

# Validation of Surface-only Fluxes

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## Surface -only Fluxes

# Validation of Surface-only Fluxes

(CERES Subsystem 4.6)

- Downwelling clear-sky and all-sky SW and LW surface fluxes derived from relationships with TOA fluxes and atmospheric data.

- Each component currently computed from two models

LPSA/LPLA:

Langley Parameterized  
SW/LW Algorithm

		Model A	Model B
SW	Clear	Li et al.	LPSA
	All-sky	-	LPSA
LW	Clear	Inamdar and Ramanathan	LPLA
	All-sky	-	LPLA

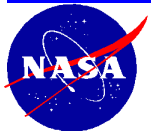
- Validation criteria:

$\pm 20 \text{ Wm}^{-2}$  for instantaneous CERES FOV

$\pm 10 \text{ Wm}^{-2}$  for monthly average 1-deg gridded

- Validation data sources:

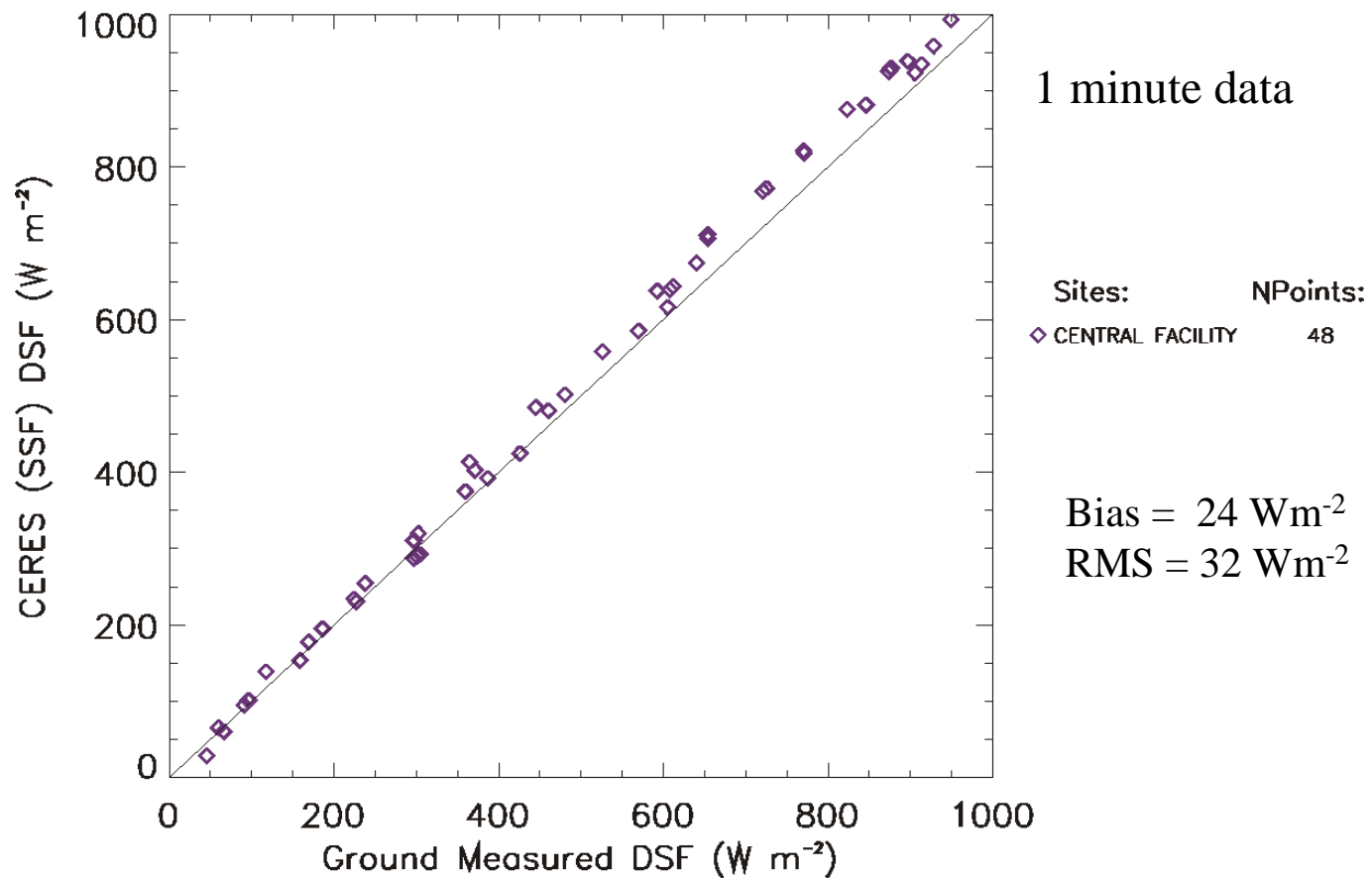
ARM Central facility and extended facilities; BSRN and CMDL sites



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

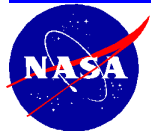
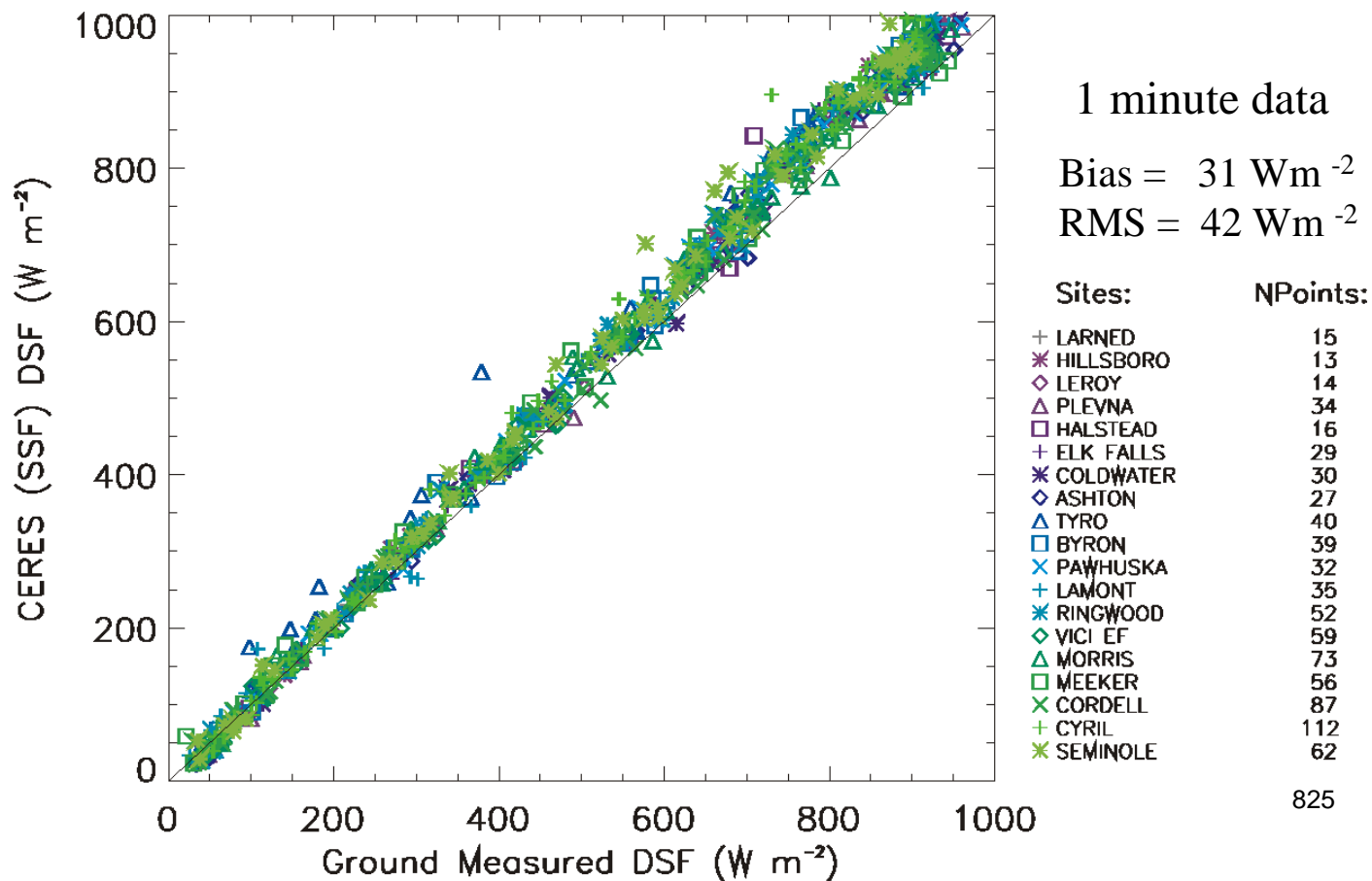
Model A Central Facility Edition 2 V 2 (Li *et al*)



