

# Aerosol Effect on Residual Clear-sky Insolation Discrepancy

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Clear-sky surface insolation a few years ago (CAGEX, Kato et al.)...

(Computed - Observed)  $\sim$  20-30  $\text{Wm}^{-2}$

"Clear-sky diffuse discrepancy" not universally reported

Questions about input AOD and diffuse PSP

Brief ARESE II observations (Haeffelin et al.) with thermistor PSP

(Computed - Observed)  $\sim$  5-10  $\text{Wm}^{-2}$

Here extend to 1999-2000 ARM SGP Central Facility without thermistor

ARM SGP CF (1999-2000)

SW Surface Clear-sky (Long-Ackerman)

Fu-Liou code using MWR PW

AOD(MFRSR) and AOD(Cimel)

Table of (Computed - Measured) in Wm-2

full domain	NIP1-NIP2  < 5 Wm-2	smoothed Angstrom	domain of Cimel V2.0
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MFRSR	normal	10	6	17	16
	diffuse	3	4	0	1
	total	8	8	10	9

Cimel	normal	-2	-10	0	20
	diffuse	8	10	7	-1
	total	6	5	7	10

Jan99-May00 d'Almeida + 10% soot	two NIPs agree to 5 Wm-2	extrapolate photometer Angstrom	Jan99-Mar99 calibrated Cimel
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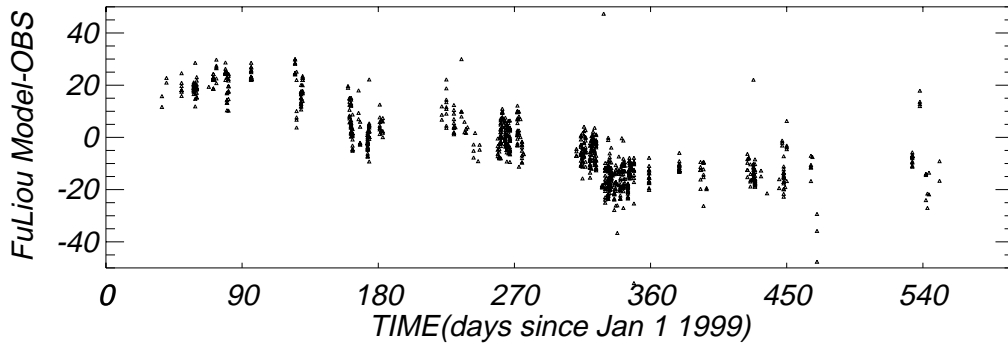
normal incidence pyrheliometer (NIP)

diffuse (shaded PSP pyranometer corrected by Alberta-Dutton)

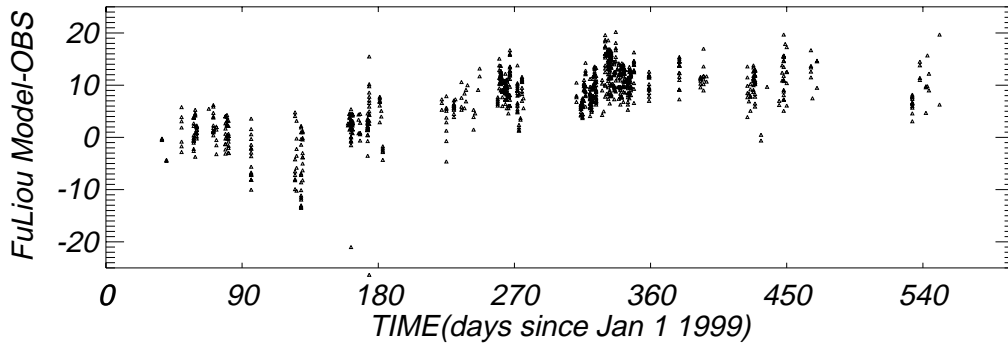
$$\text{total} = (\text{NIP}) * \cos(\text{SZA}) + \text{diffuse}$$

ARM\_SGP\_E13 : CIMEL(7)AOTs : Jan1999-May2000 Cave Flux Data  
Sonde T(z),Q(z): MWRPW : SMOBA O3(z) : CLEAR C.Long<0.01

