

## Validation of Surface-only Fluxes

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David P. Kratz<sup>1</sup>, Shashi K. Gupta<sup>2</sup>,  
Anne C. Wilber<sup>2</sup>, and Cathy Nguyen<sup>3</sup>

<sup>1</sup>NASA Langley Research Center

<sup>2</sup>Analytical Services and Materials, Inc.

<sup>3</sup>Science Applications International Corp.

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## 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 SGP (Central and extended facilities), NSA and TWP sites



## Algorithm Changes Since the 24th STM

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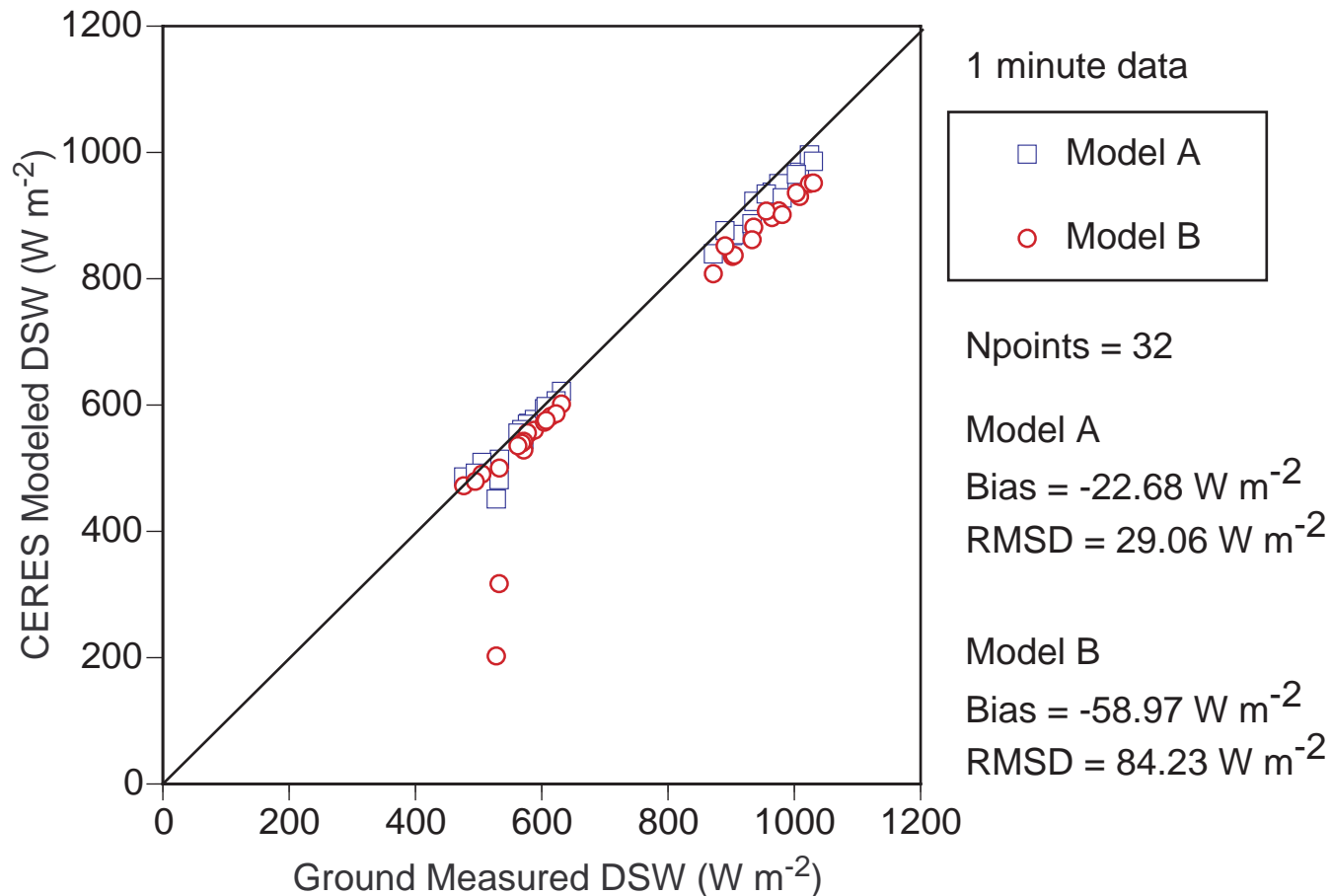
- Validation of TRMM Ed. 2A Indicated Some Changes
  - SW Model A (Li *et al.*):  
Low AOD Caused Overestimation of Insolation  
AOD From GFDL Climatology Improved Insolation
  - SW Model B (LPSA; Staylor *et al.*):  
No Changes Required.
  - LW Model A (Inamdar and Ramanathan):  
Changes to Land Algorithm; Now Works Globally
  - LW Model B (LPLA; Gupta *et al.*):  
No Changes Required
- Changes to be Implemented for TRMM Ed. 2B and Terra Beta 4
- Present Results From Offline Implementation of Changes (2A/2B)