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

Model A Extended Facilities Edition 2 V 2



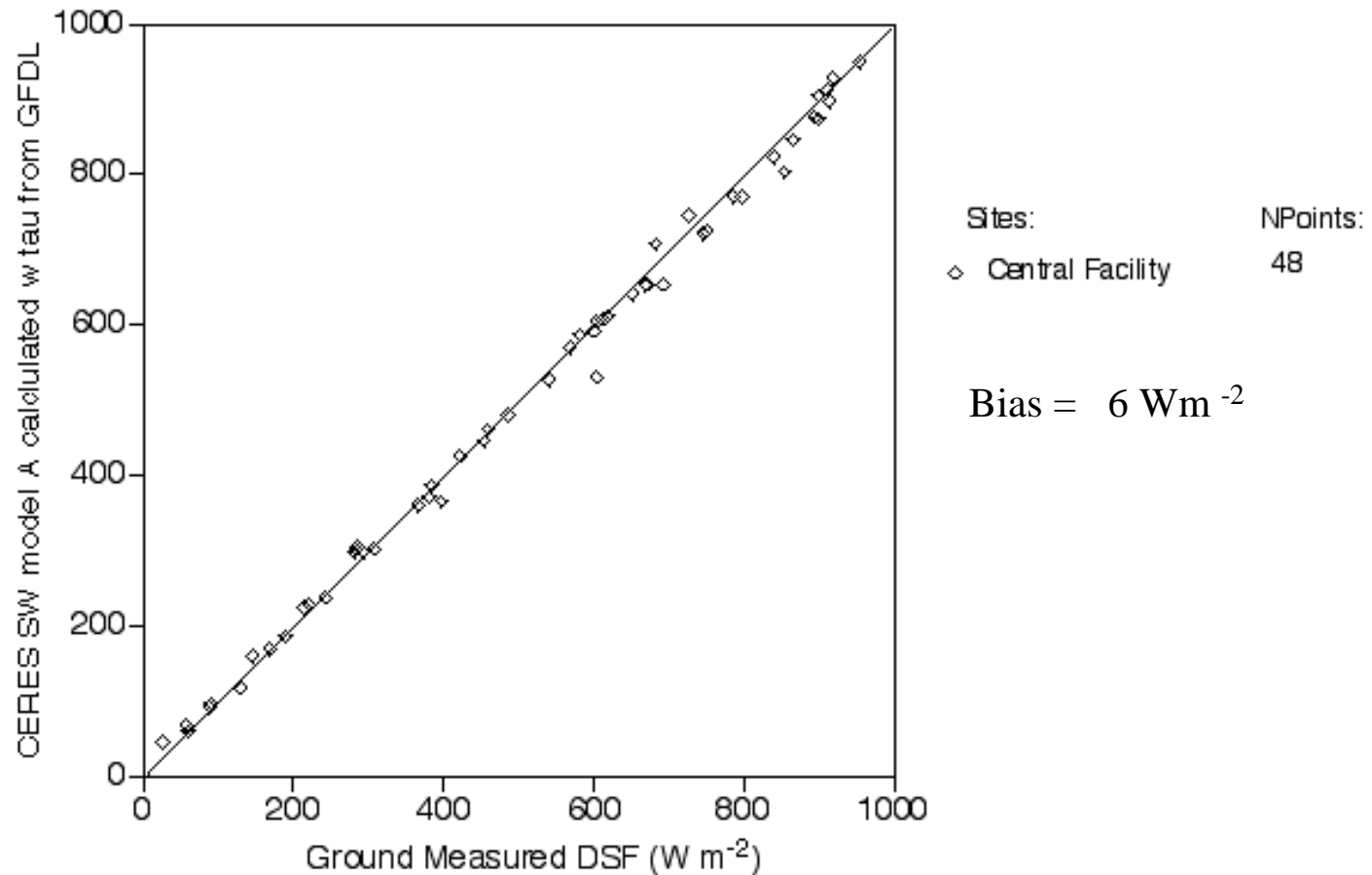
NASA Langley Research Center / Atmospheric Sciences



Surface  
-only  
Fluxes

## Shortwave Model A - Clear Sky

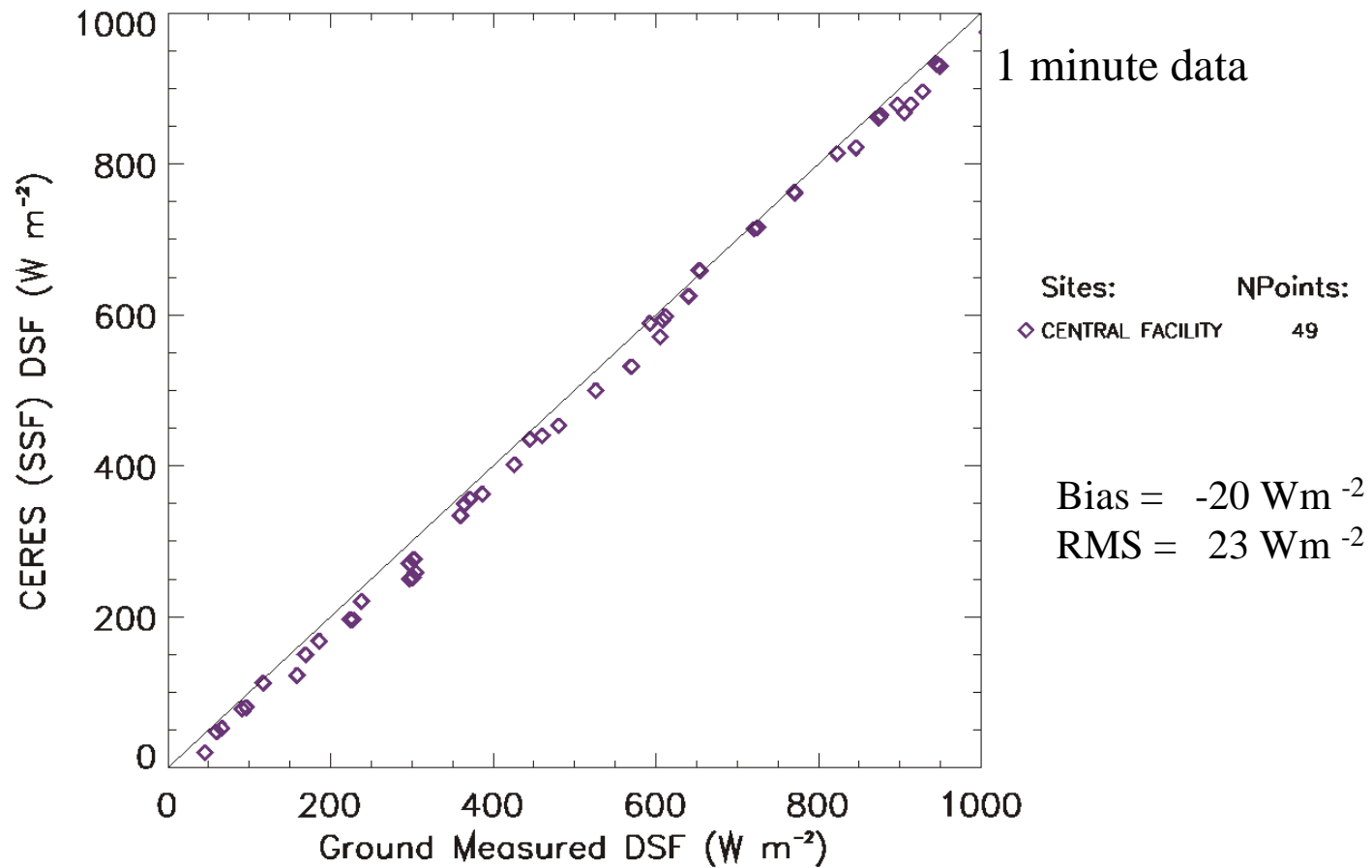
With Aerosol Correction using GFDL  $\tau$



