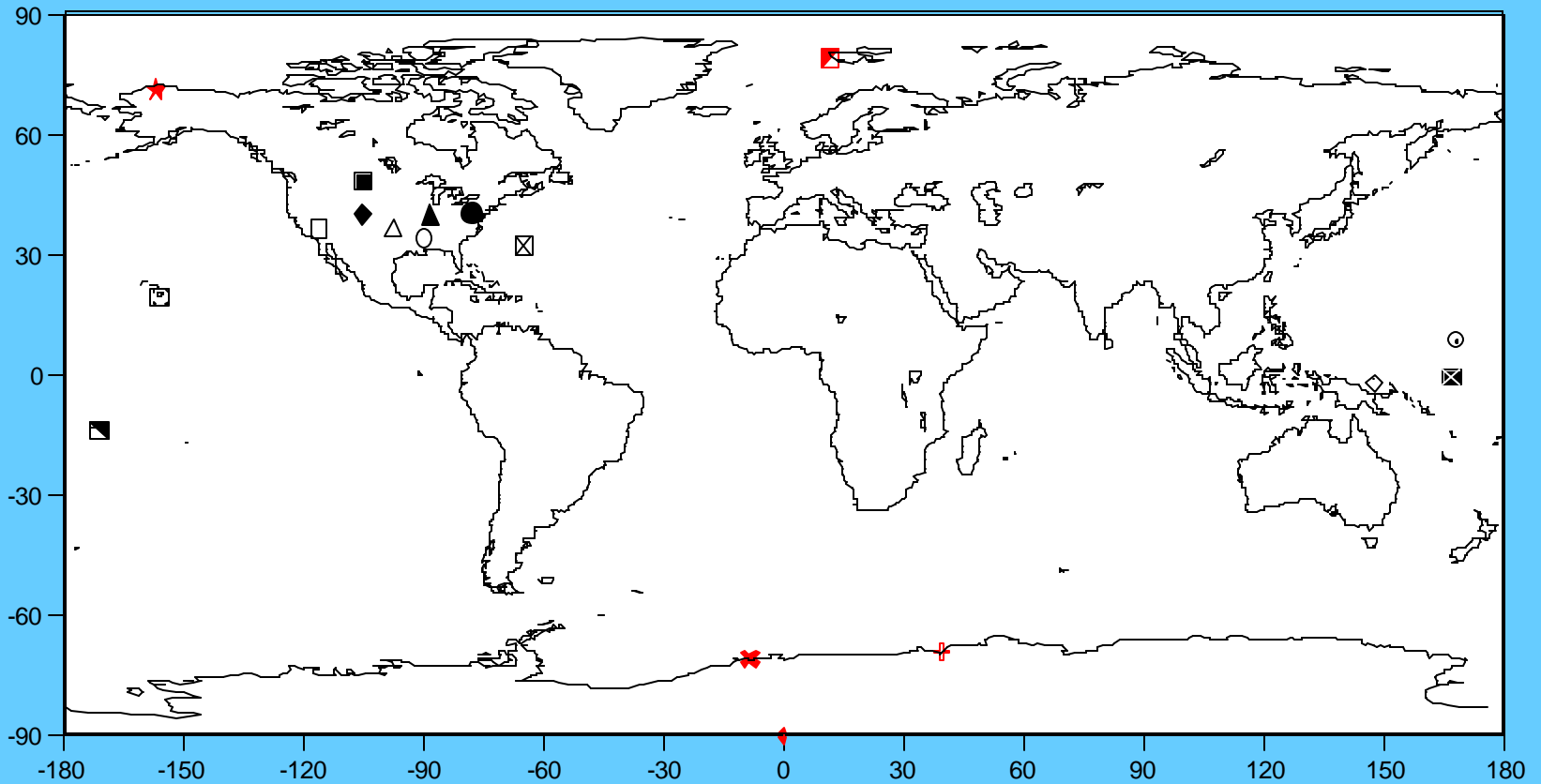
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29th CERES Science Team Meeting
Hampton, Virginia



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|---|----------------------------------|---|-------------------------------|---|----------------------------------|
| ■ | 48.31N, 105.10W Fort Peck, MT | △ | 36.60N, 97.48W SGP ARM | ◼ | 14.23S, 170.56W American Samoa |
| ● | 40.72N, 77.93W Penn State, PA | ◇ | 2.06S, 147.43E Manus | ★ | 71.32N, 156.61W Barrow, AK |
| ▲ | 40.05N, 88.37W Bondville, IL | ⊠ | 0.52S, 166.92E Nauru Island | ‡ | 90.00S, 0.00 South Pole |
| ◆ | 40.13N, 105.24W Boulder, CO | ⊞ | 32.30N, 64.77W Bermuda | ⊕ | 69.00S, 39.58E Syowa |
| □ | 36.63N, 116.02W Desert Rock, NV | ◉ | 8.72N, 167.72E Kwajalein | ✖ | 70.65S, 8.25W Georg von Neumayer |
| ○ | 34.25N, 89.87W Goodwin Creek, MS | ◻ | 19.54N, 155.58W Mauna Loa, HI | ◼ | 78.9N, 11.95E Ny Alesund |