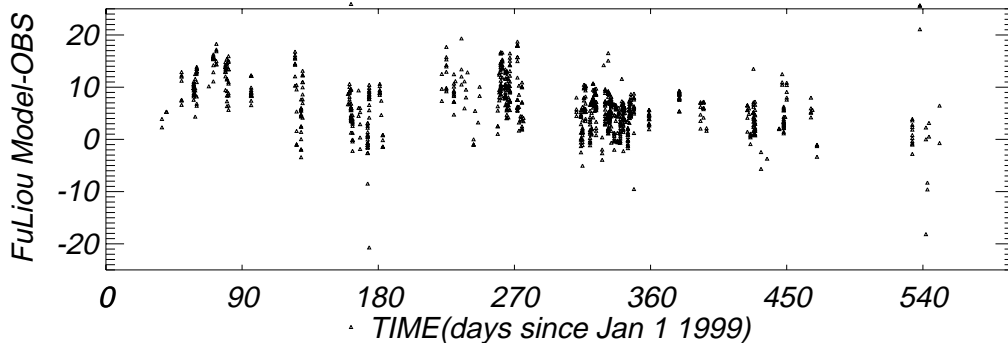
Direct Normal  
N= 915 Model-Obs= -2.5 ( 15.7)



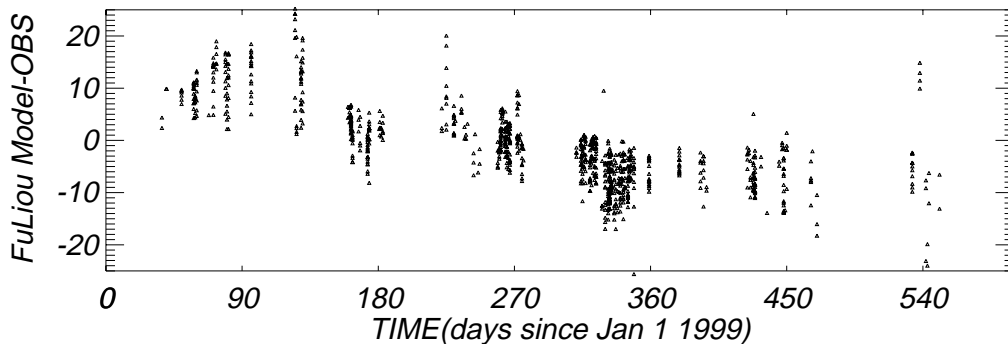
Diffuse(adj)  
N= 915 Model-Obs= 7.6 ( 5.9)



Total SW  
N= 915 Model-Obs= 6.4 ( 4.9)