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

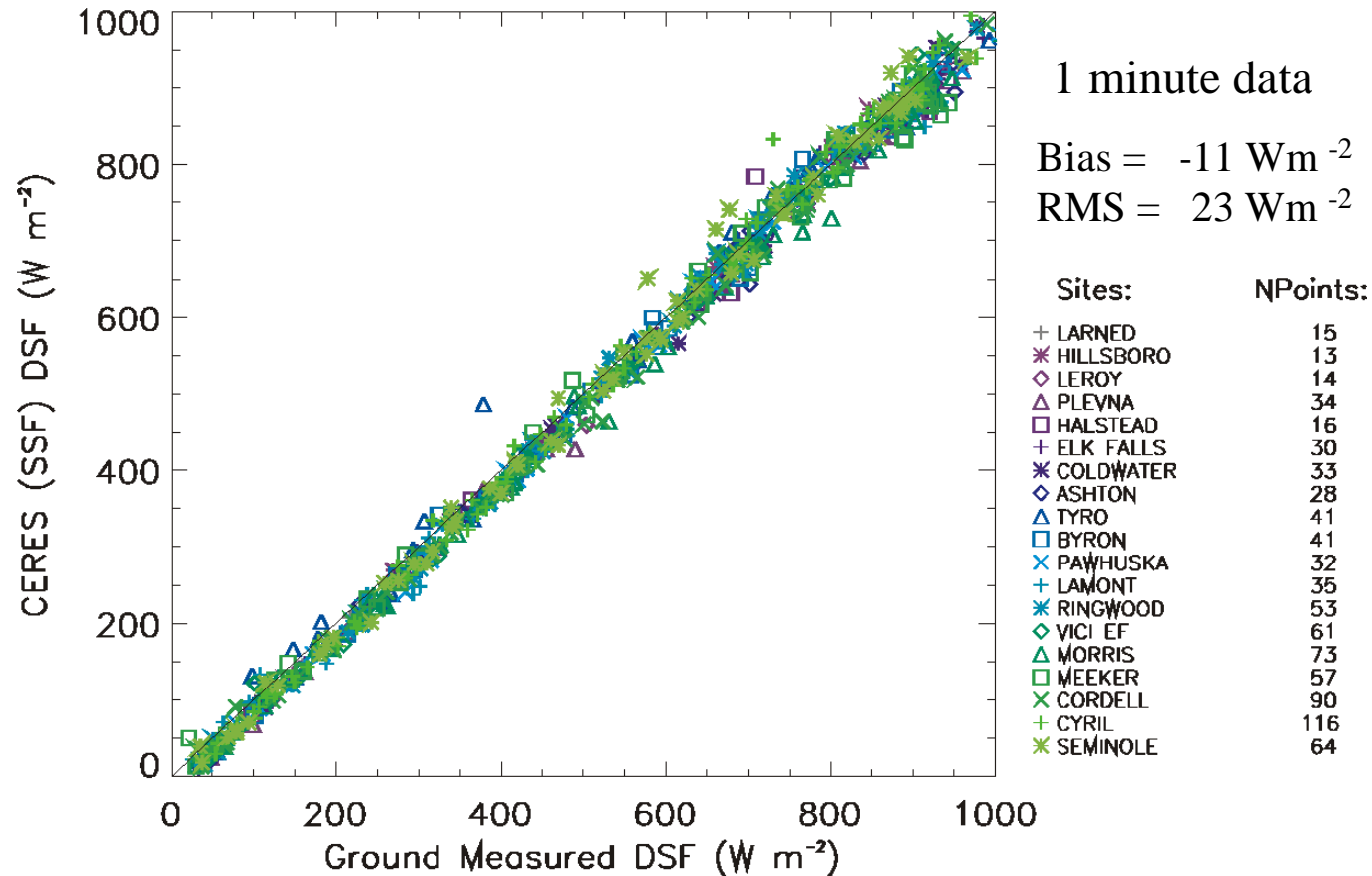
Model B Central Facility Edition 2 V 2



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

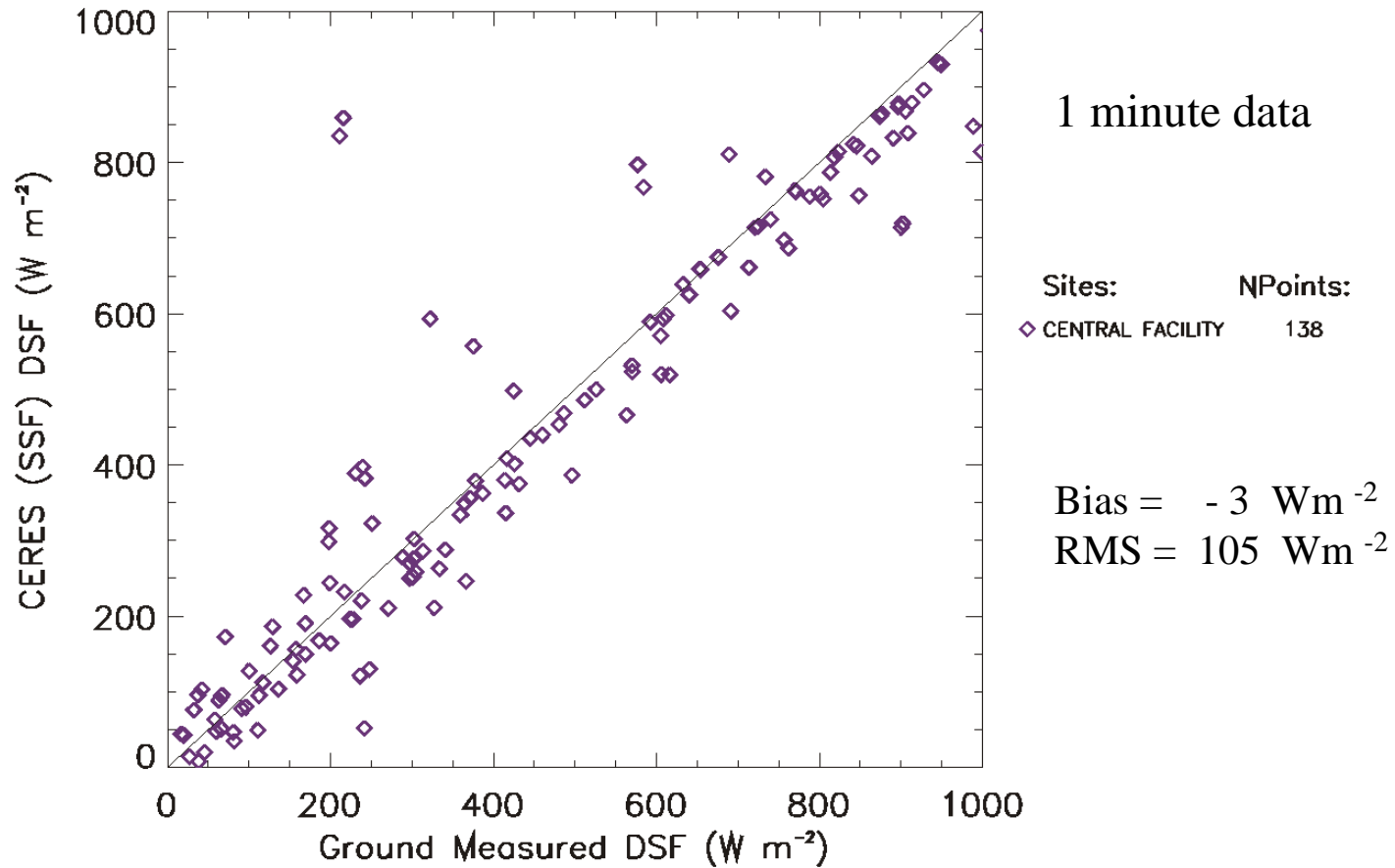
Model B Extended Facilities Edition 2 V 2