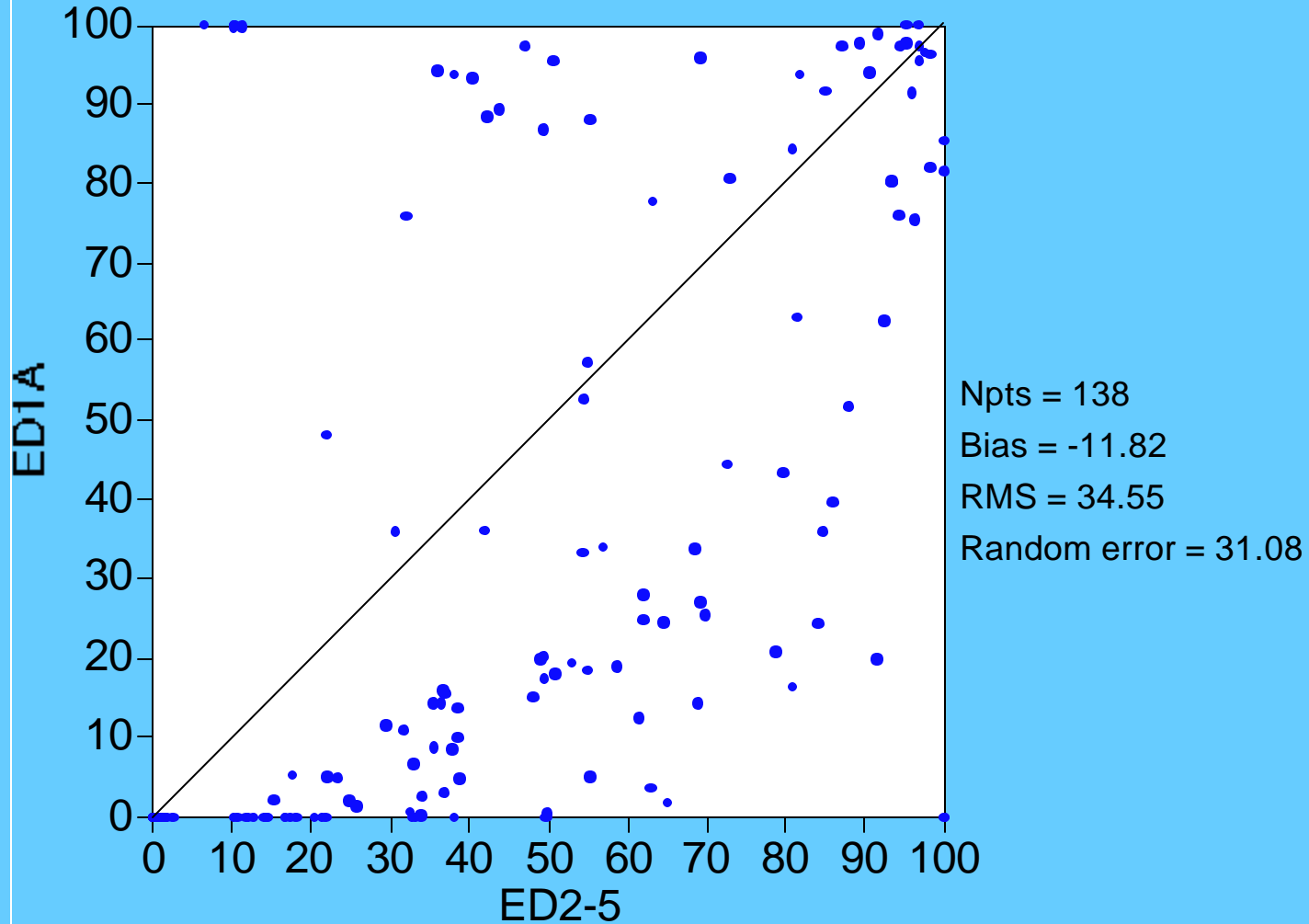
Comparison of Nighttime Statistics Non-Polar vs. Polar Sites

Location	Number of Points	Bias $W\ m^{-2}$ (%)	RMSD $W\ m^{-2}$ (%)	Random Error $W\ m^{-2}$ (%)
Central Facility (SGP)	197	2.0 (0.6)	19.4 (6.3)	18.7 (6.1)
Goodwin Creek (SURF)	228	-1.6 (-0.5)	15.2 (4.6)	14.9 (4.5)
Desert Rock (SURF)	233	4.2 (1.4)	13.6 (4.7)	12.7 (4.4)
Barrow (CMDL)	382	-12.1 (-5.4)	30.4 (13.5)	27.5 (12.2)