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

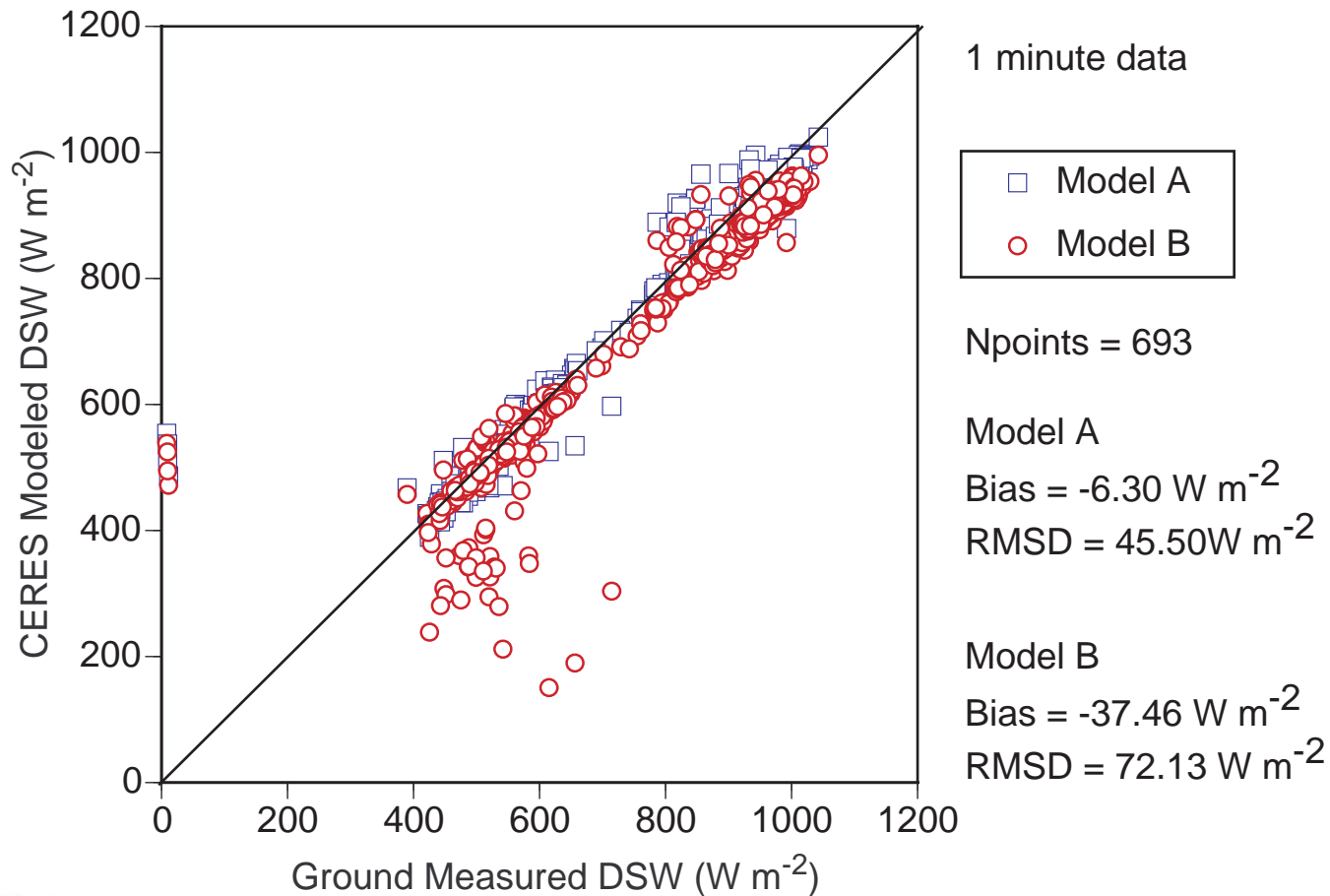
Central Facility      Terra Beta 4



Surface  
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Fluxes

# Shortwave Clear-sky Comparison

Extended Facilities      Terra Beta 4

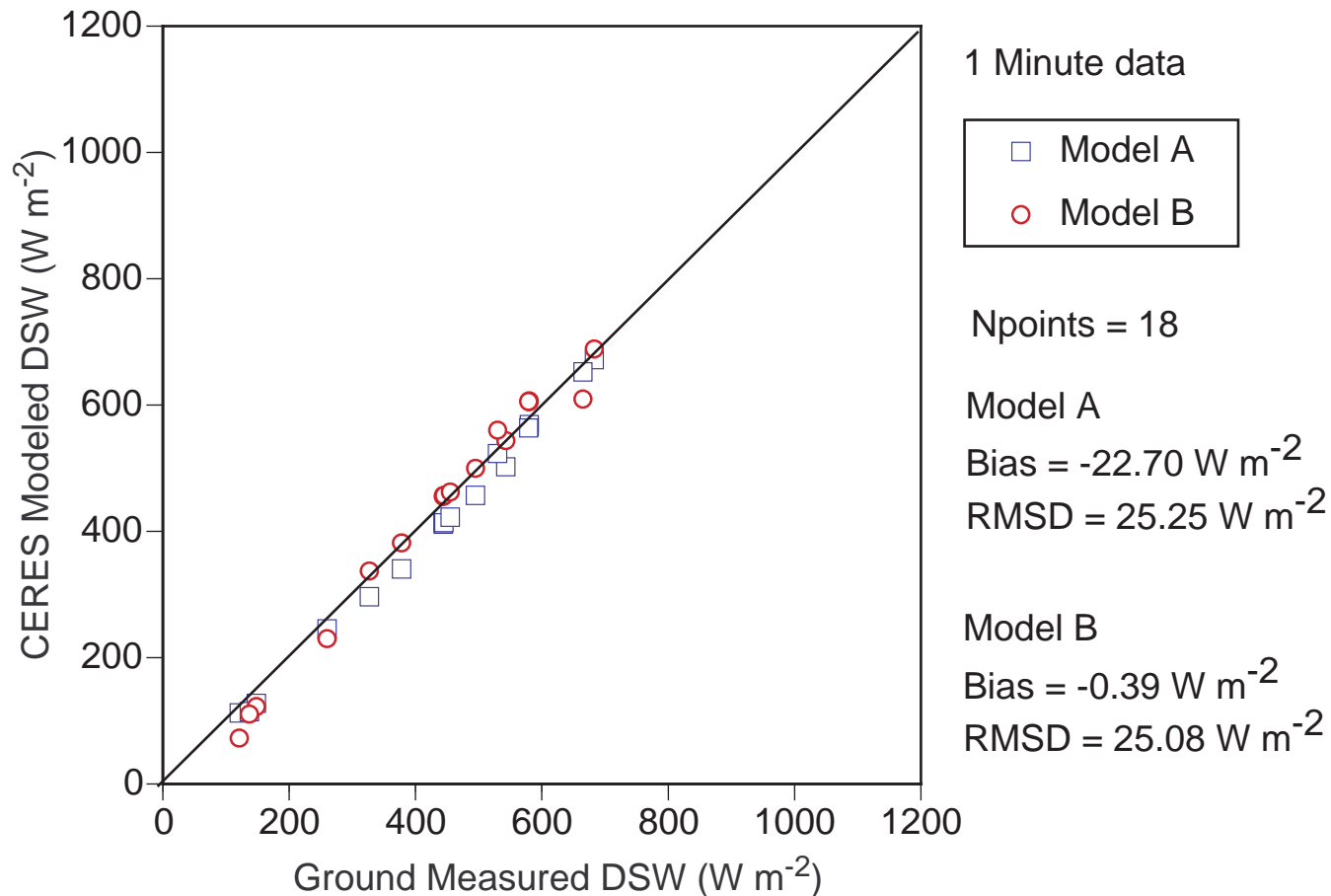


Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

Barrow, AK

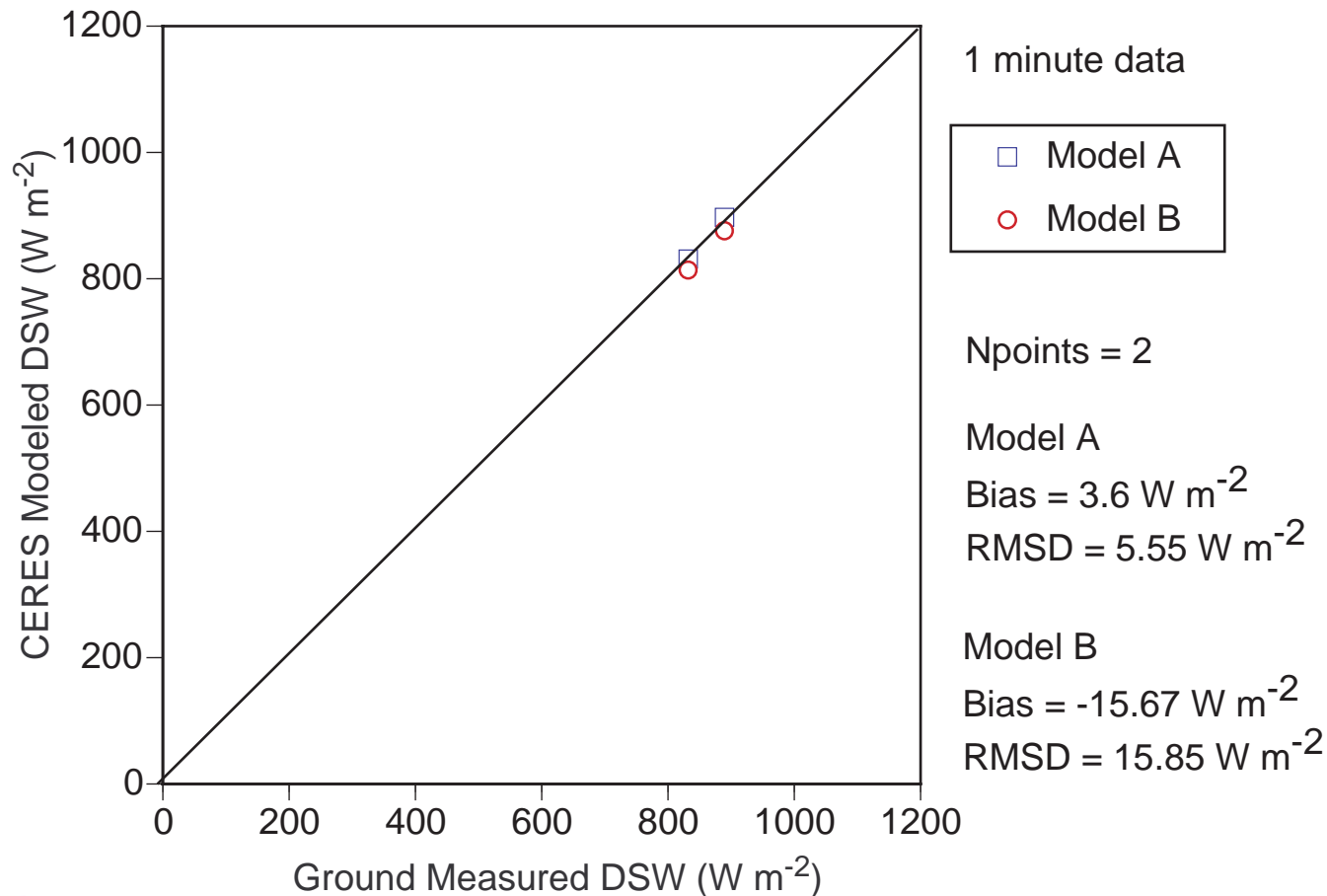
Terra Beta 4