Surface  
-only  
Fluxes

# Shortwave All-sky Comparison

Model B Central Facility Edition 2 V 2

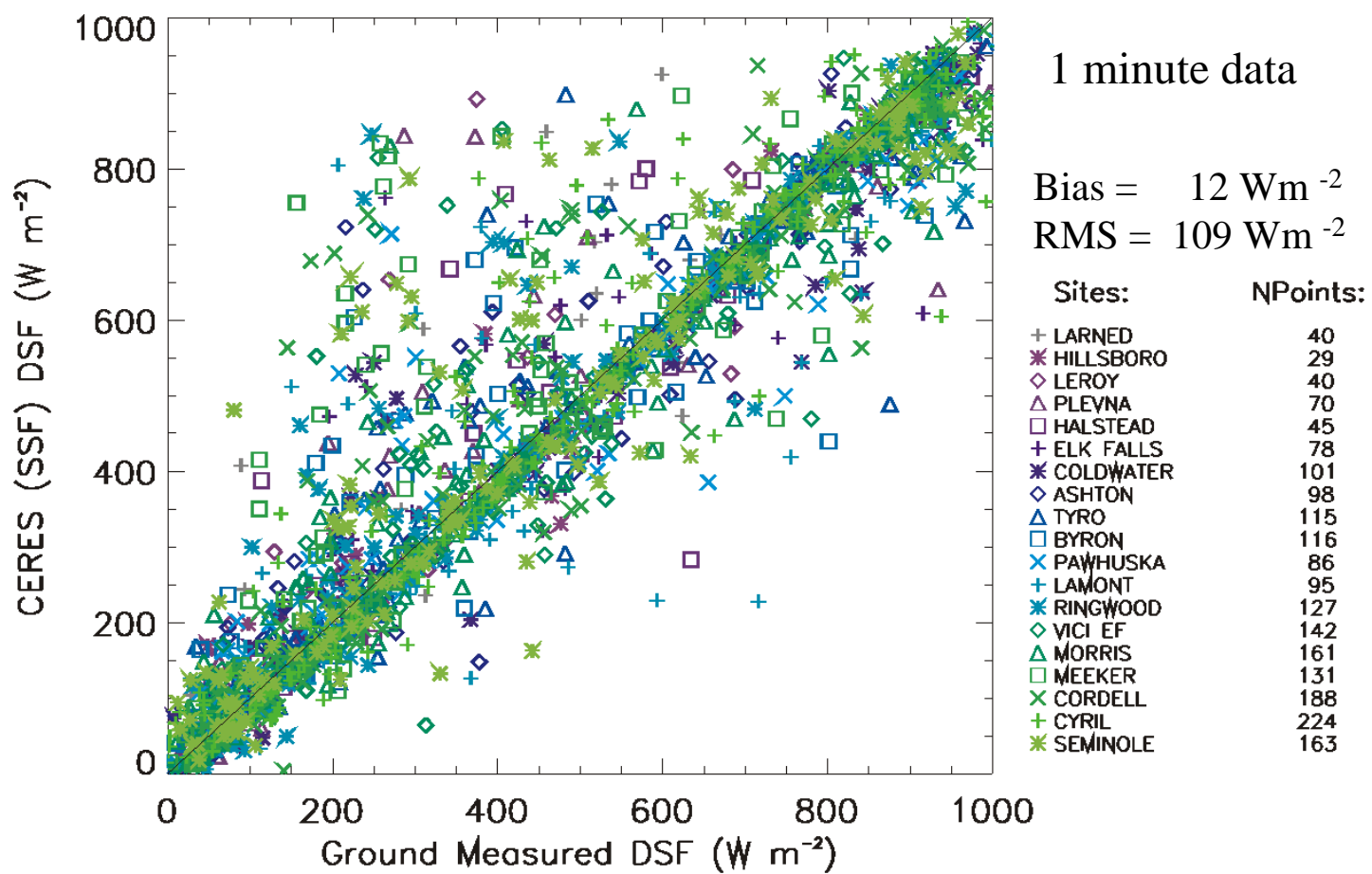




Surface  
-only  
Fluxes

# Shortwave All-sky Comparison

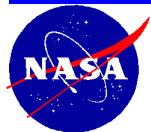
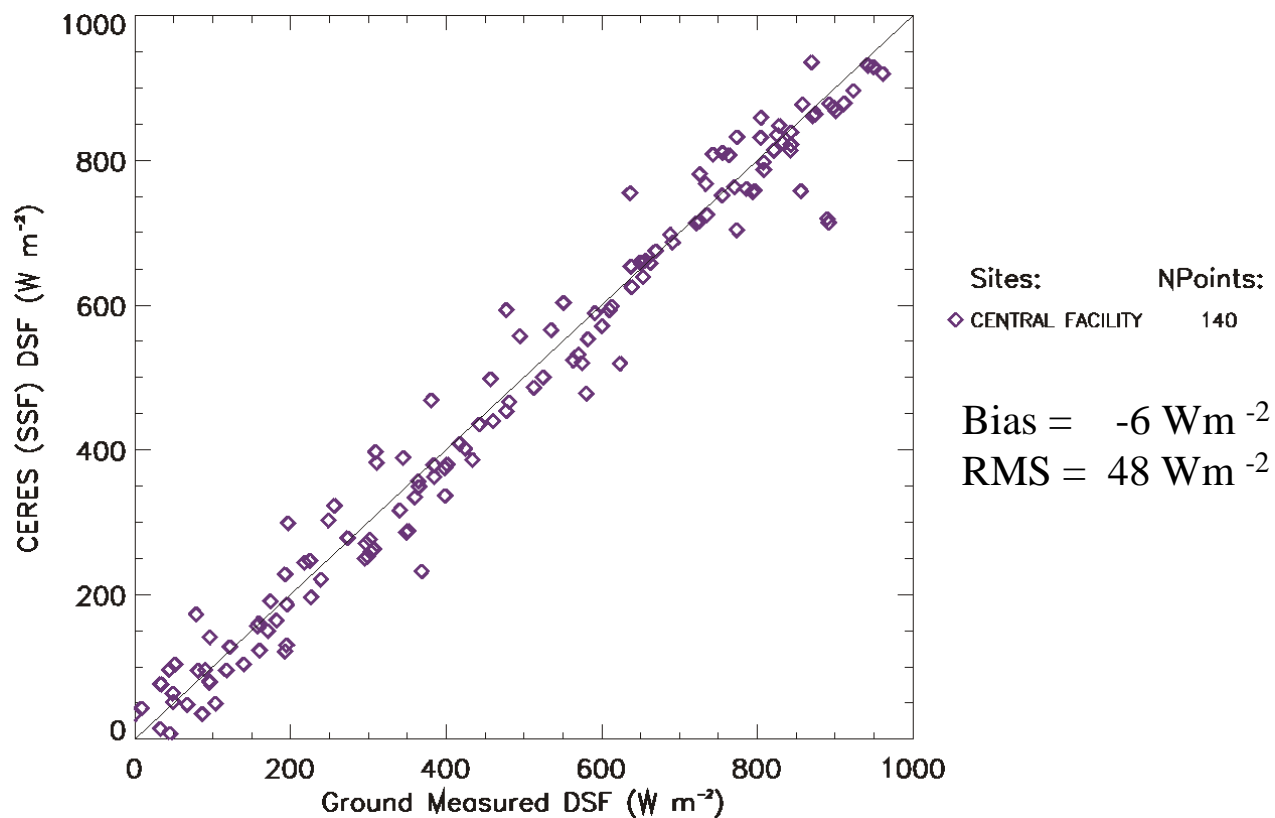
Model B Extended Facilities Edition 2 V 2



Surface  
-only  
Fluxes

## Shortwave Model B- All Sky

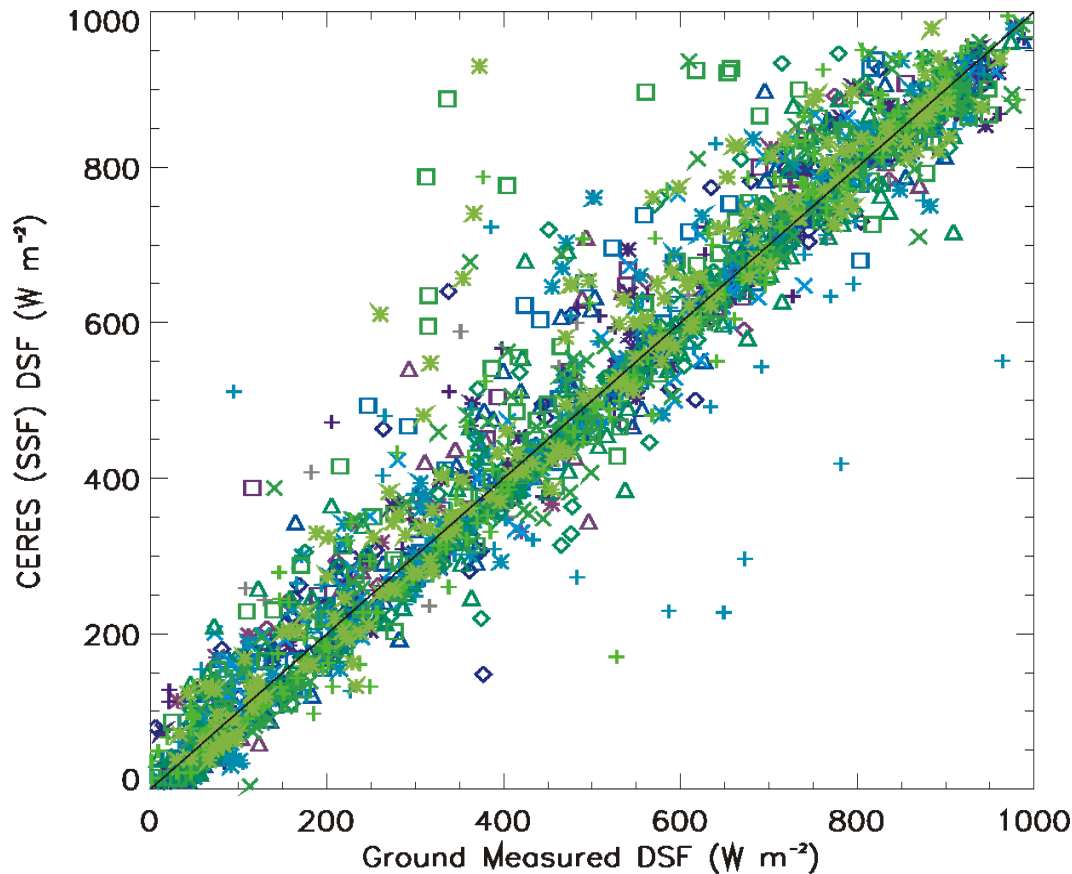
Central Facility - 60 minutes



Surface  
-only  
Fluxes

# Shortwave Model B - All Sky

## Extended Facilities - 60 minutes



Bias =  $13 W m^{-2}$

RMS =  $72 W m^{-2}$

Sites: NPoints:

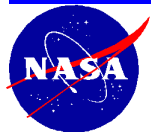
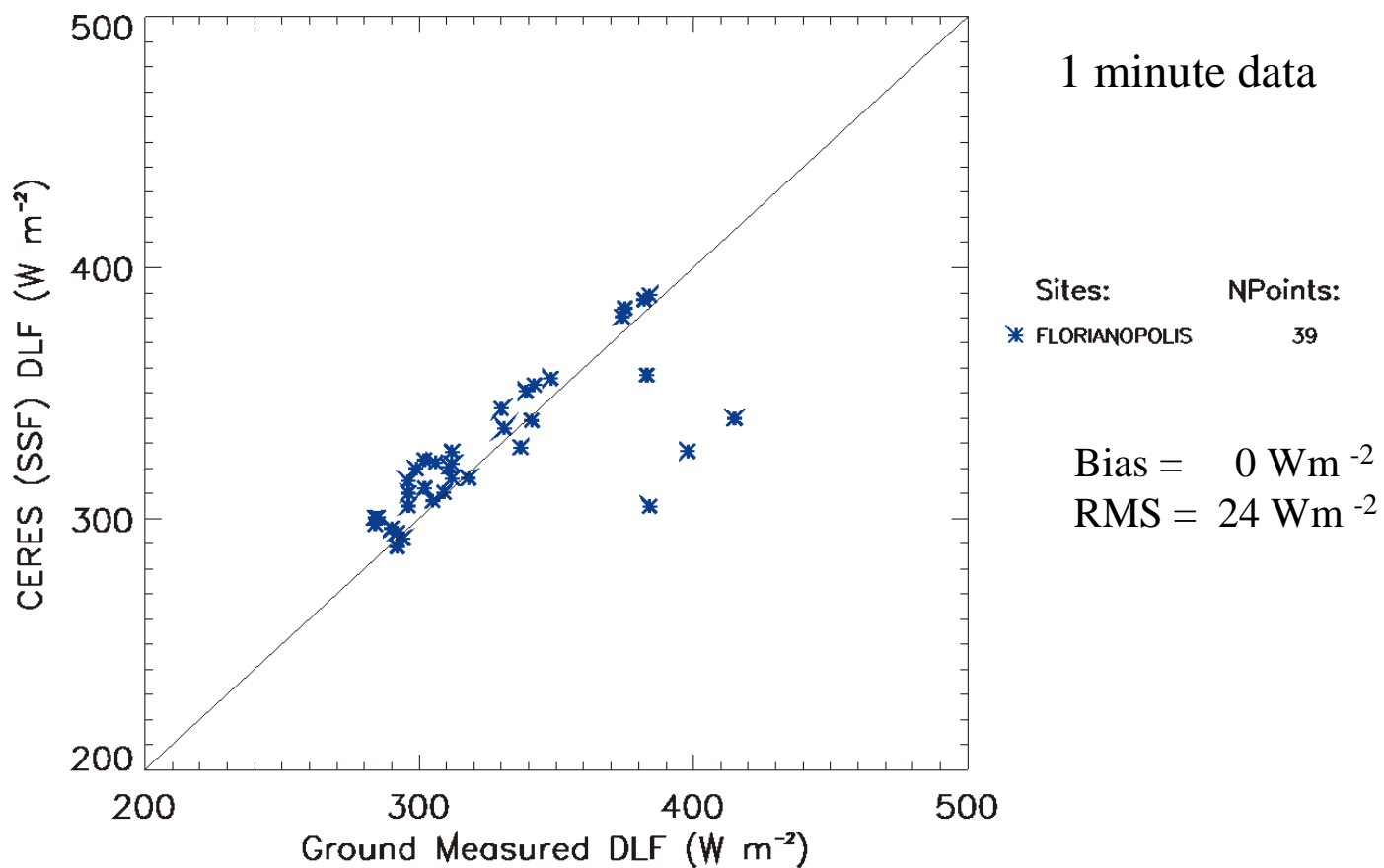
+	LARNED	28
*	HILLSBORO	30
◇	LEROY	25
△	PLEVNA	58
□	HALSTEAD	35
×	TOWANDA	37
+	ELK FALLS	71
*	COLDWATER	80
◇	ASHTON	66
△	TYRO	91
□	BYRON	91
×	PAWHUSKA	74
+	LAMONT	82
*	RINGWOOD	145
◇	VICI EF	144
△	MORRIS	170
□	MEEKER	115
×	CORDELL	196
+	CYRIL	229
*	SEMINOLE	195