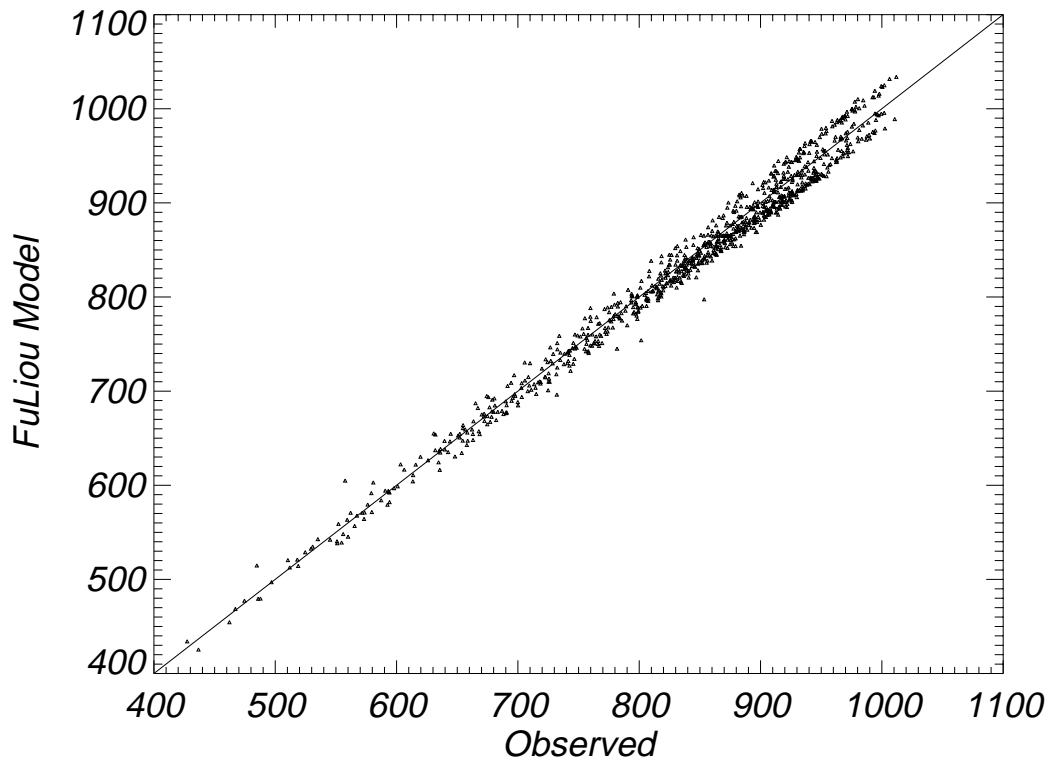


Direct Horizontal SW  
N= 915 Model-Obs= -1.2 ( 7.9)

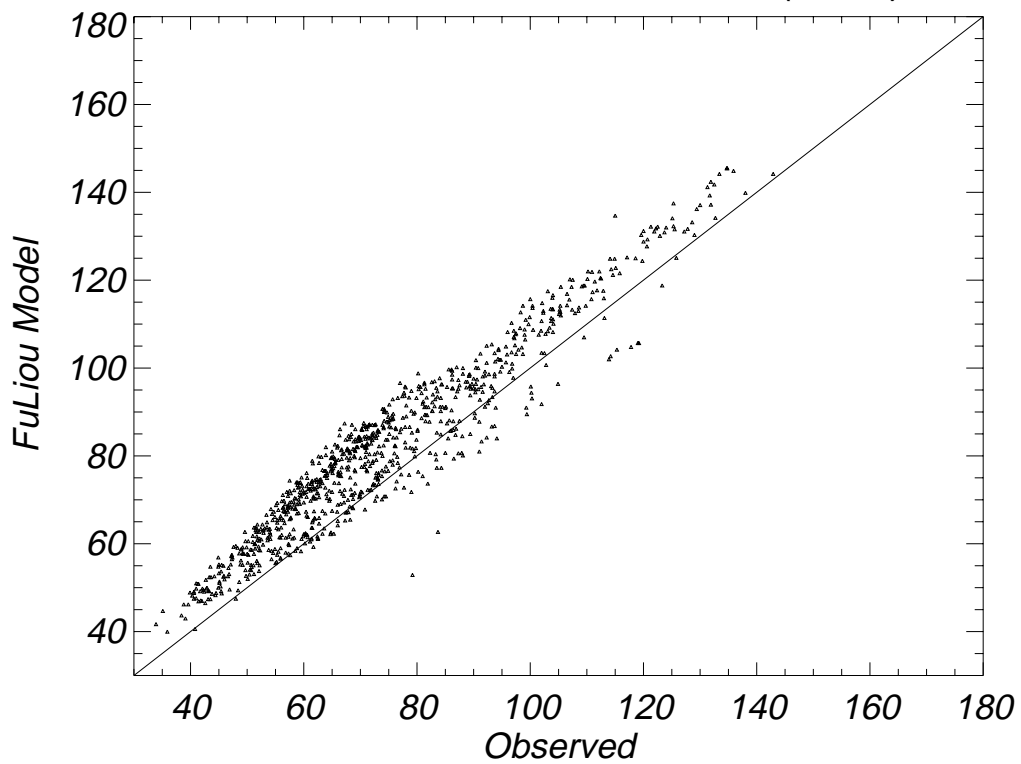


ARM\_SGP\_E13 : CIMEL(7)AOTs : Jan1999-May2000 Cave Flux Data  
Sonde T(z),Q(z): MWRPW : SMOBA O3(z) : CLEAR C.Long<0.01

Direct Normal  
N= 915 Model-Obs= -2.5 ( 15.7)