Barrow, AK
NOV 2000 - FEB 2001

Nighttime
Cloud Percent

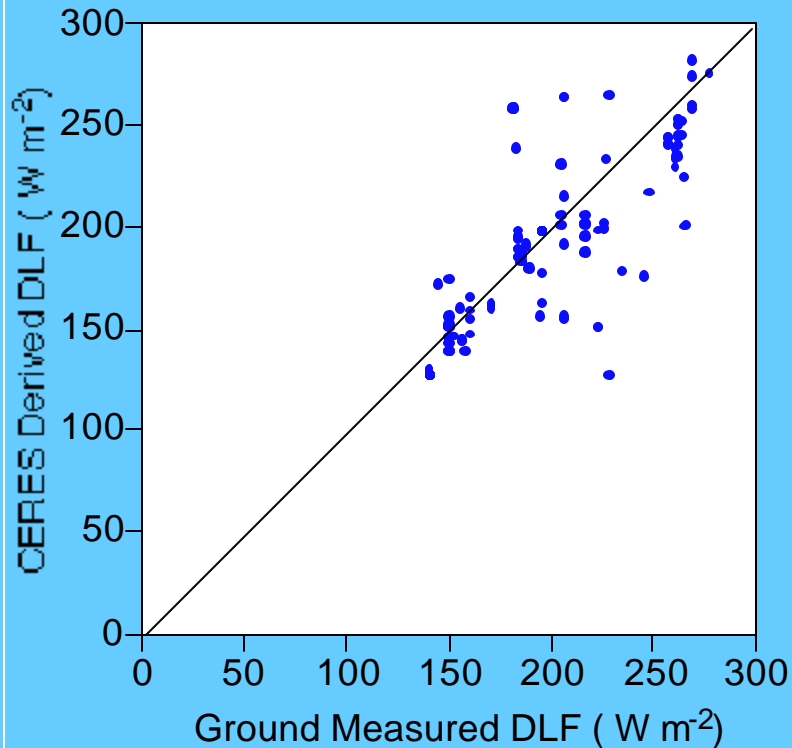
minute average



Barrow, AK
NOV 2000 - FEB 2001
Nighttime
Downward Longwave Flux

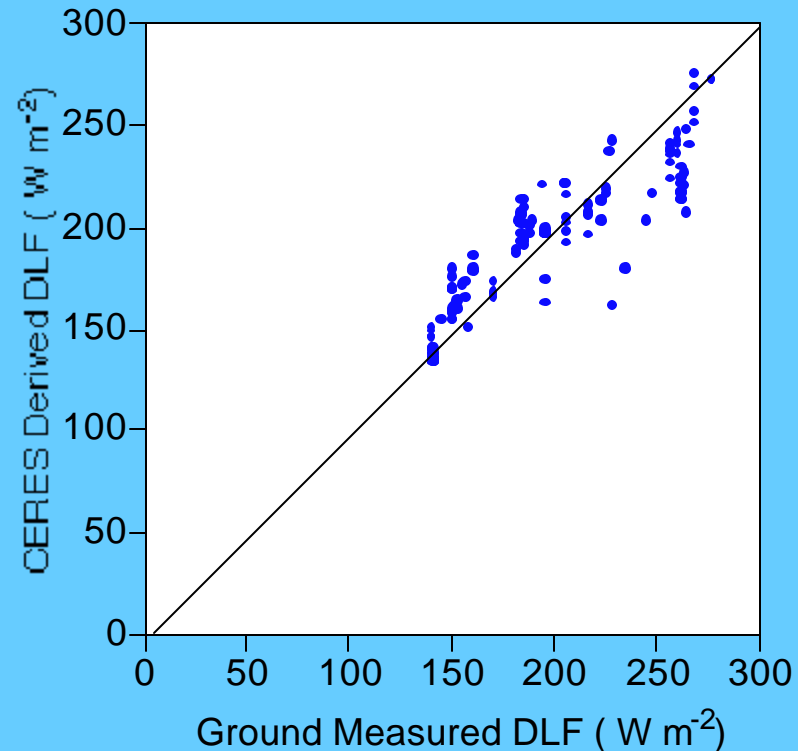
minute average

ED1A



npts = 138
Bias = -7.87 W m^{-2}
RMS = 25.38 W m^{-2}
Random error = 23.26 W m^{-2}

ED2-5

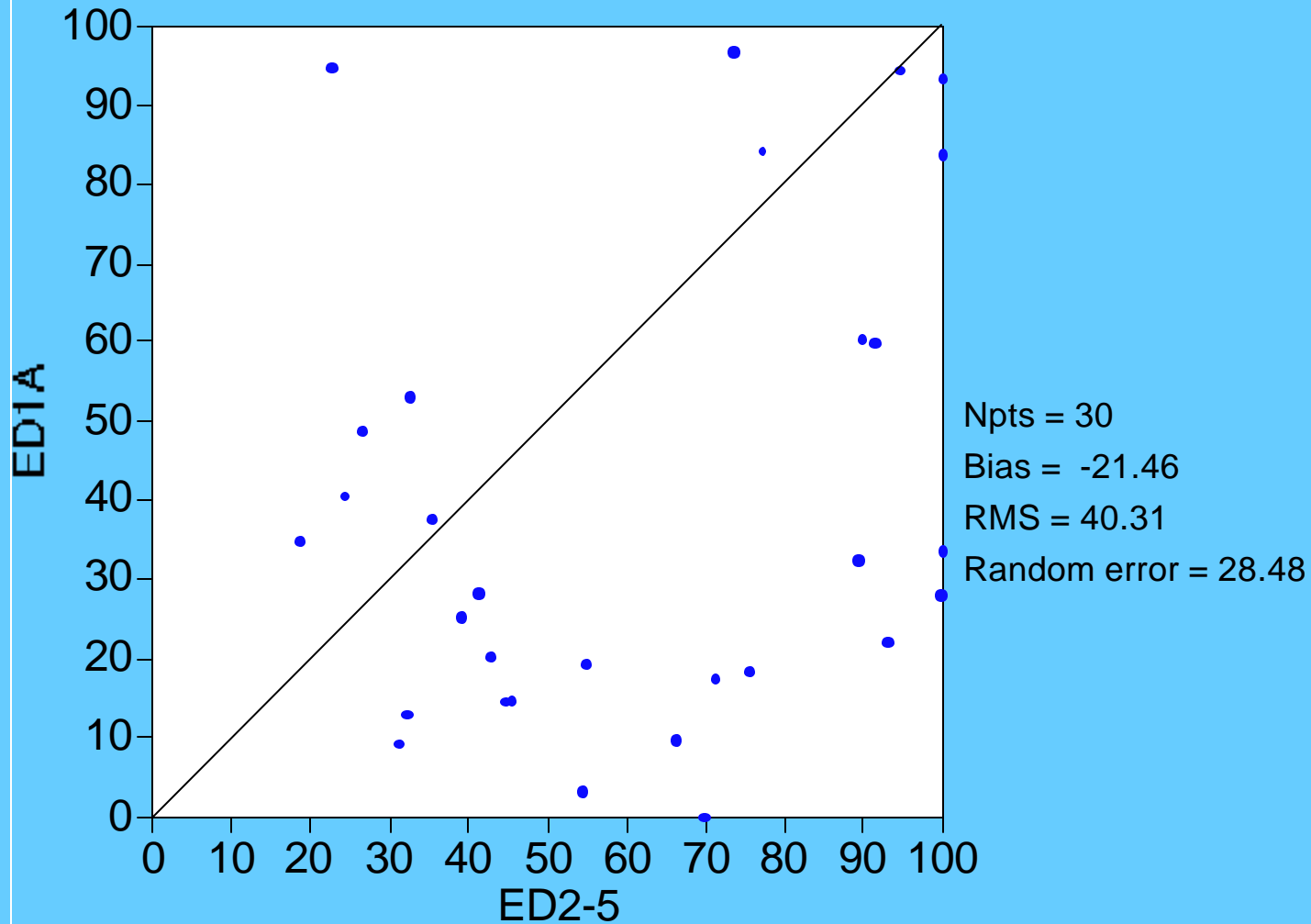


npts = 138
Bias = -1.65 W m^{-2}
RMS = 19.67 W m^{-2}
Random error = 15.23 W m^{-2}