Surface  
-only  
Fluxes

## Longwave Clear-sky

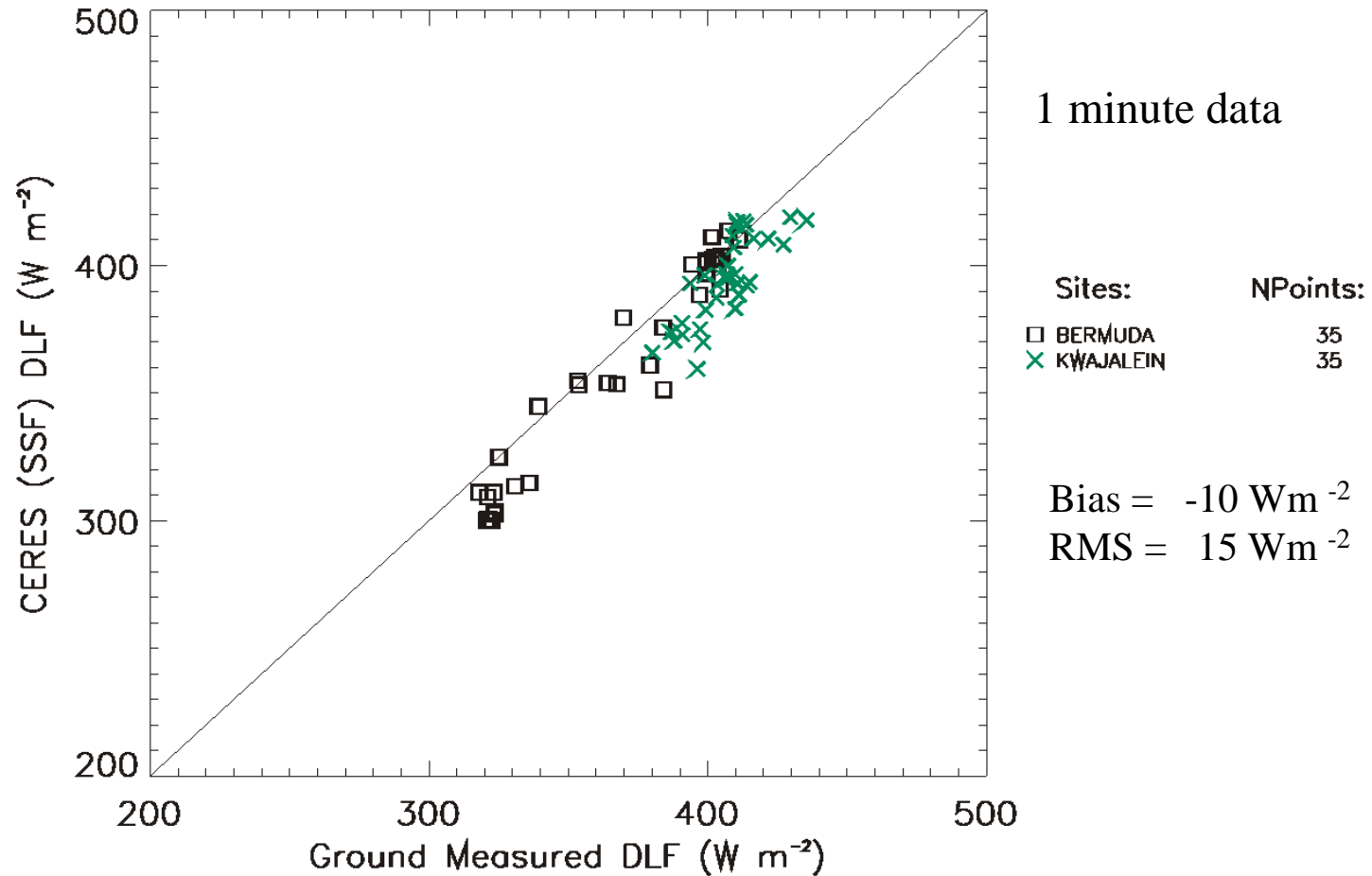
Model A BSRN Edition 2 V 1 (Inamdar and Ramanathan)