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

Manus Terra Beta 4

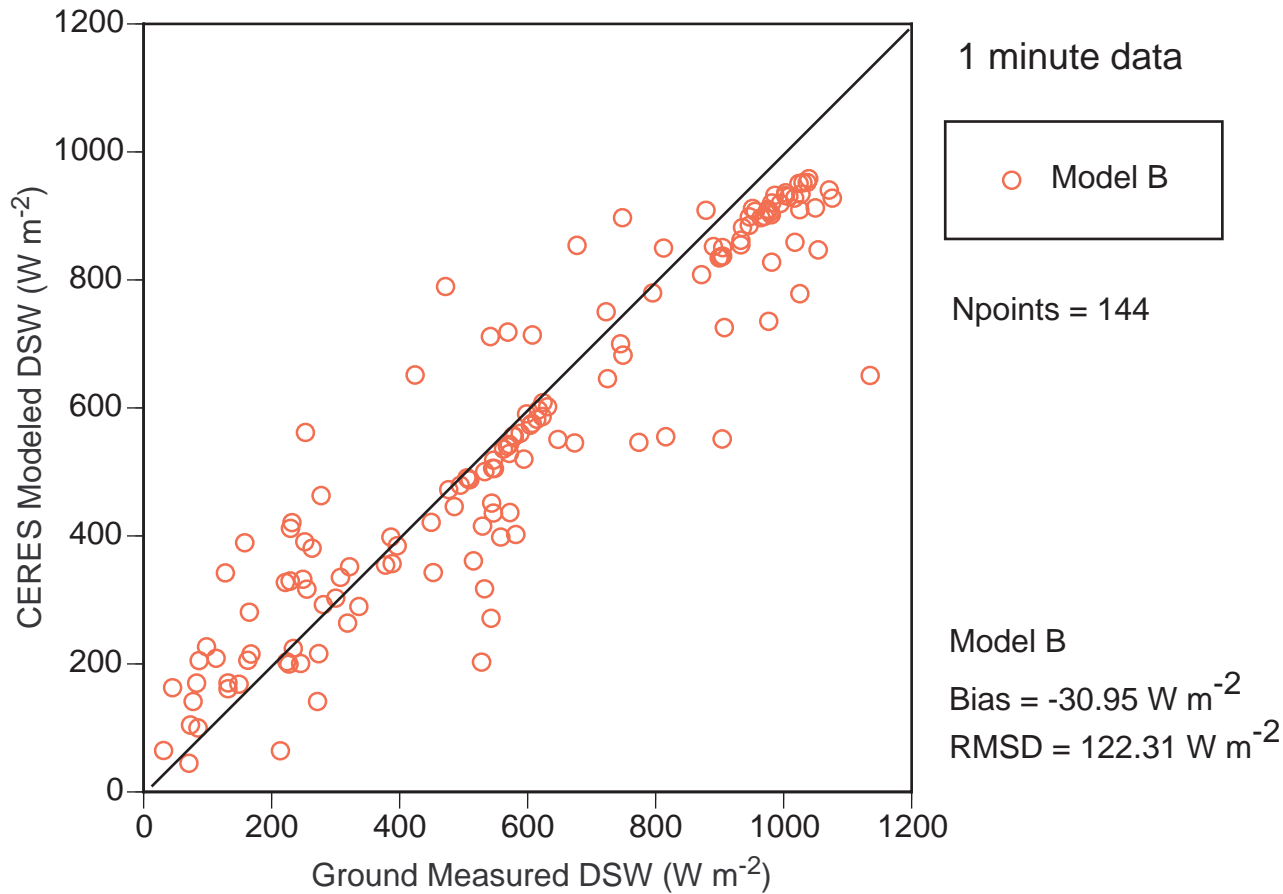


Surface  
-only  
Fluxes

# Shortwave All-sky Comparison

Central Facility

Terra Beta 4



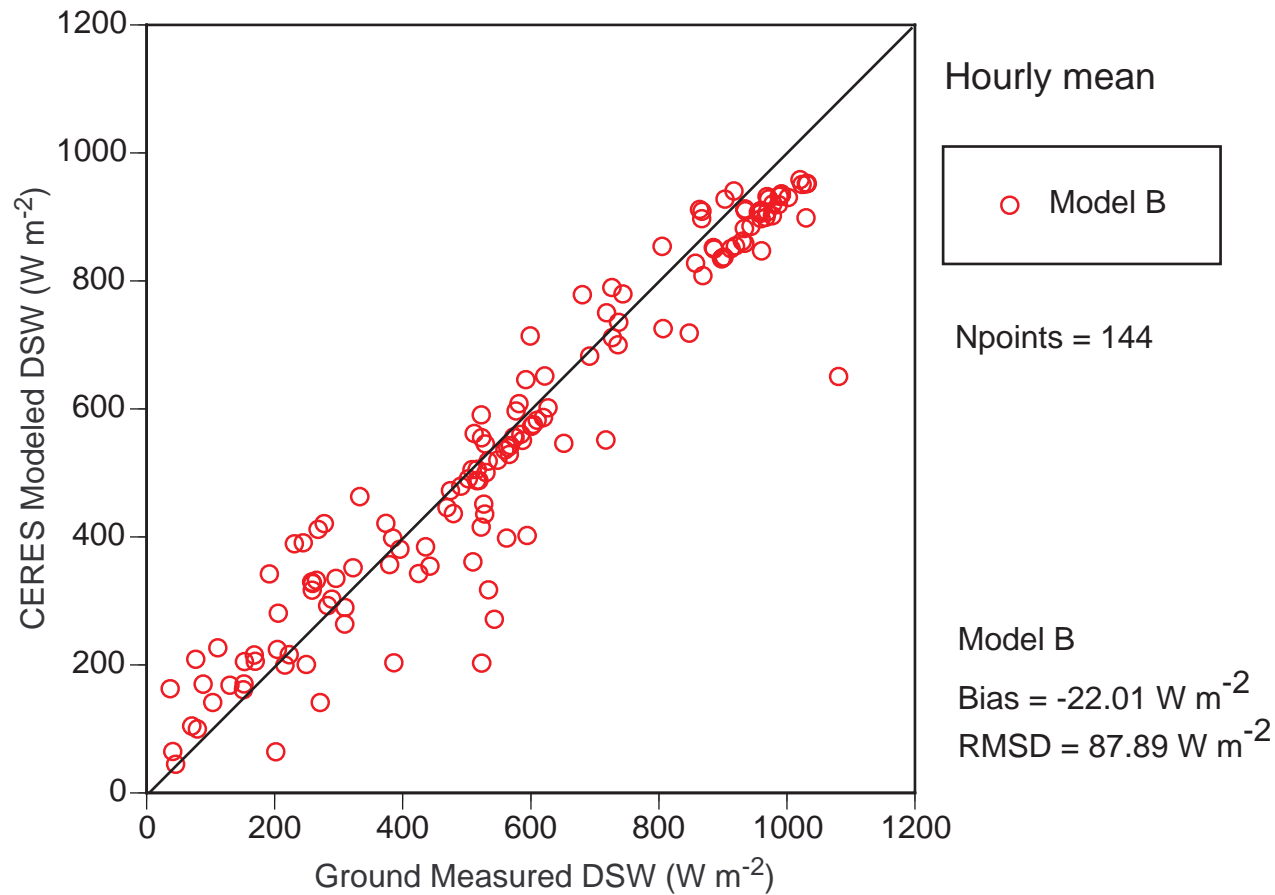


Surface  
-only  
Fluxes

# Shortwave All-sky Comparison

Central Facility

Terra Beta 4

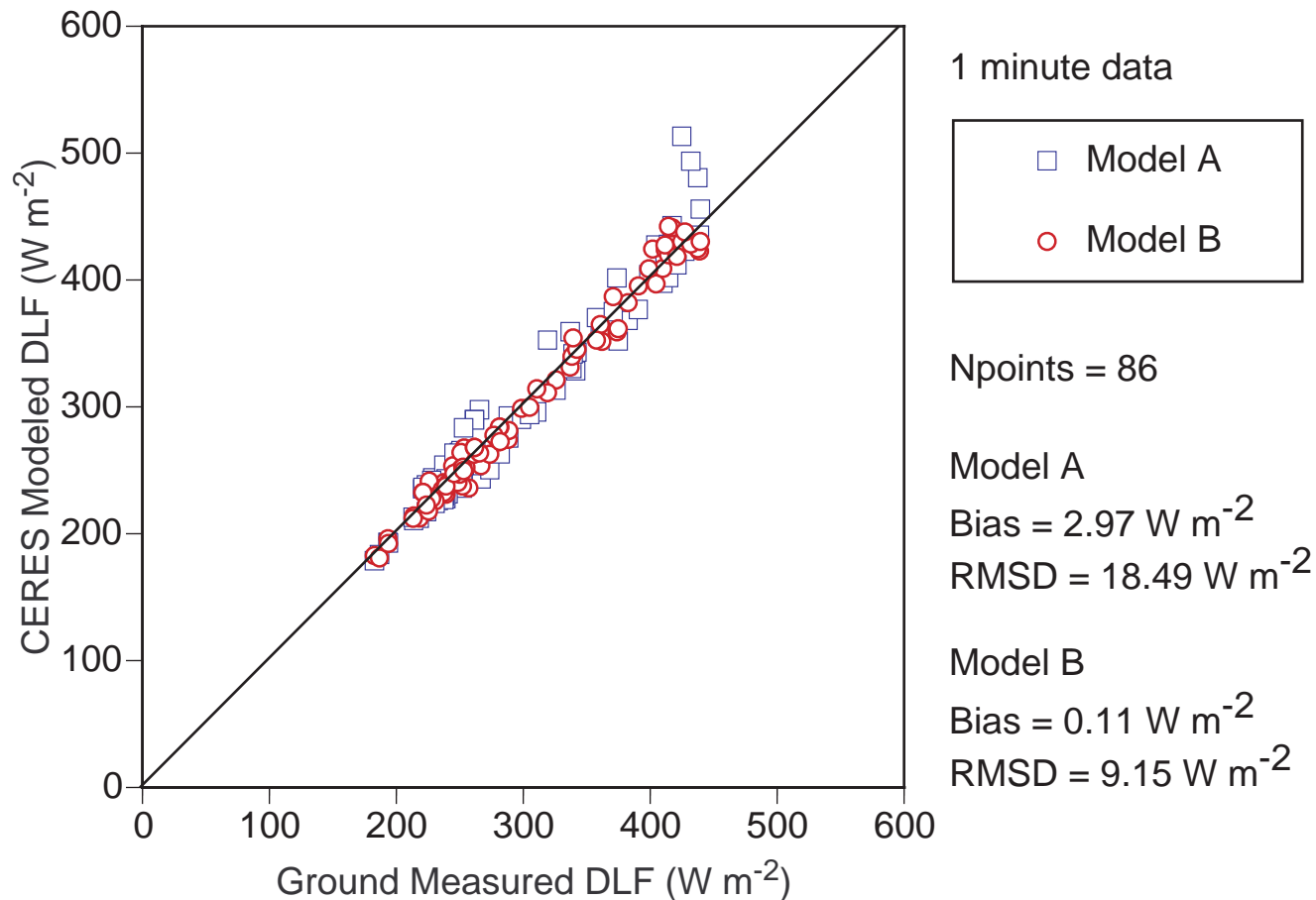


Surface  
-only  
Fluxes

# Longwave Clear-sky Comparison

Central Facility