Ny Alesund
NOV 2000 - FEB 2001

Nighttime
Cloud Percent

minute average



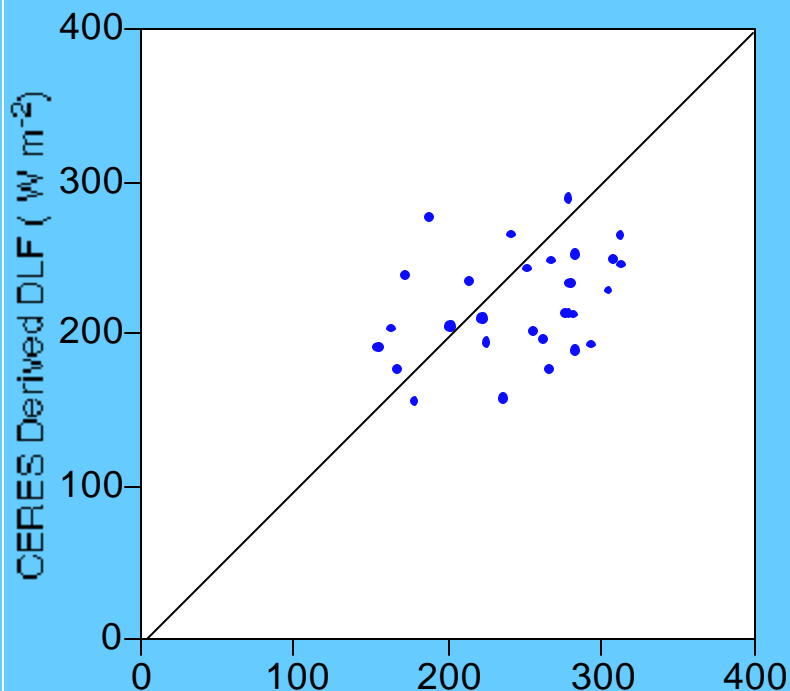
Ny Alesund NOV 2000 - FEB 2001

Nighttime

Downward Longwave Flux

minute average

ED1A



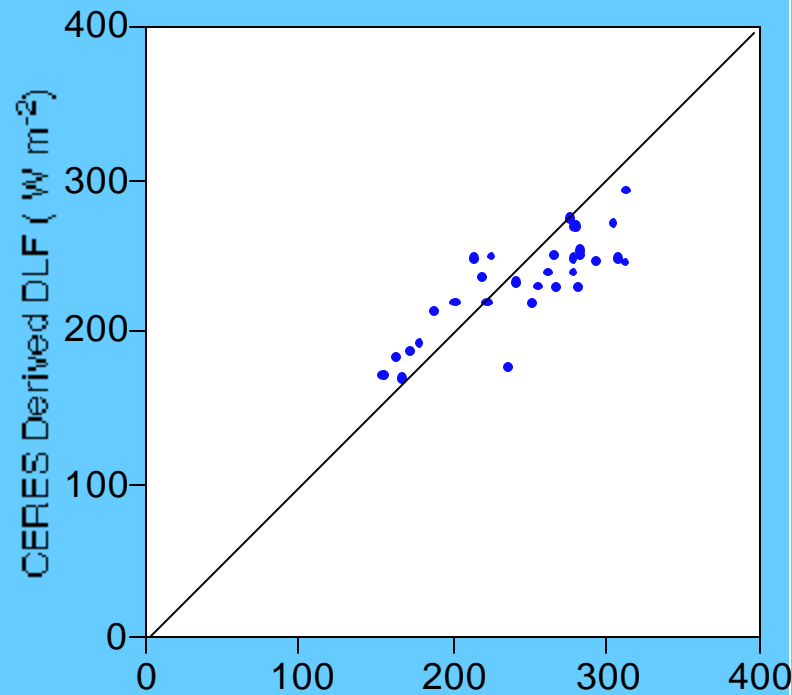
Ground Measured DLF ($W m^{-2}$)
npts = 30

Bias = $-28.52 W m^{-2}$

RMS = $56.92 W m^{-2}$

Random error = $34.23 W m^{-2}$

ED2-5



Ground Measured DLF ($W m^{-2}$)