Surface  
-only  
Fluxes

# Longwave Clear-sky

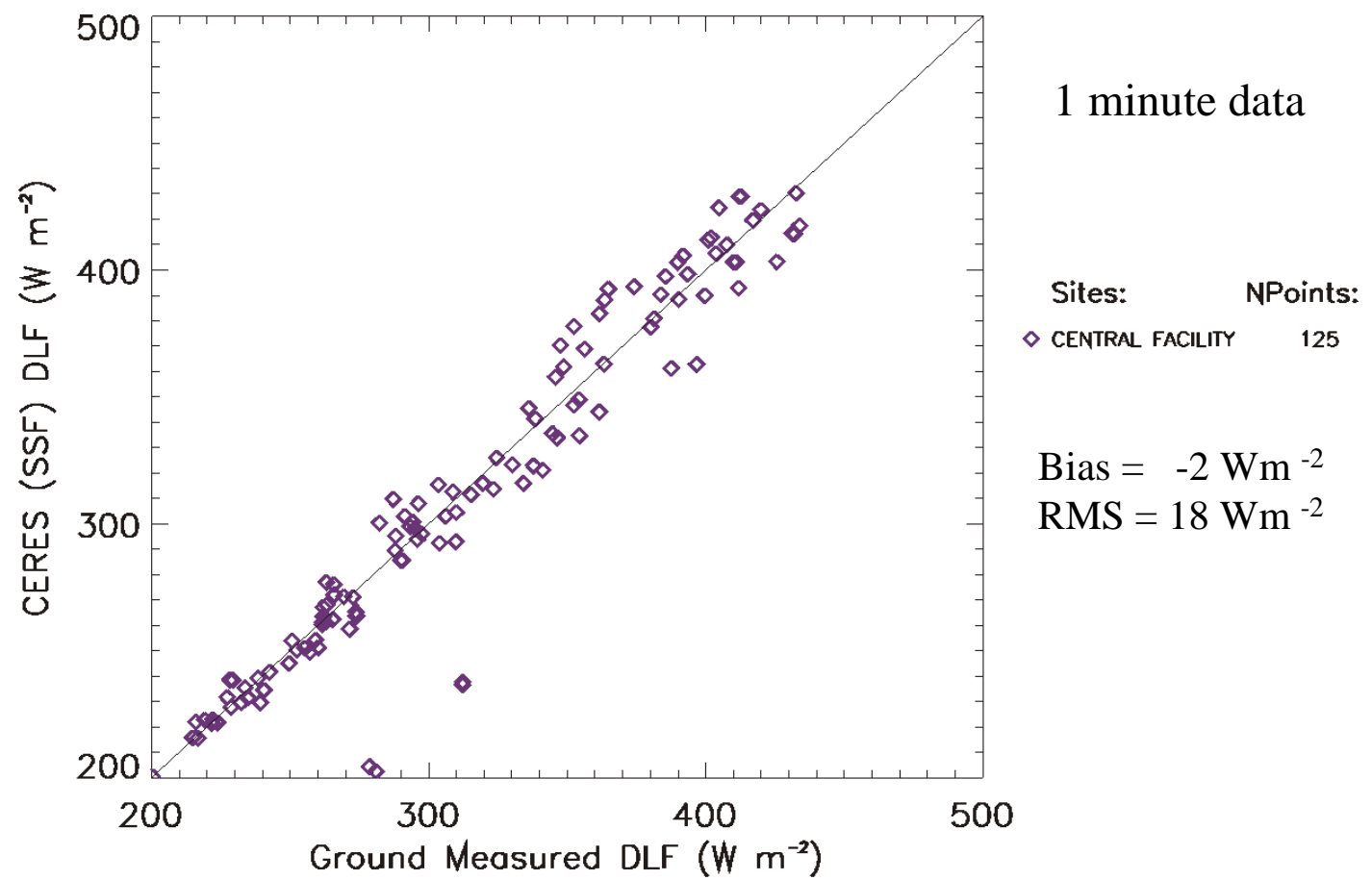
Model A CMDL Edition 2 V 1



Surface  
-only  
Fluxes

# Longwave Clear-sky

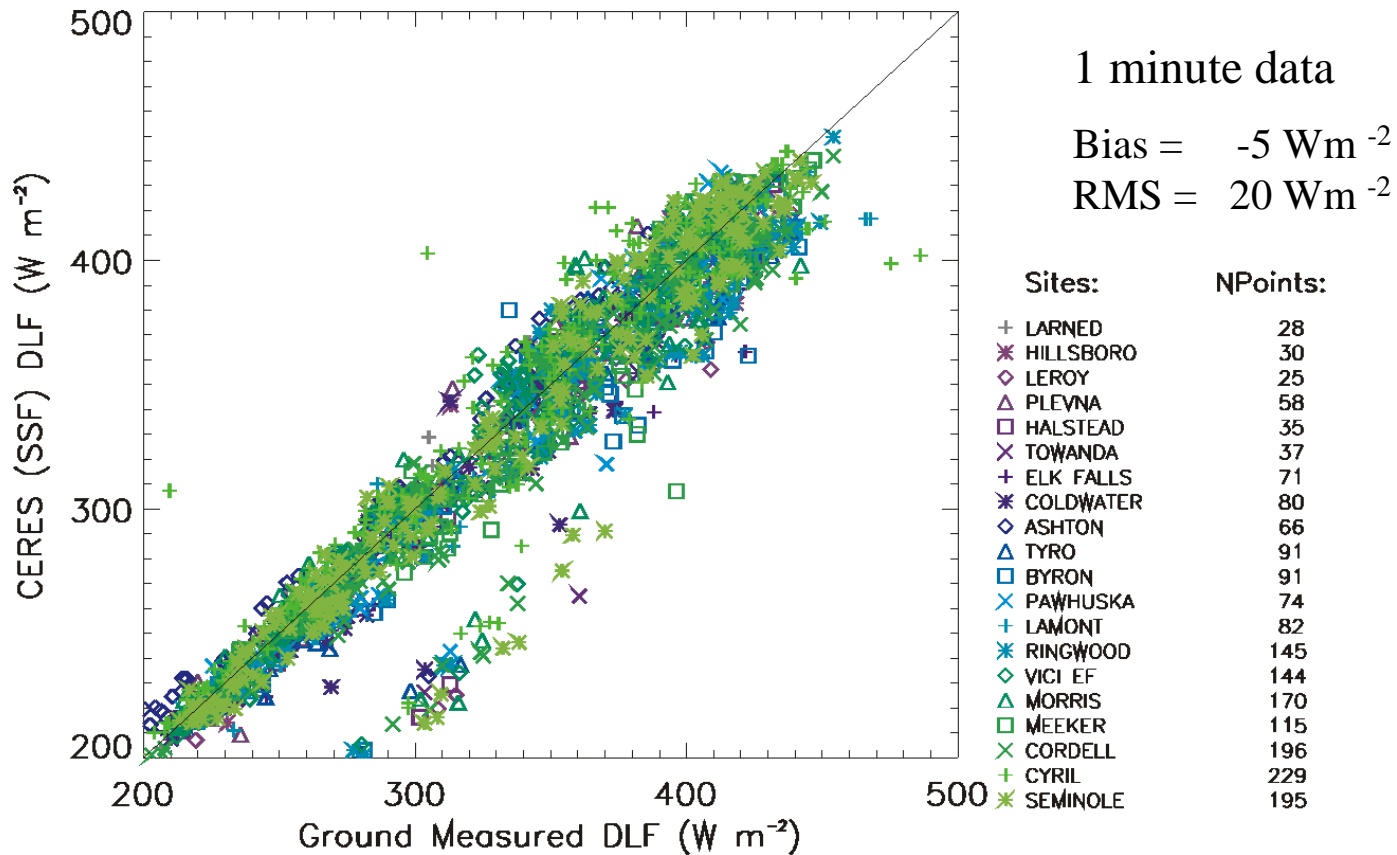
Model B Central Facility Edition 2 V 2 (Gupta *et al*)



Surface  
-only  
Fluxes

# Longwave Clear-sky

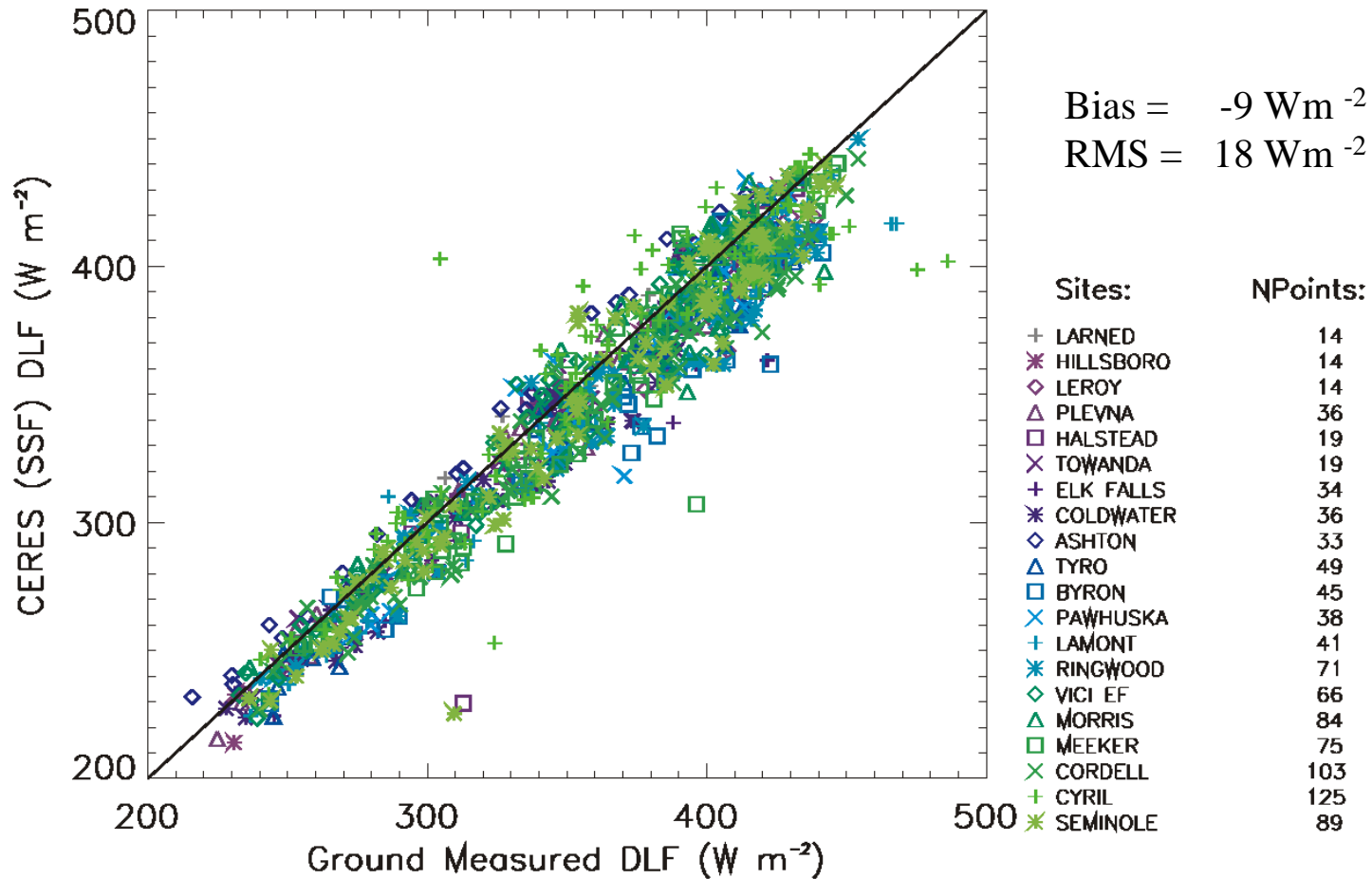
Model B Extended Facilities Edition 2 V 2