Terra Beta 4

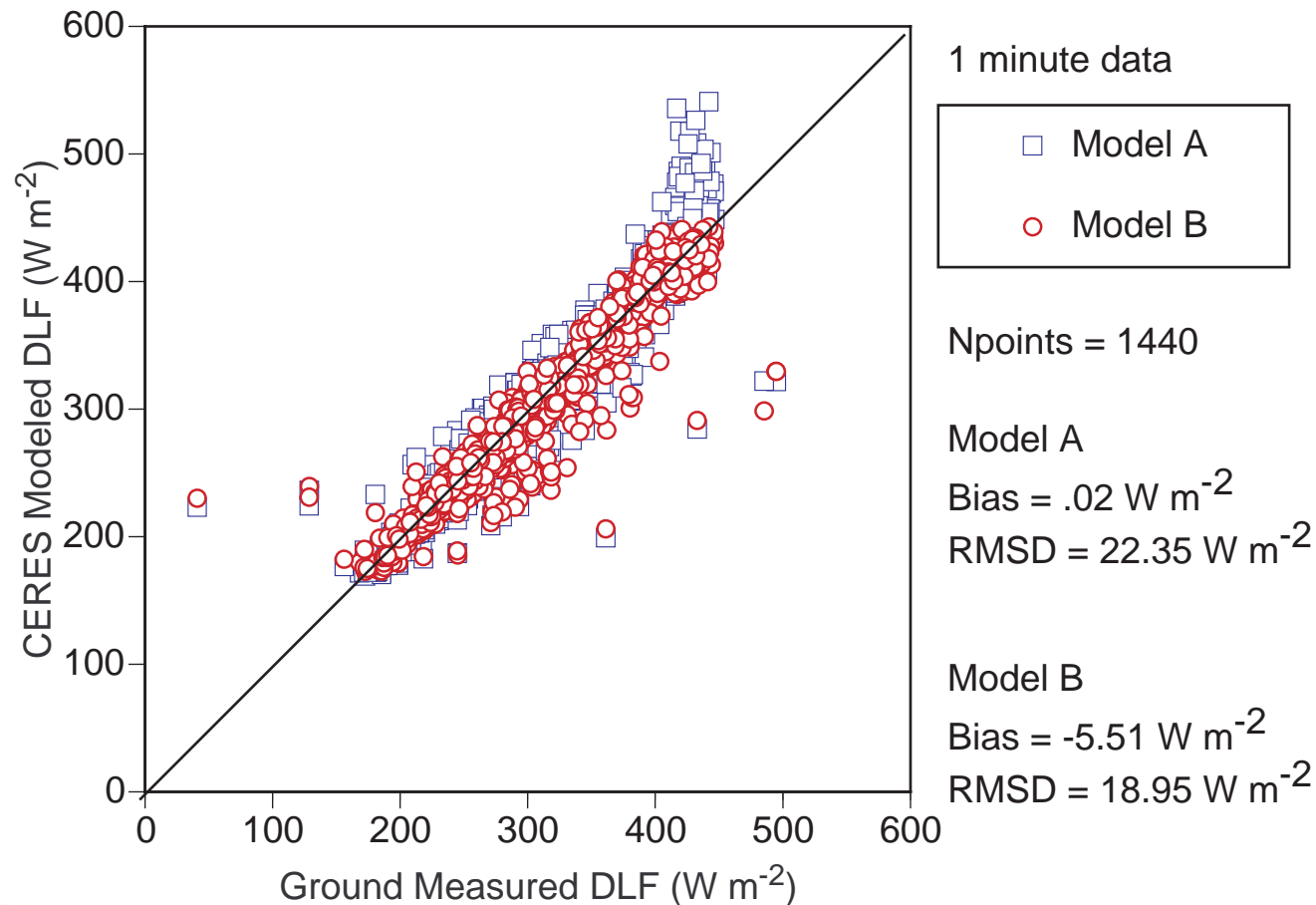


Surface  
-only  
Fluxes

# Longwave Clear-sky Comparison

Extended Facilities

Terra Beta 4

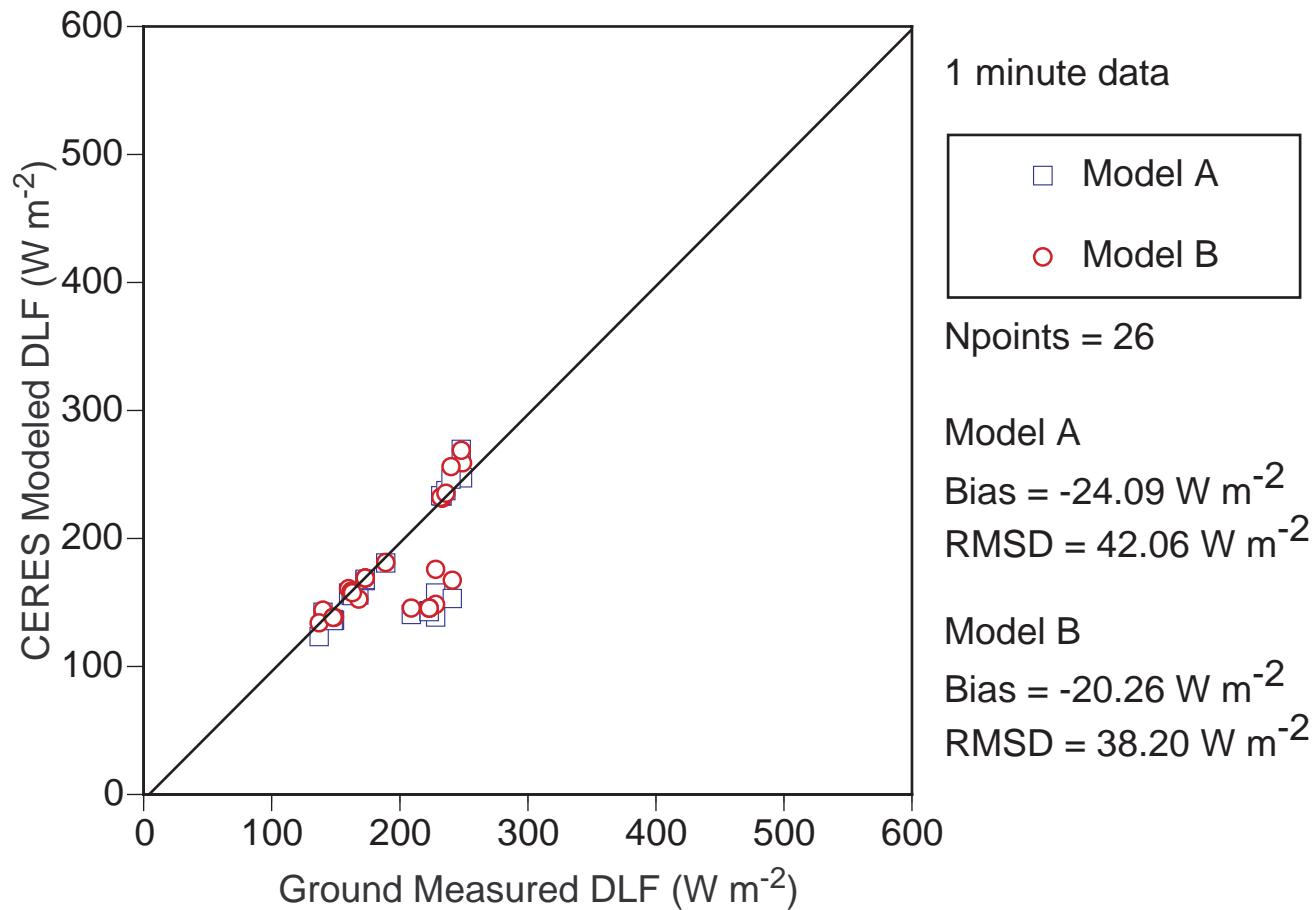


Surface  
-only  
Fluxes

# Longwave Clear-sky Comparison

Barrow, AK

Terra Beta 4



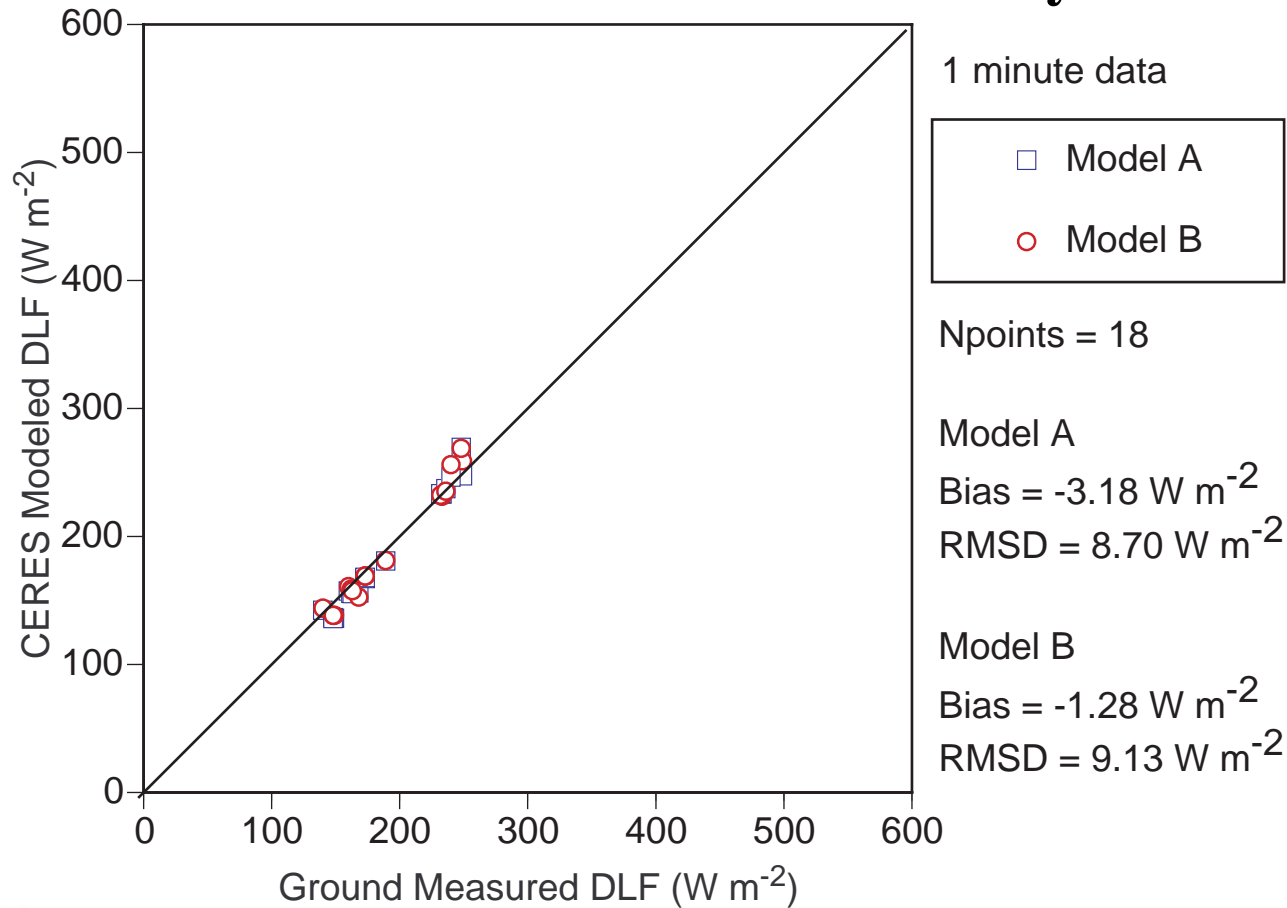
Surface  
-only  
Fluxes

# Longwave Clear-sky Comparison day

Barrow, AK

Terra Beta 4

**Daytime only**

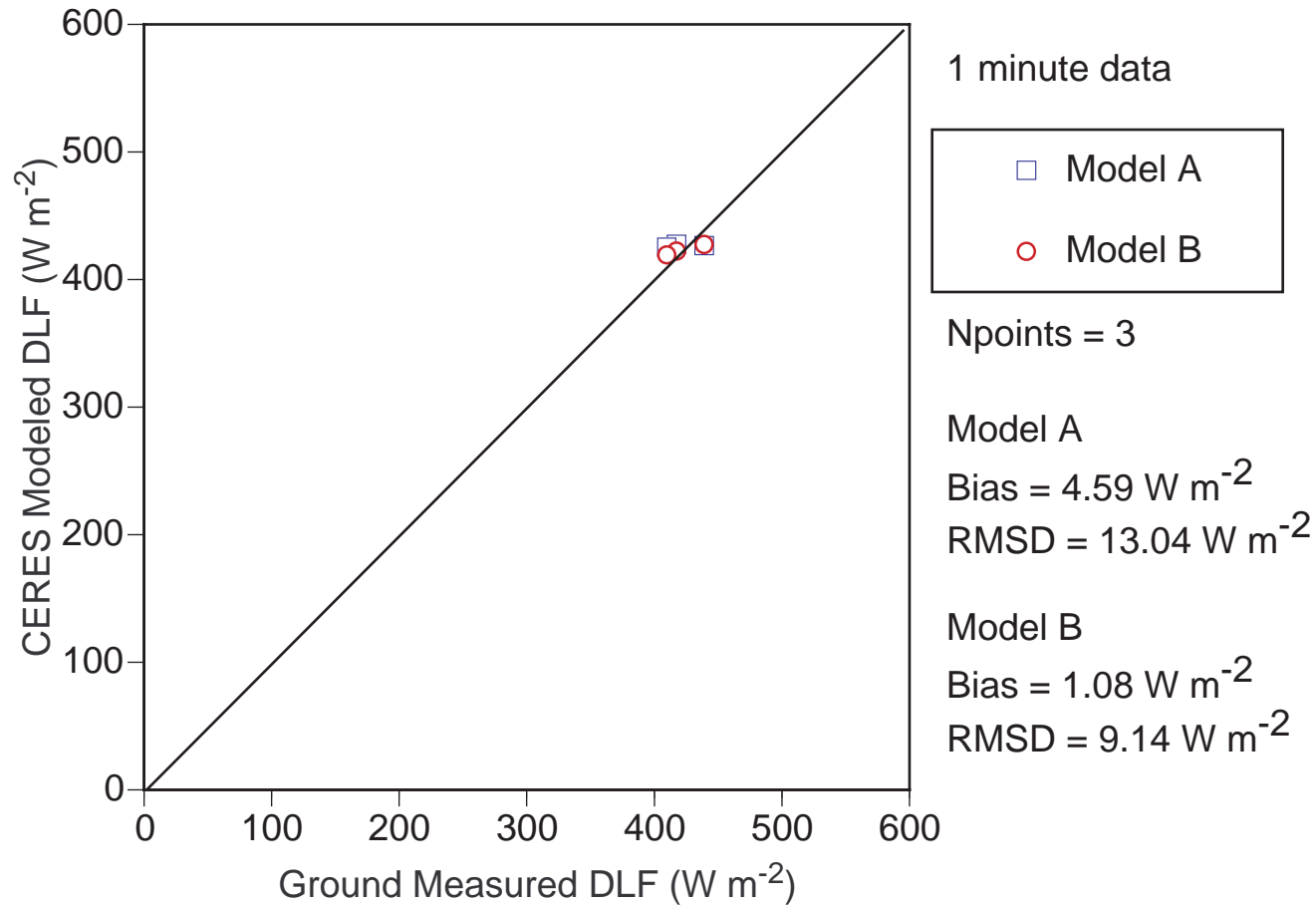