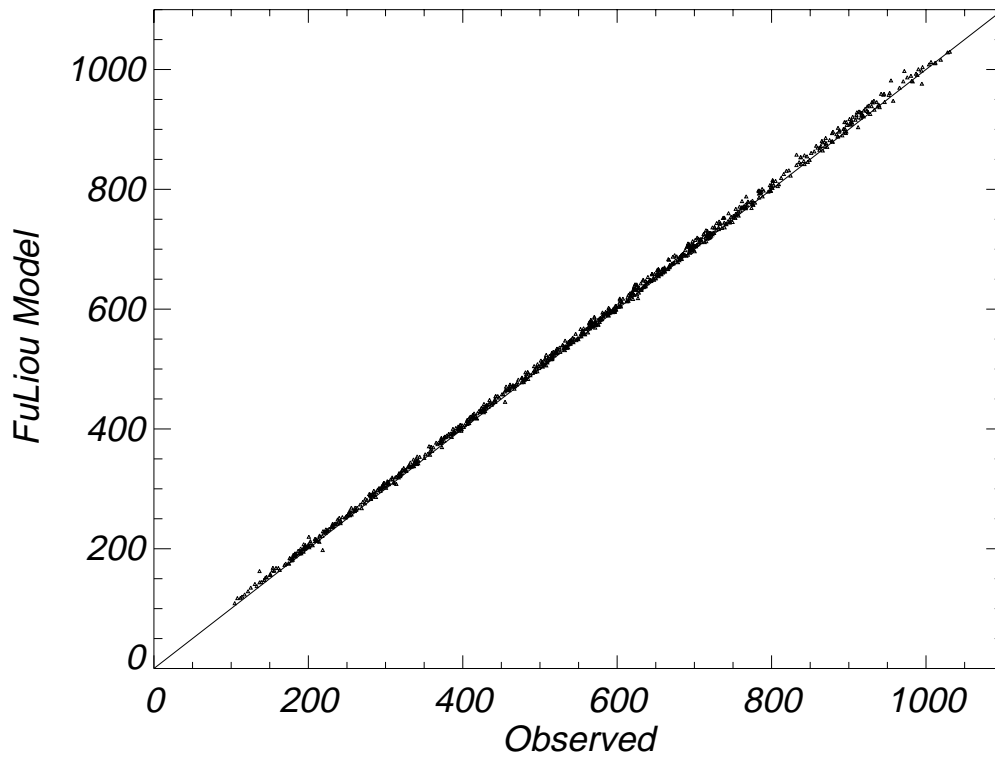


Diffuse(adj)  
N= 915 Model-Obs= 7.6 ( 5.9)