Surface  
-only  
Fluxes

# Longwave Model B - Clear Sky

## Extended Facilities - Daytime

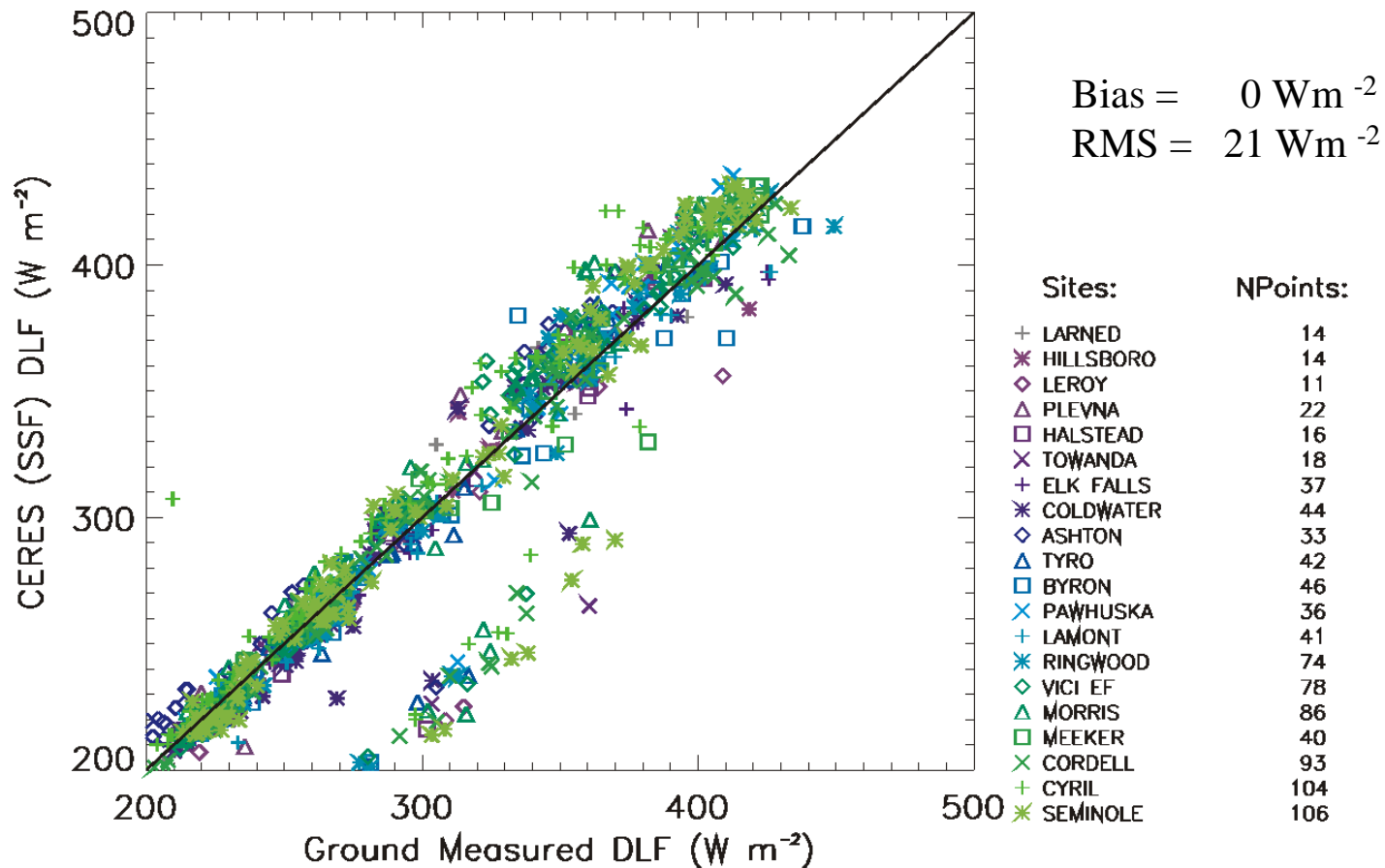




Surface  
-only  
Fluxes

# Longwave Model B - Clear Sky

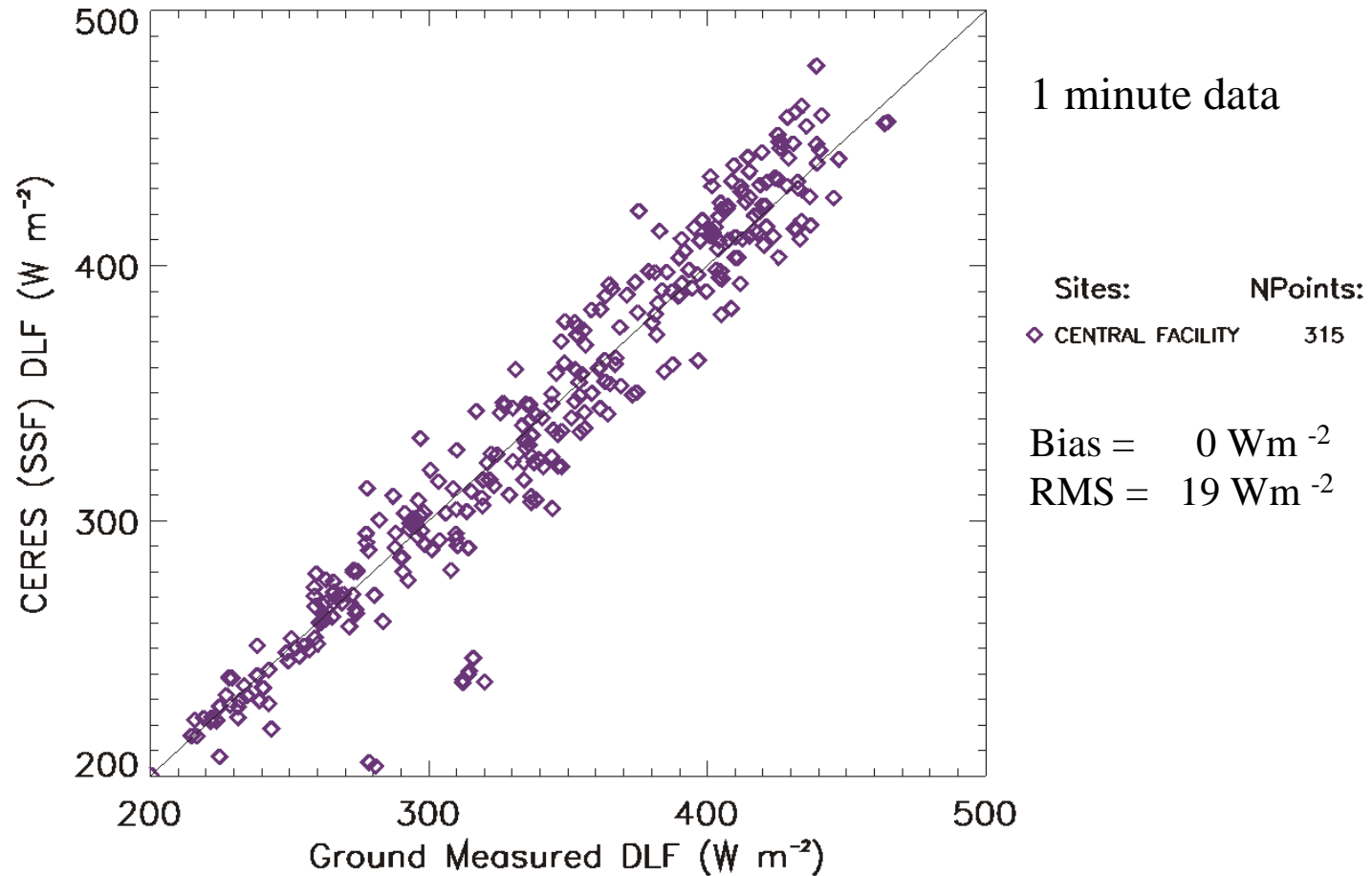
## Extended Facilities - Nighttime



Surface  
-only  
Fluxes

# Longwave All-sky

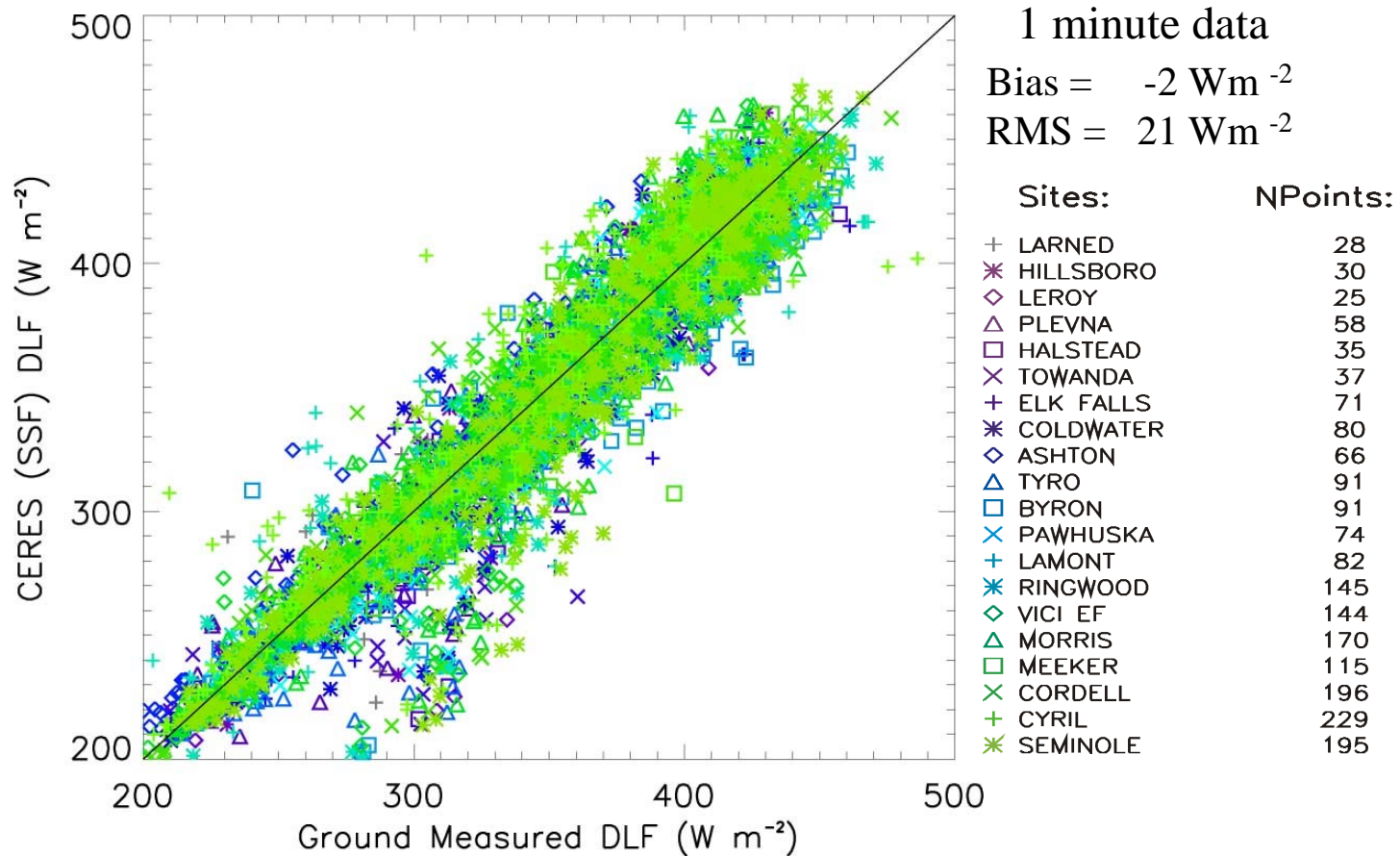
Model B Central Facility Edition 2 V 2



Surface  
-only  
Fluxes

# Longwave All-sky

Model B Extended Facilities Edition 2 V 2



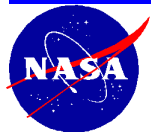
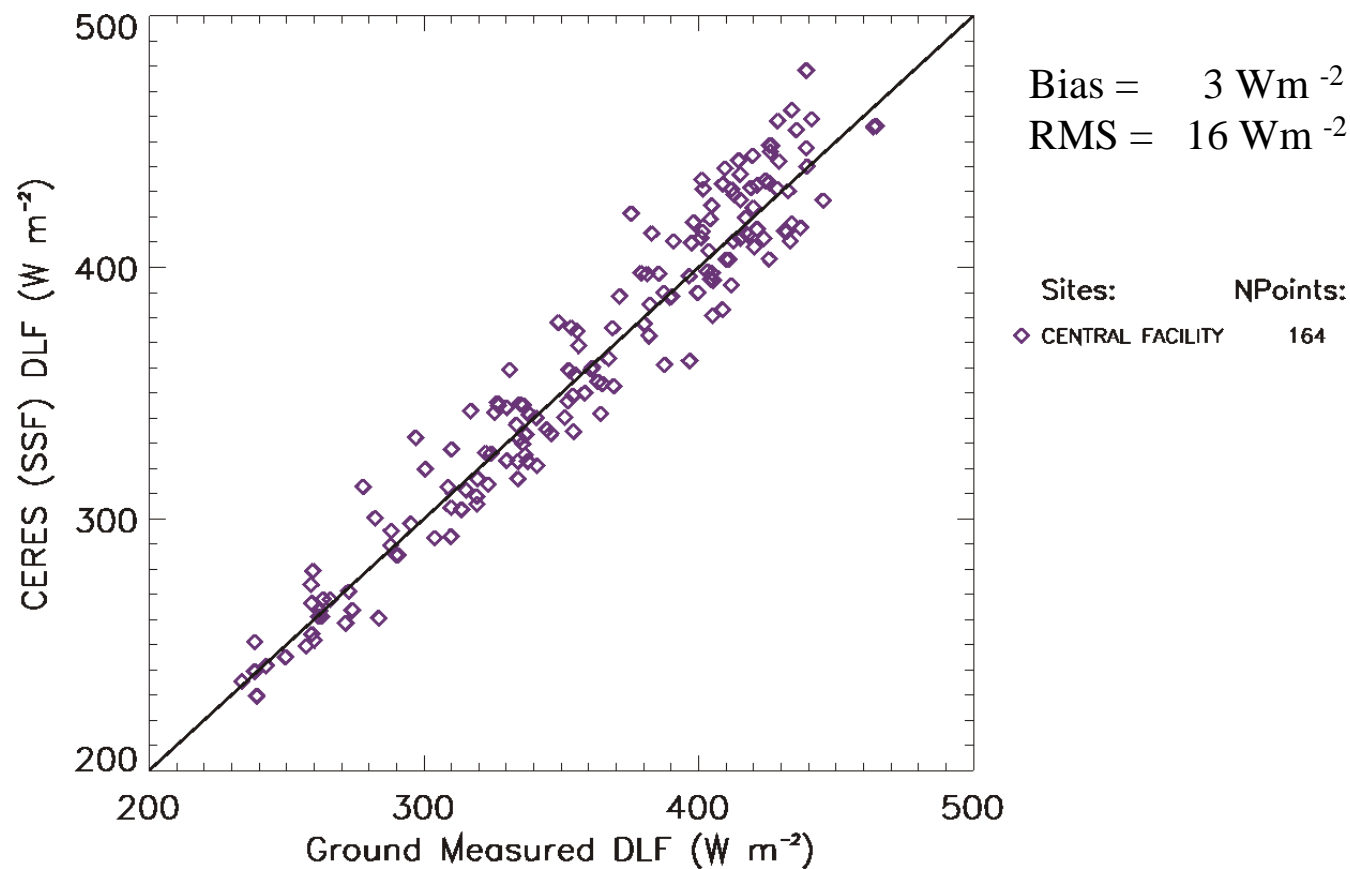