Surface  
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Fluxes

# Longwave Clear-sky Comparison

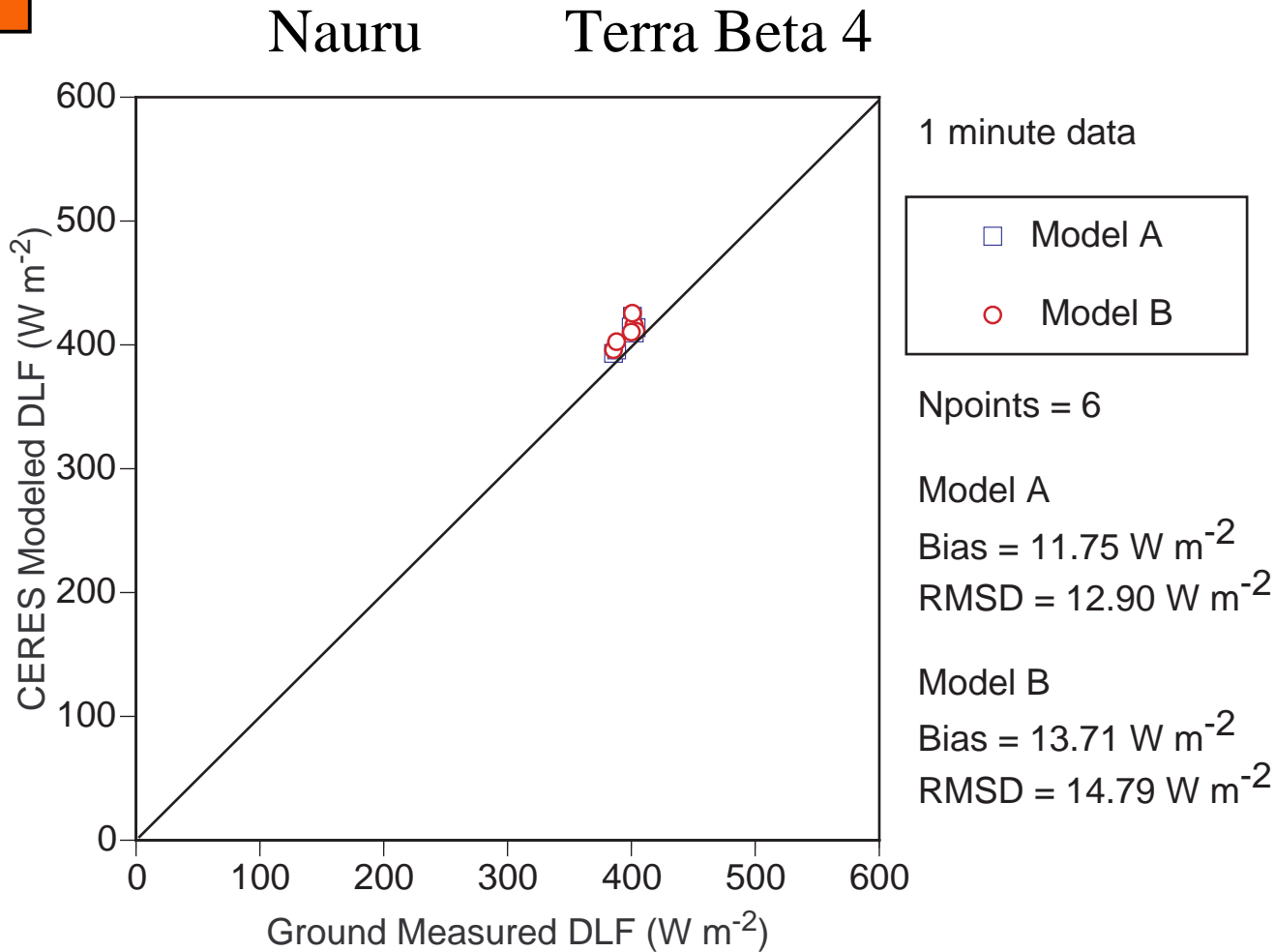
Manus

Terra Beta 4



Surface  
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Fluxes

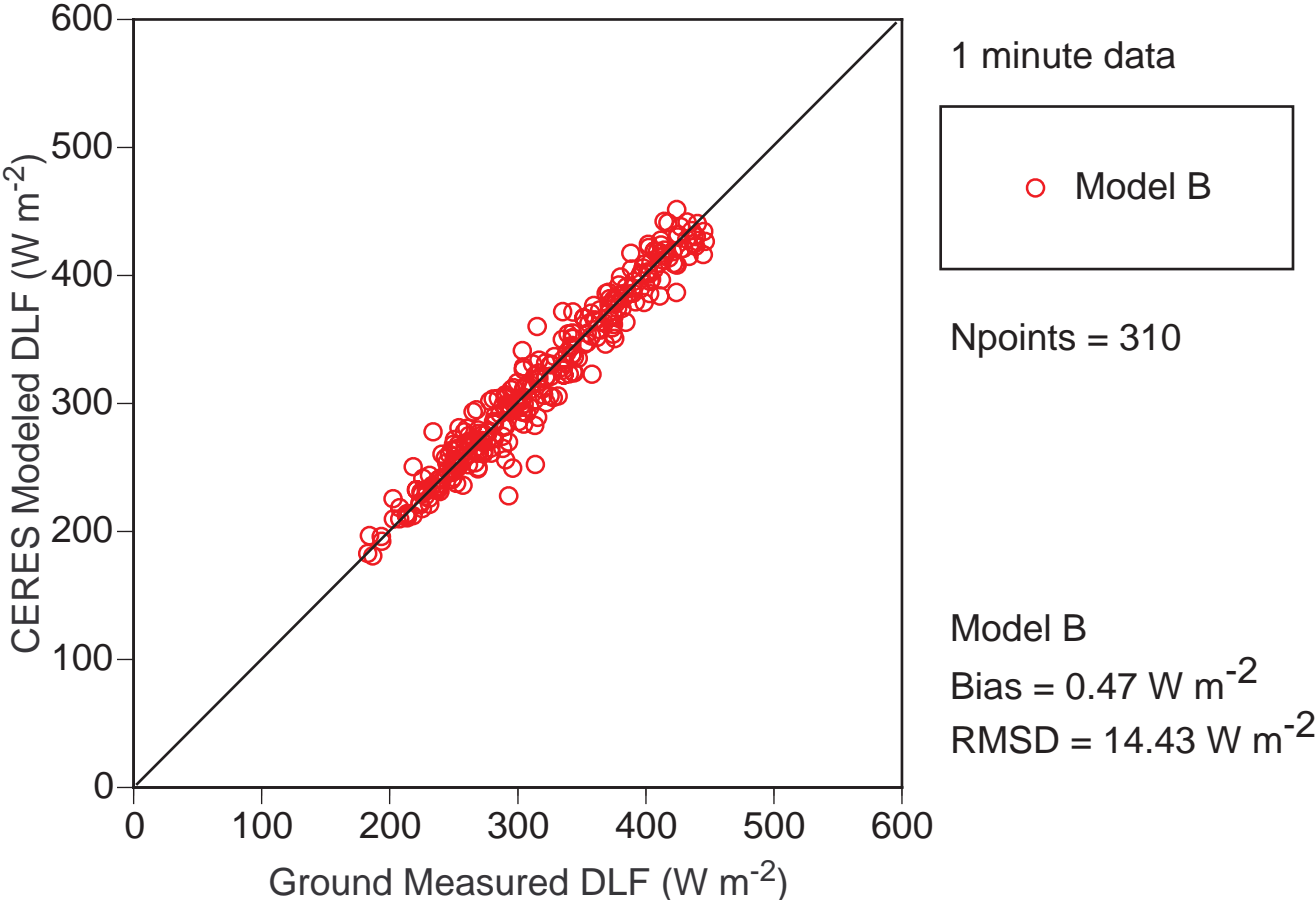
# Longwave Clear-sky Comparison



Surface  
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Fluxes

# Longwave All-sky Comparison

Central Facility      Terra Beta 4