npts = 30

Bias = $-13.85 W m^{-2}$

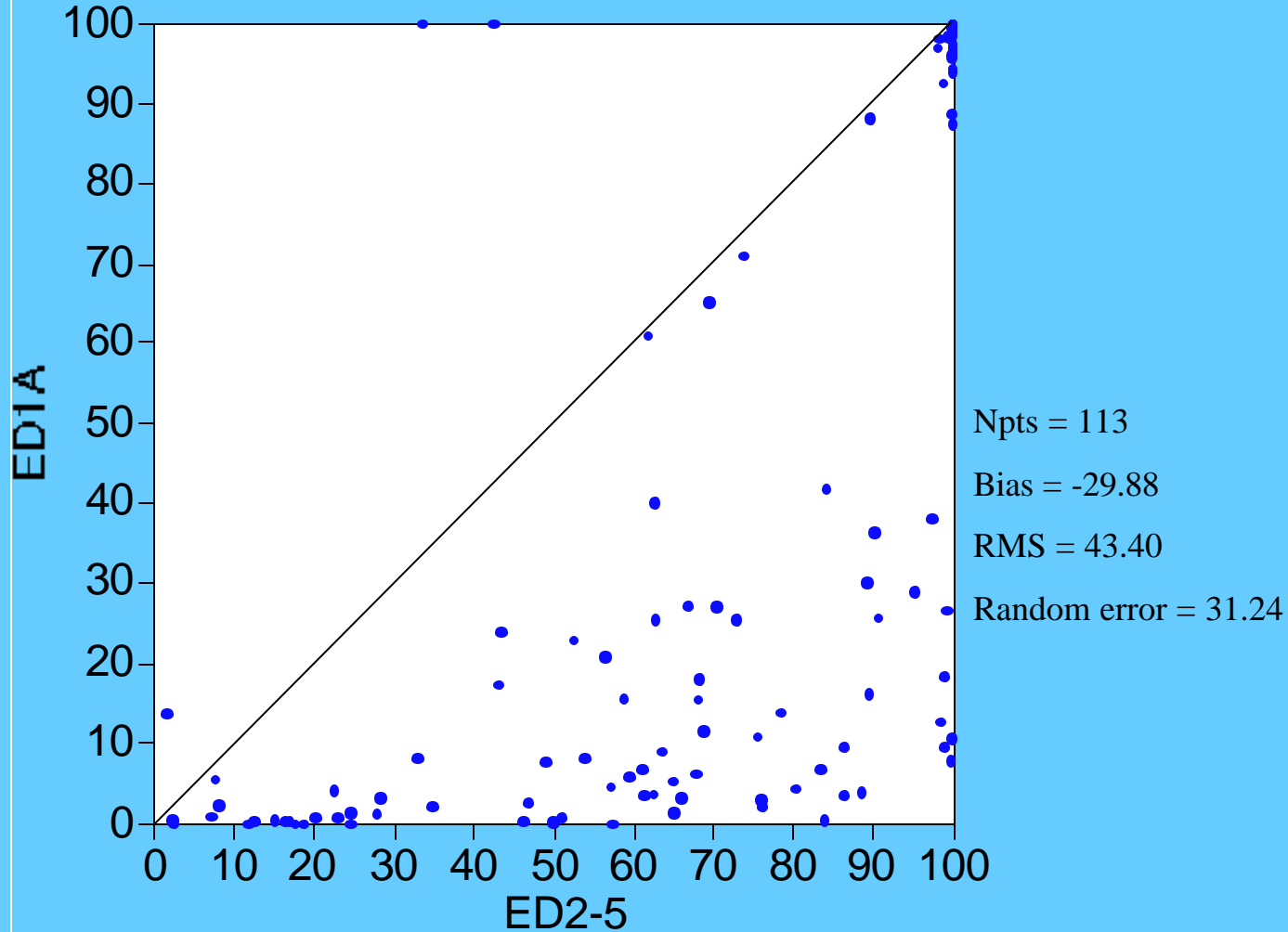
RMS = $31.61 W m^{-2}$

Random error = $18.10 W m^{-2}$

Georg Von Neumayer June - August 2000

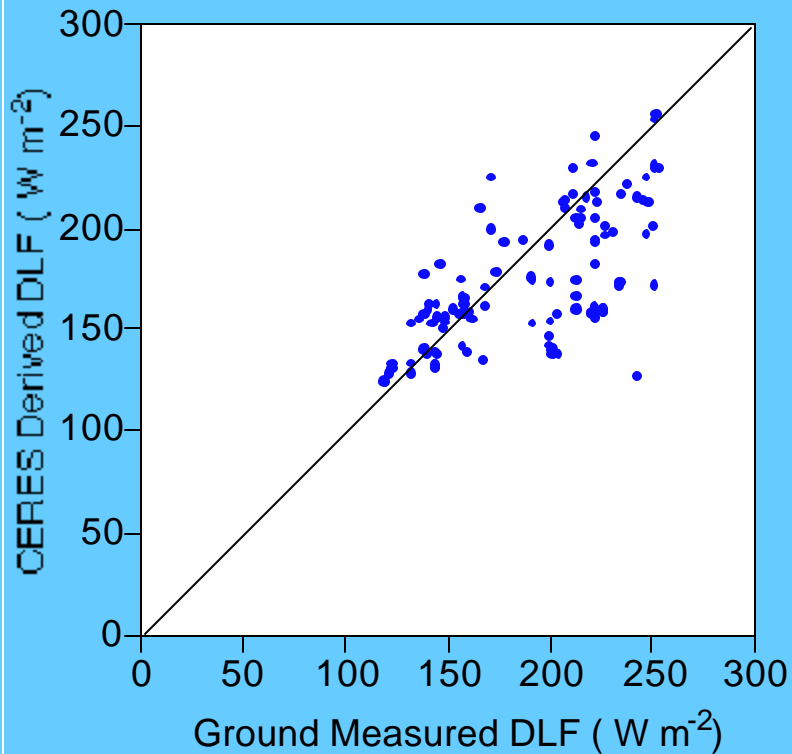
Nighttime Cloud Percent

minute average



Georg Von Neumayer
June - August 2000
Nighttime
Downward Longwave Flux

ED1A



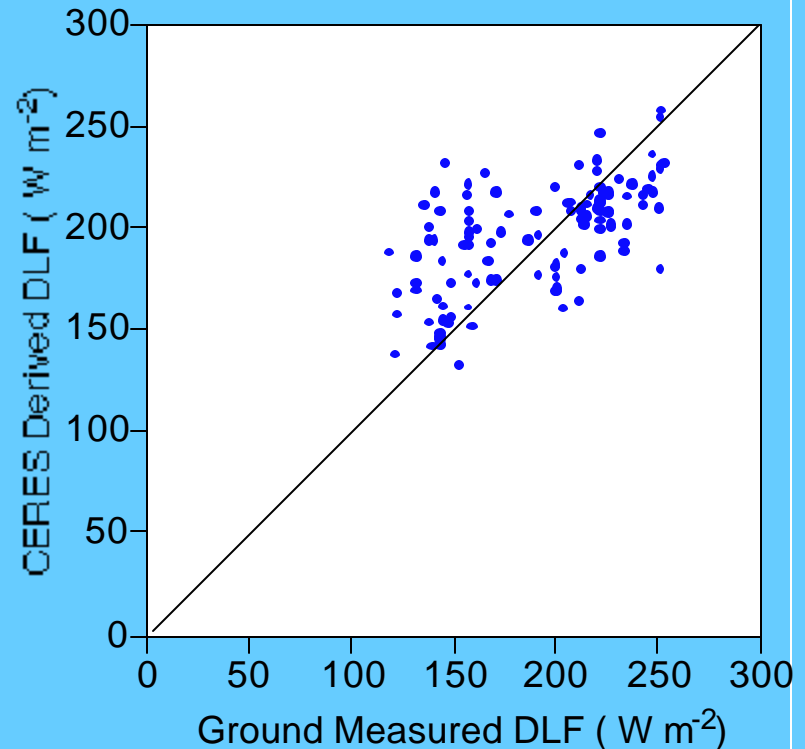
npts = 113

Bias = -14.65 W m^{-2}

RMS = 33.92 W m^{-2}

Random error = 24.36 W m^{-2}

ED2-5



npts = 113

Bias = 5.93 W m^{-2}

RMS = 31.85 W m^{-2}