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Surface  
-only  
Fluxes

## Longwave Model B All-sky

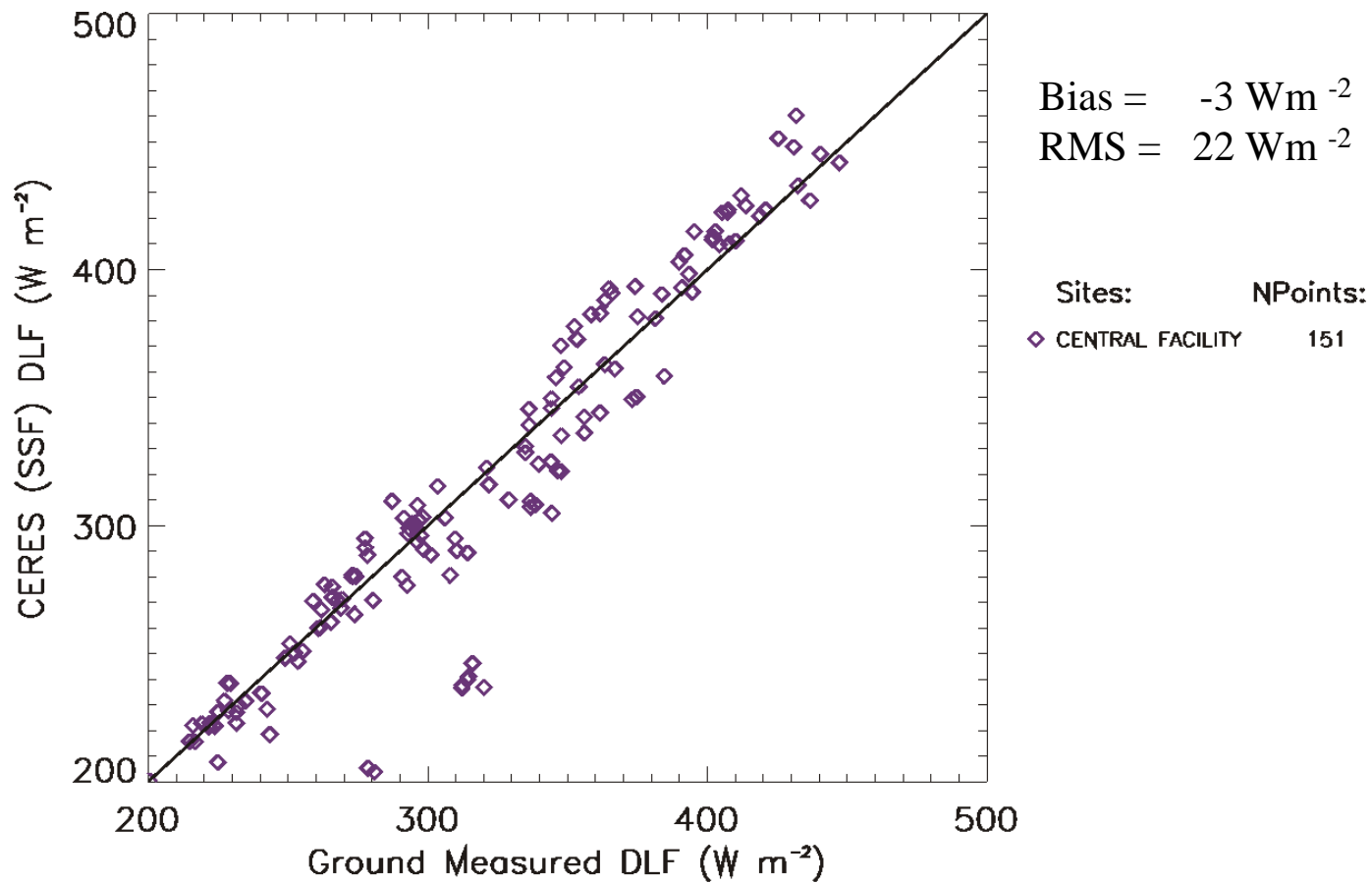
### Central Facility - Daytime



Surface  
-only  
Fluxes

# Longwave Model B All-sky

## Central Facility - Nighttime



## Summary

- Clear-sky results presented from SW and LW Models A and B
- All-sky results available only from Models B
- LW Model C (Zhou and Cess) will be introduced shortly

		Model A	Model B	Model C
SW	Clear	Li et al.	LPSA	-
	All-sky	-	LPSA	-
LW	Clear	Inamdar and Ramanathan	LPLA	Zhou & Cess
	All-sky	-	LPLA	Zhou & Cess