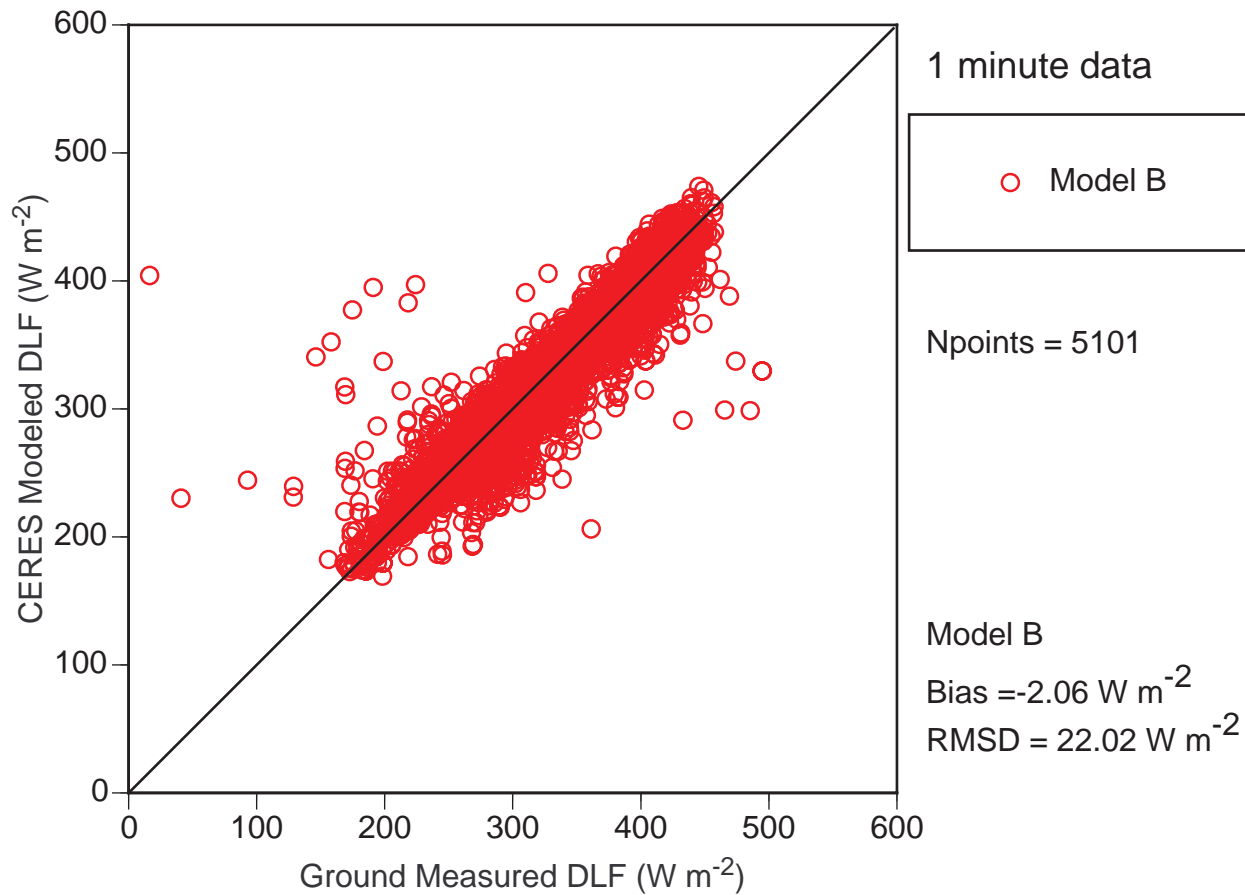




Surface  
-only  
Fluxes

# Longwave All-sky Comparison

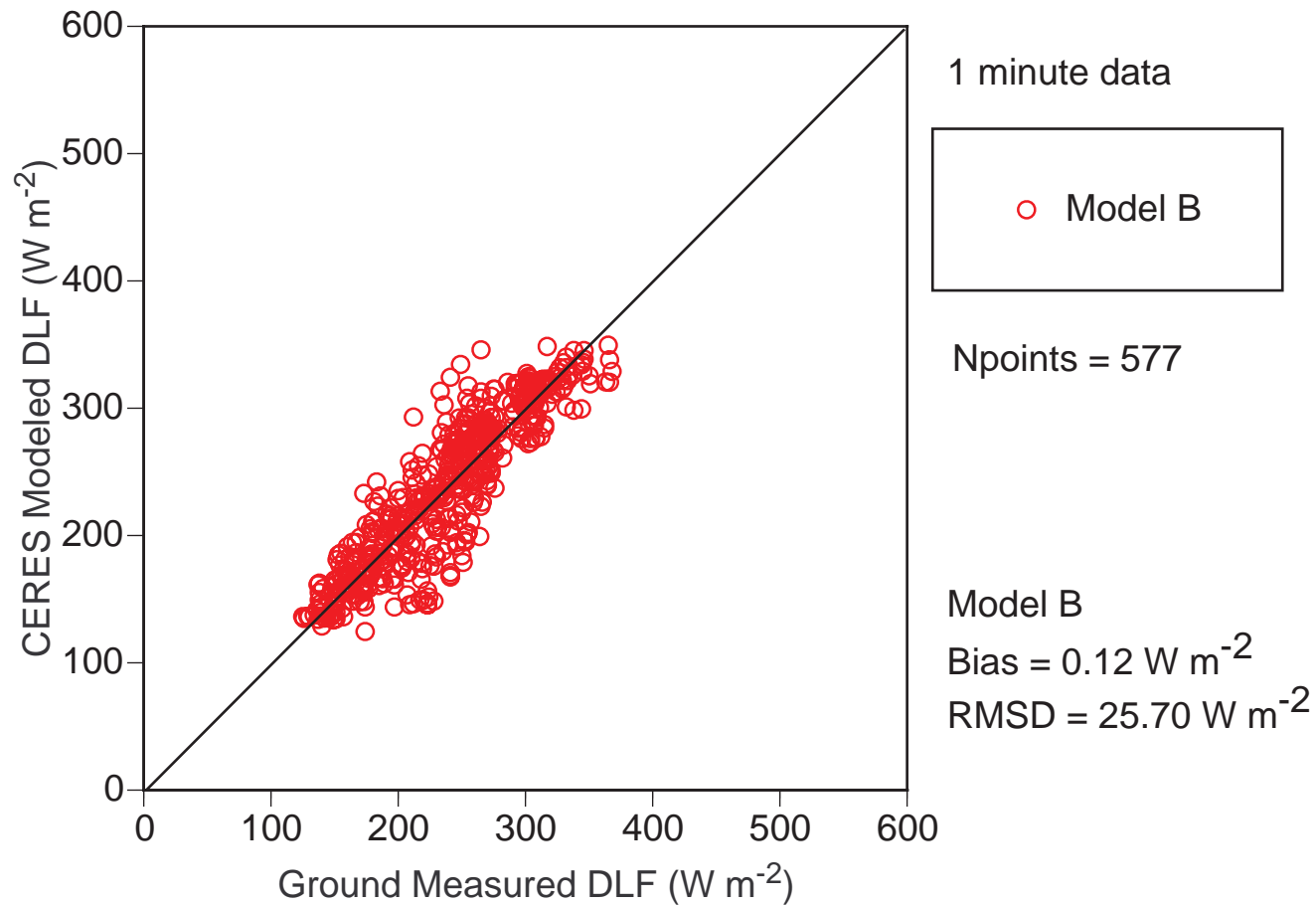
Extended Facilities Terra Beta 4



Surface  
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Fluxes

# Longwave All-sky Comparison

Barrow, AK Terra Beta 4



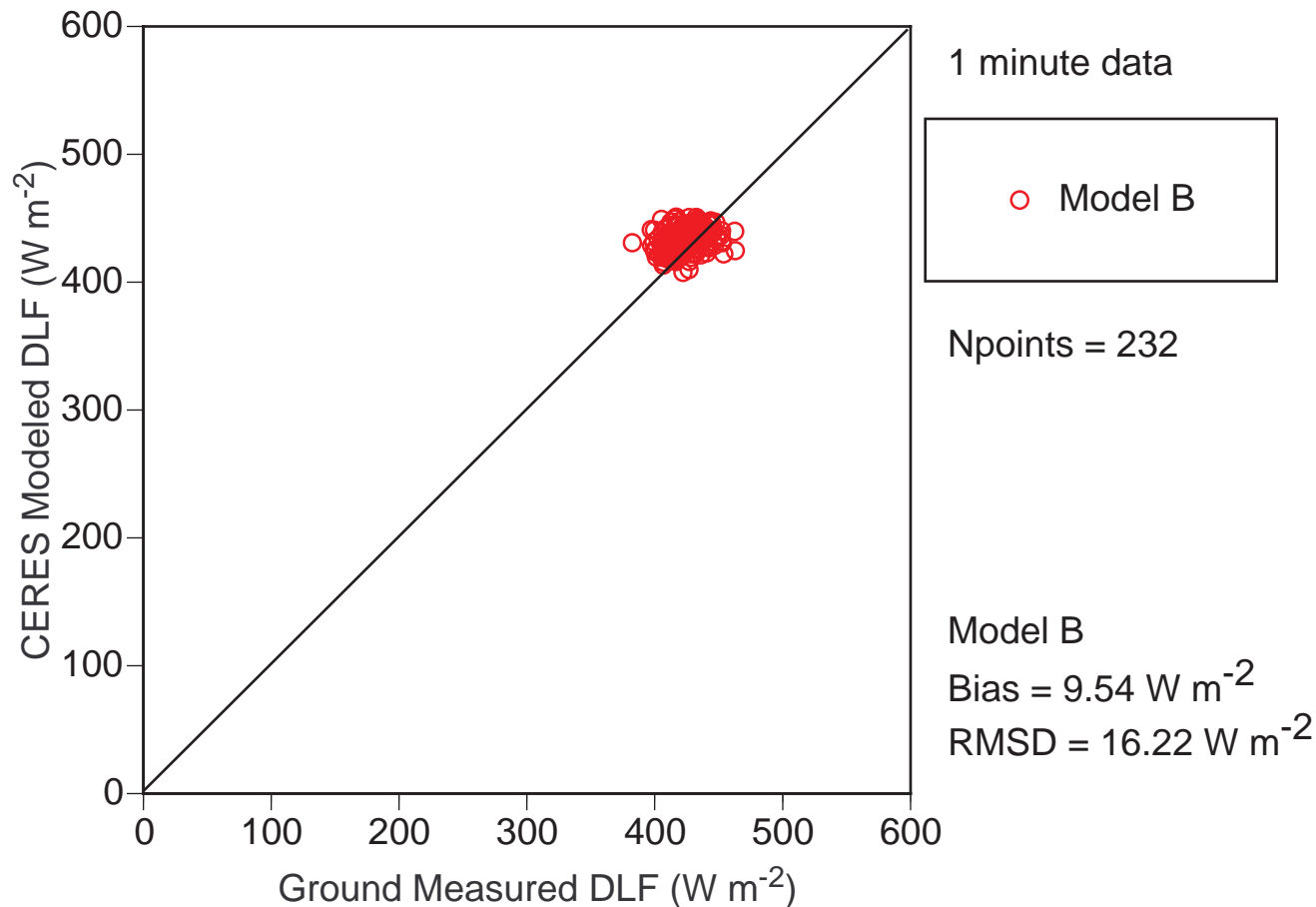
NASA Langley Research Center / Atmospheric Sciences



Surface  
-only  
Fluxes