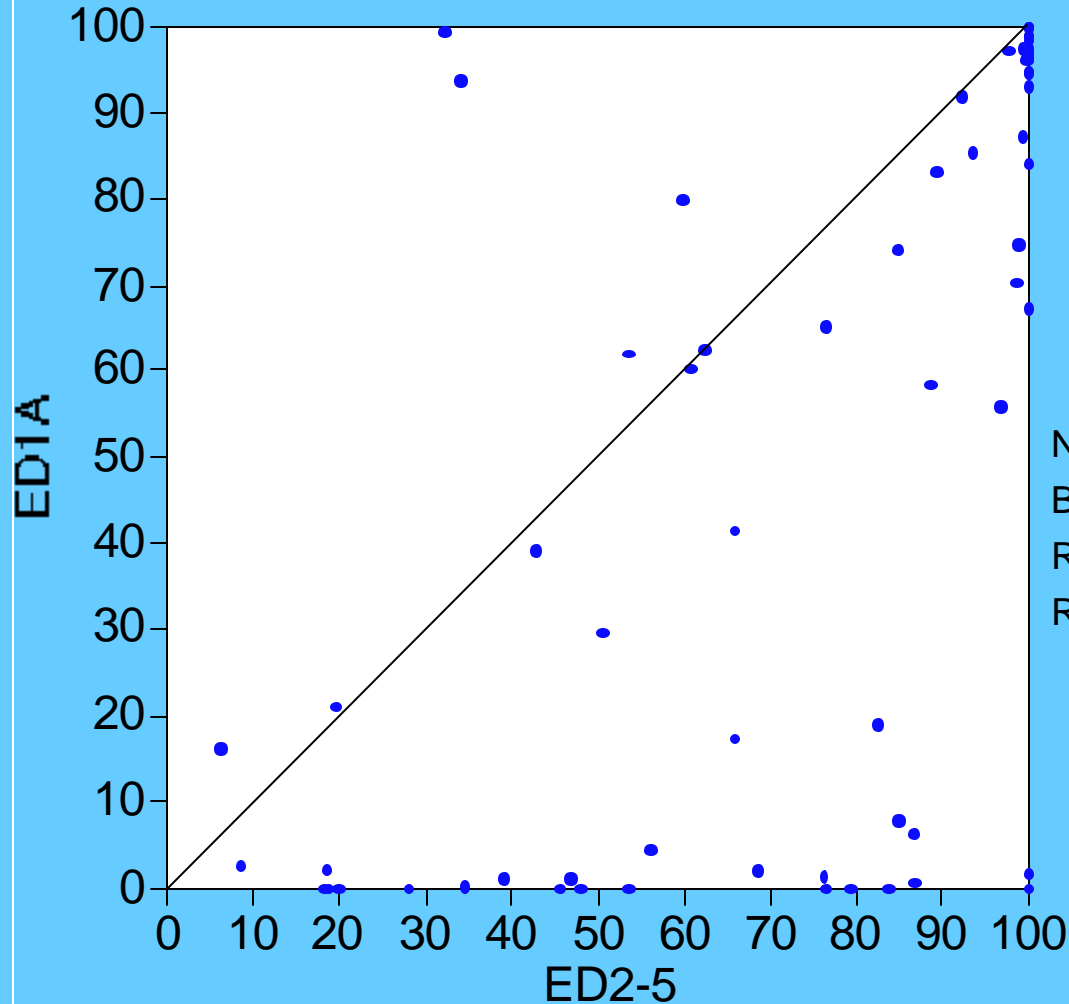
Random error = 21.06 W m^{-2} 8

Syowa
June - August 2000

Nighttime

Cloud Percent

minute average



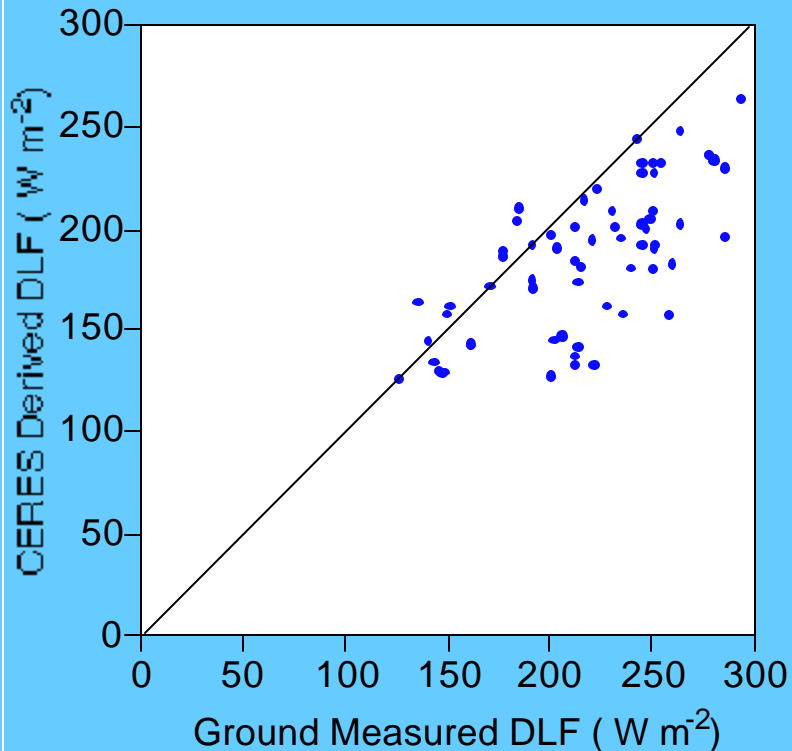
Syowa June - August 2000

Nighttime

minute average

Downward Longwave Flux

ED1A



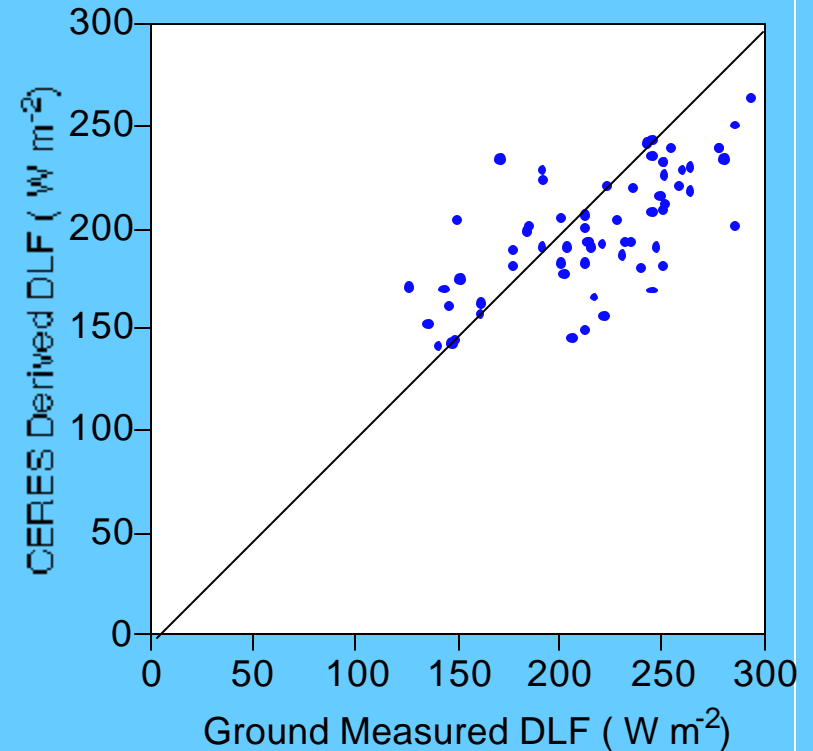
npts = 65

Bias = -31.13 W m^{-2}

RMS = 43.69 W m^{-2}

Random error = 25.29 W m^{-2}

ED2-5



npts = 65

Bias = -17.69 W m^{-2}

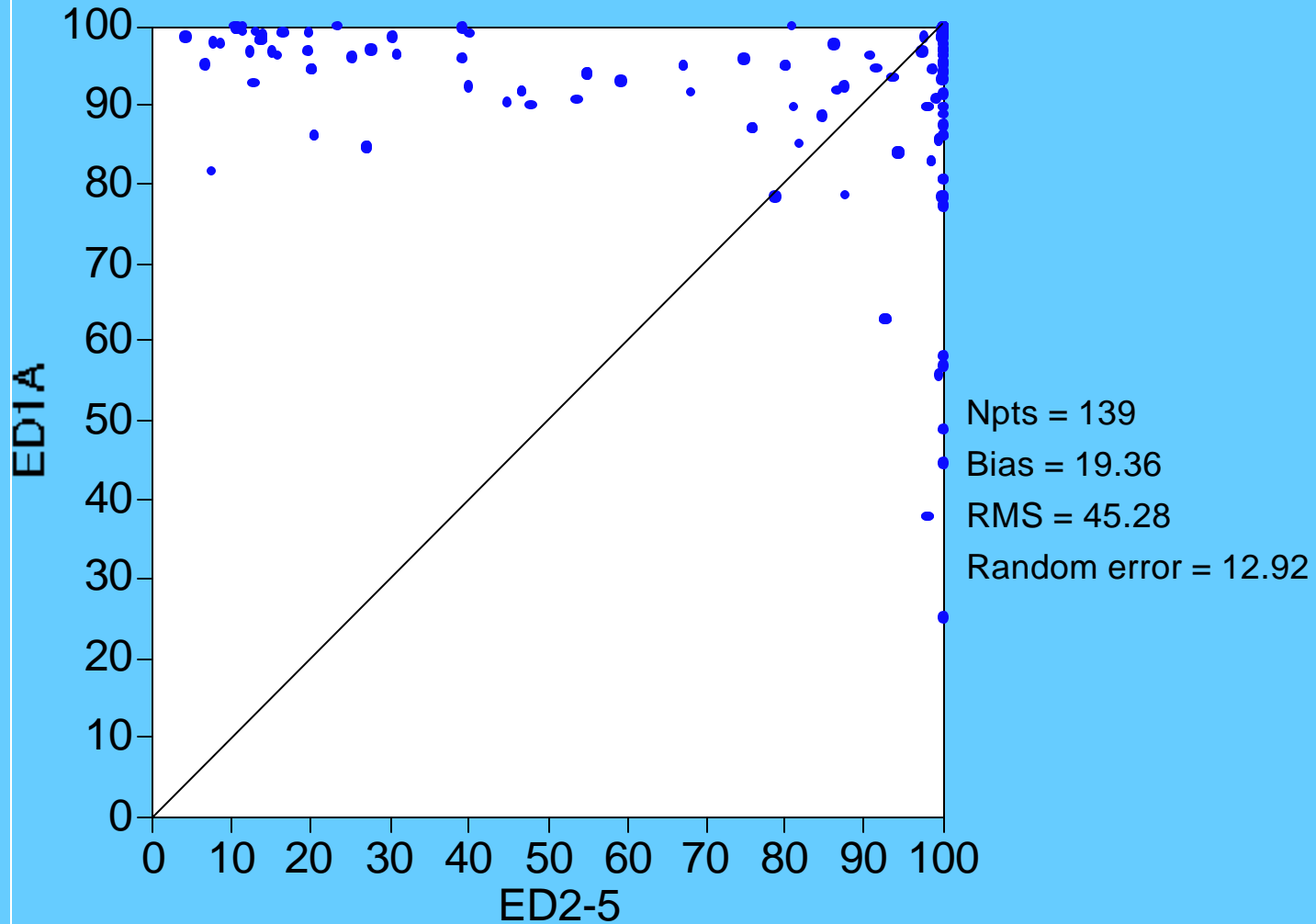
RMS = 35.65 W m^{-2}

Random error = 21.89 W m^{-2}

South Pole
June - August 2000