# Longwave All-sky Comparison

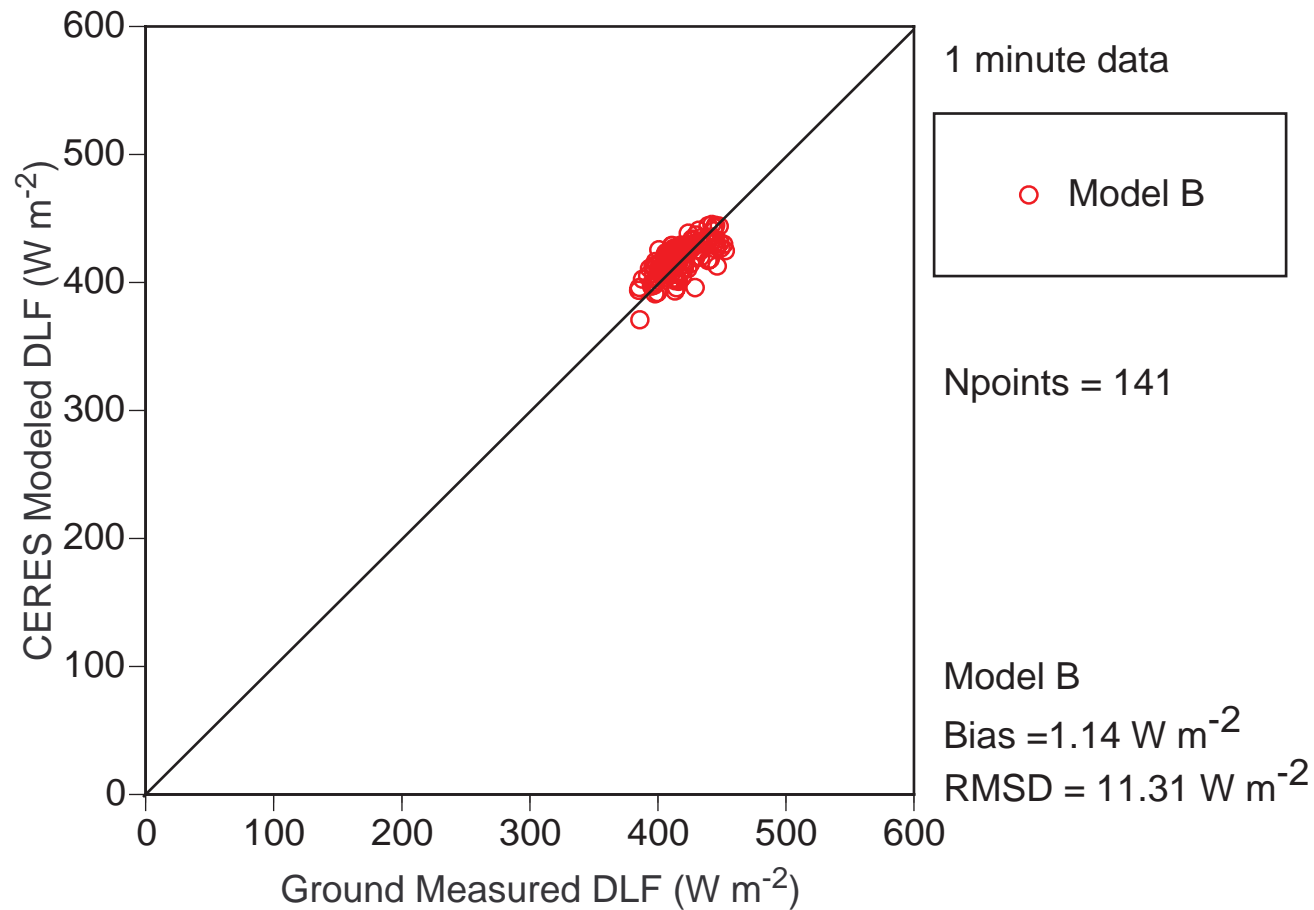
Manus Terra Beta 4



Surface  
-only  
Fluxes

# Longwave All-sky Comparison

Nauru Terra Beta 4



## 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 & Cess) will be introduced time permitting

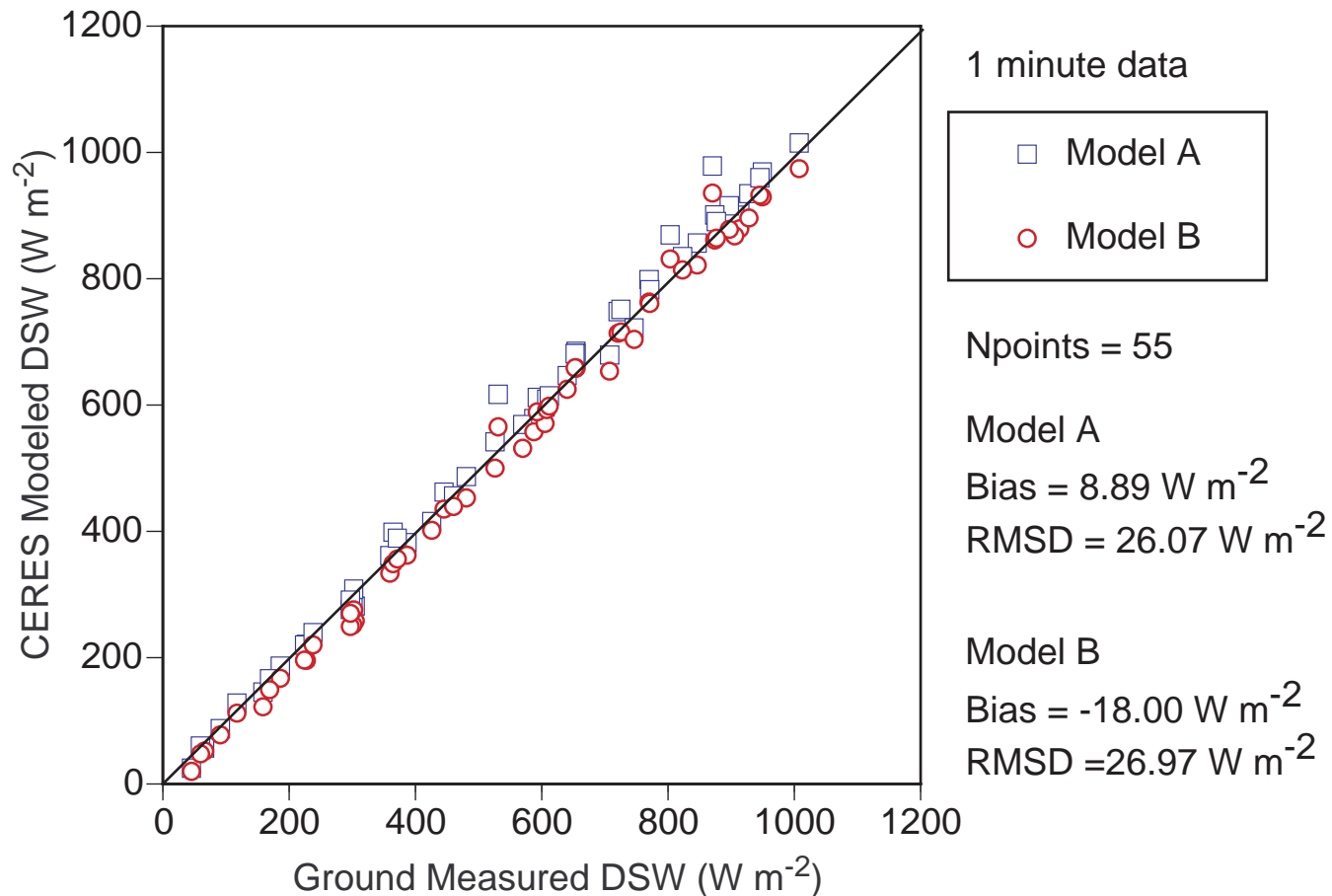
		Model A	Model B	Model C
SW	Clear	Li et al.	LPSA	-
	All-sky	-	LPSA	-
LW	Clear	Inamdar and Ramanathan	LPLA	Zhou & Cess
	All-sky	-	LPLA	Zhou & Cess