Nighttime
Cloud Percent

minute average



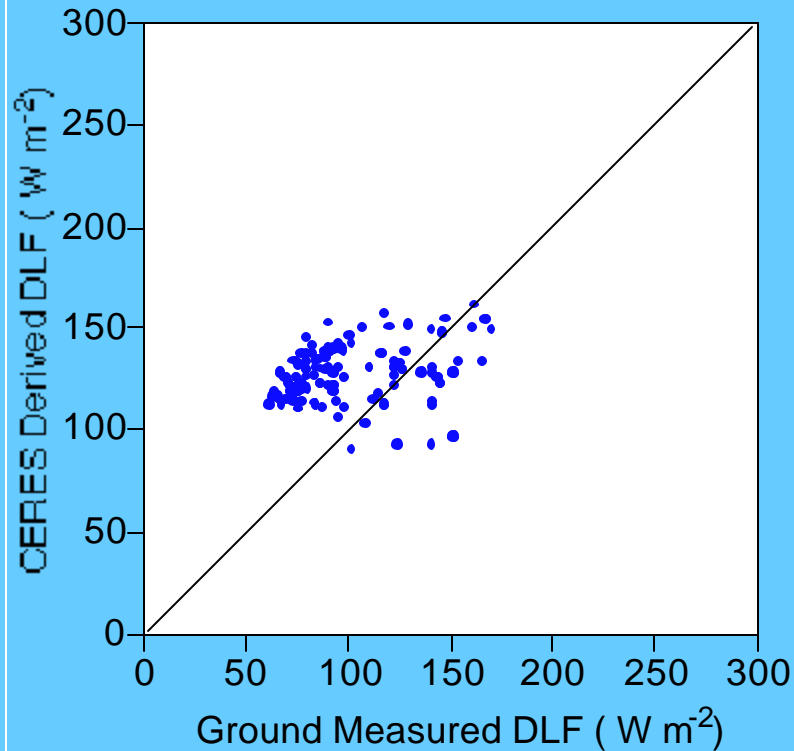
South Pole June - August 2000

Nighttime

minute average

Downward Longwave Flux

ED1A



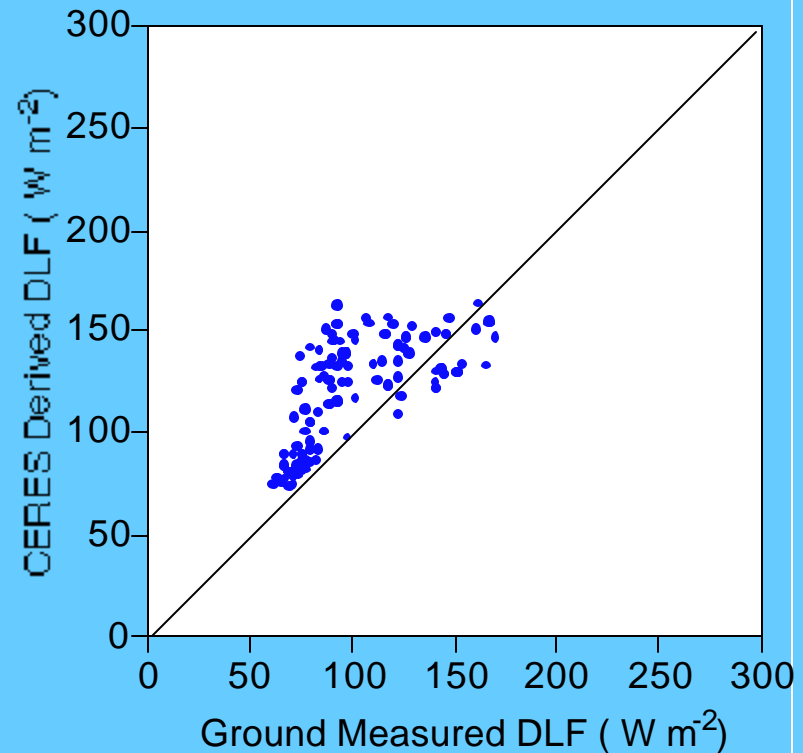
npts = 139

Bias = 27.52 W m^{-2}

RMS = 39.42 W m^{-2}

Random error = 12.97 W m^{-2}

ED2-5



npts = 139

Bias = 19.88 W m^{-2}

RMS = 30.02 W m^{-2}

Random error = 19.30 W m^{-2}

Nighttime Polar Summary Statistics Minute-average

Site	No. of Points	Mean Cloud Amount(%)		Downward LW Flux ($W m^{-2}$)			No. Clear Points	
		Ed1 A	Ed2-5	Measured	Ed1 A (Bias)	Ed2-5 (Bias)	Ed1 A	Ed2-5
Barrow	138	35.4	47.2	197.0	189.2 (-7.9)	195.4 (-1.6)	38	7
Ny Alesund	30	39.7	61.2	245.9	217.4 (-28.5)	232.1 (-13.8)	1	0
Georg von Neumayer	113	38.8	68.7	190.2	175.5 (-14.6)	196.1 (5.9)	13	0
Syowa	65	49.7	72.7	216.8	185.7 (-31.1)	199.1 (-17.7)	11	0
South Pole	139	90.7	71.3	100.0	127.5 (27.5)	119.9 (19.9)	0	0

Conclusion

The use of the ED2-5 cloud algorithm significantly improves the accuracy of the surface retrievals for arctic/polar regions as compared with the ED1A cloud algorithm.