Surface  
-only  
Fluxes

# Shortwave Clear-sky Comparison

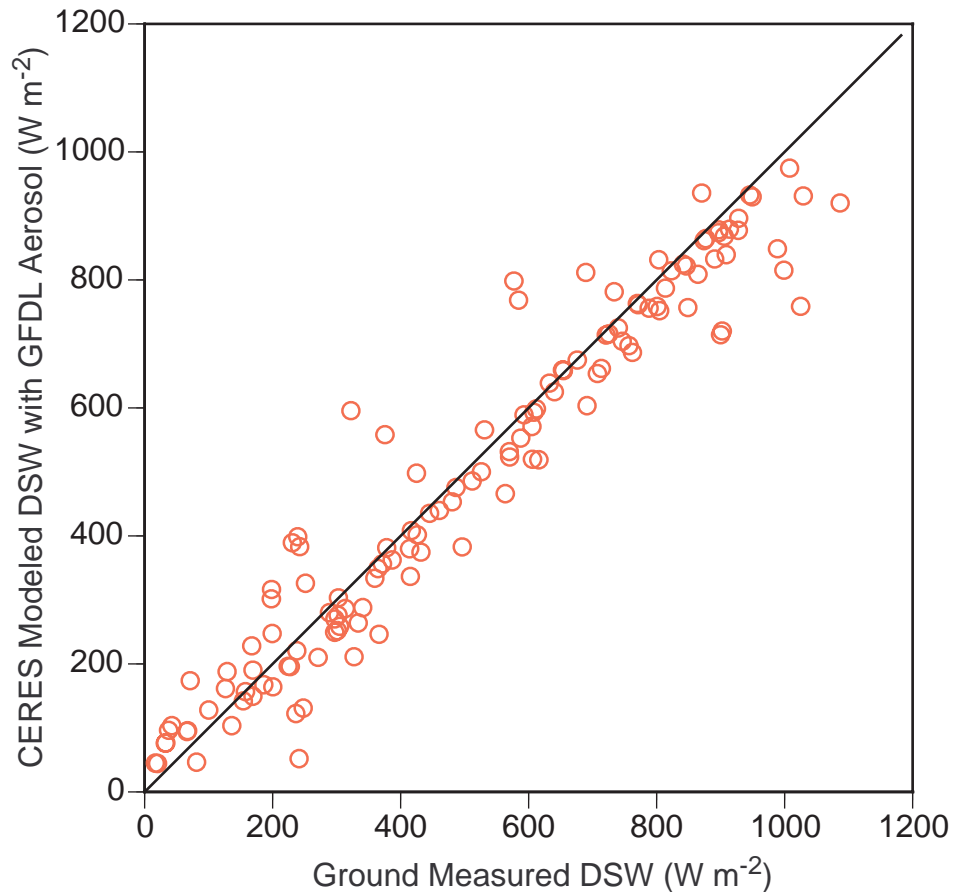
Central Facility Jan - Aug 1998



Surface  
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Fluxes

# Shortwave All-sky Comparison

Central Facility Jan - Aug 1998



With WCP—55 Aerosols

1 minute data

Npoints = 130

Mean X = 513.0

Mean Y = 497.4

Mean Bias = -15.6 W m<sup>-2</sup>

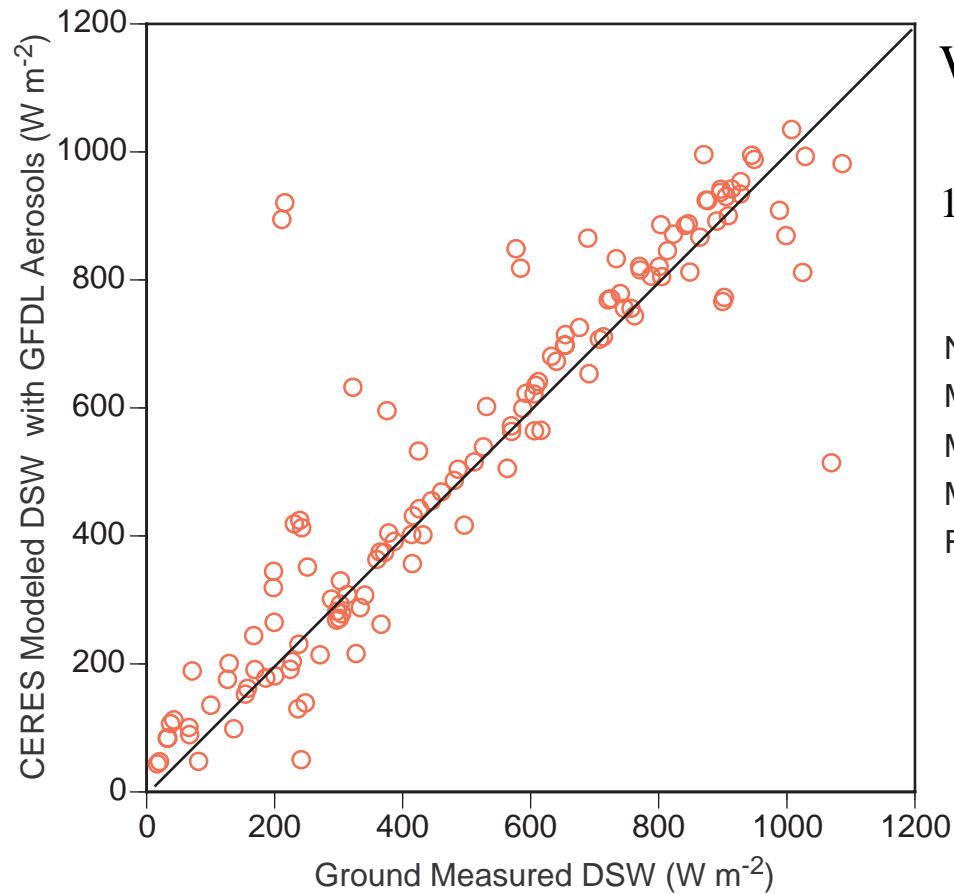
RMS = 79.5



Surface  
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Fluxes

# Shortwave All-sky Comparison

Central Facility Jan - Aug 1998



With GFDL Aerosols

1 minute data

Npoints = 132

Mean X = 515.7

Mean Y = 540.5

Mean Bias =  $25.2 W m^{-2}$

RMS = 126.4

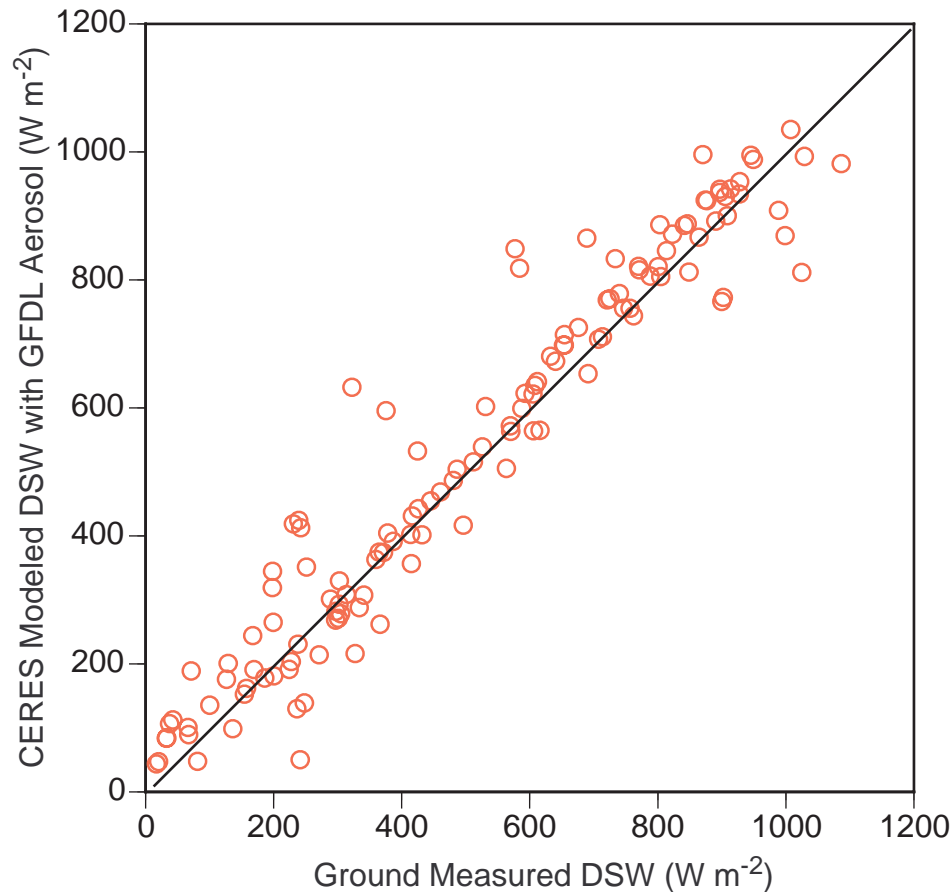




Surface  
-only  
Fluxes

# Shortwave All-sky Comparison

Central Facility Jan - Aug 1998



With GFDL Aerosols

1 minute data

Npoints = 129

Mean X = 515.3

Mean Y = 535.0

Mean Bias = 19.3 W m<sup>-2</sup>

RMS = 80.5



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