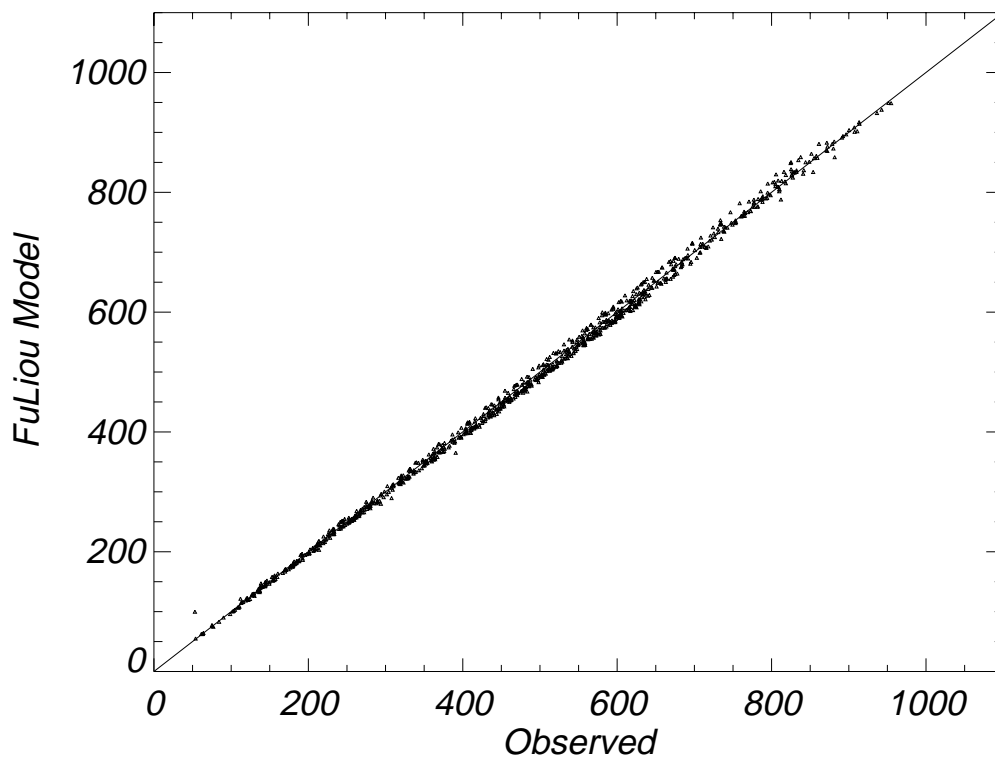


ARM\_SGP\_E13 : CIMEL(7)AOTs : Jan1999-May2000 Cave Flux Data  
Sonde T(z),Q(z): MWRPW : SMOBA O3(z) : CLEAR C.Long<0.01

Total SW  
N= 915 Model-Obs= 6.4 ( 4.9)



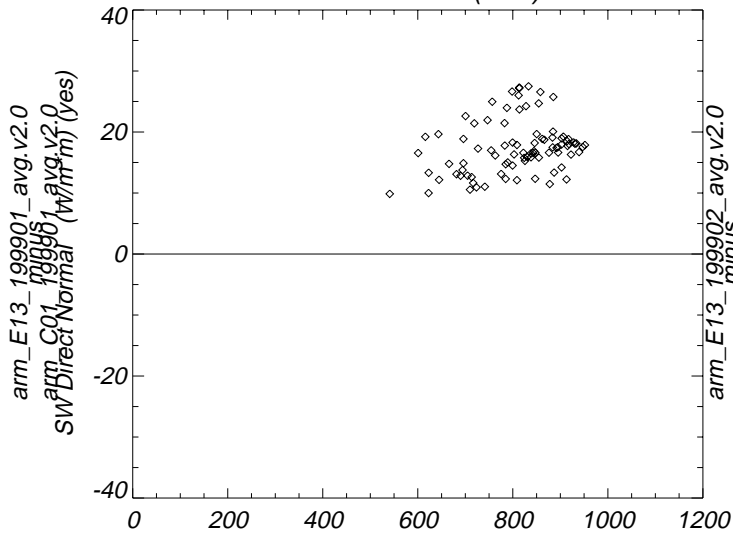
Direct Horizontal SW  
N= 915 Model-Obs= -1.2 ( 7.9)



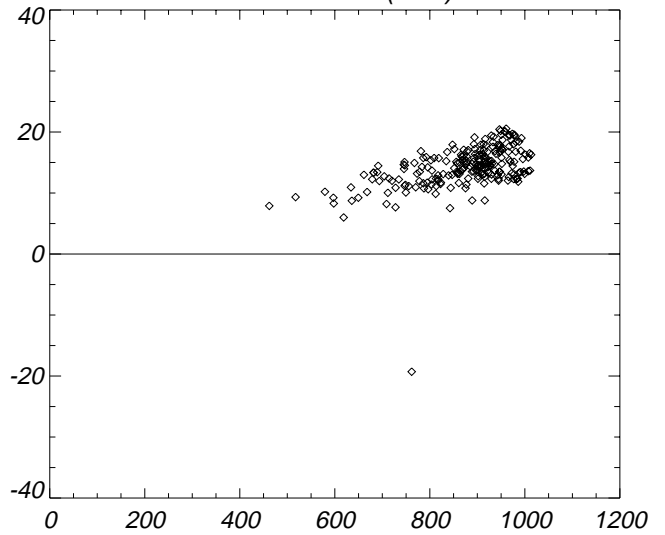
# ARM CENTRAL FACILITY

arm\_C01\_199905\_avg.v2.0 SW Direct Normal (W/m<sup>2</sup>) (yes)  
arm\_E13\_199905\_avg.v2.0 SW Direct Normal (W/m<sup>2</sup>) (yes)

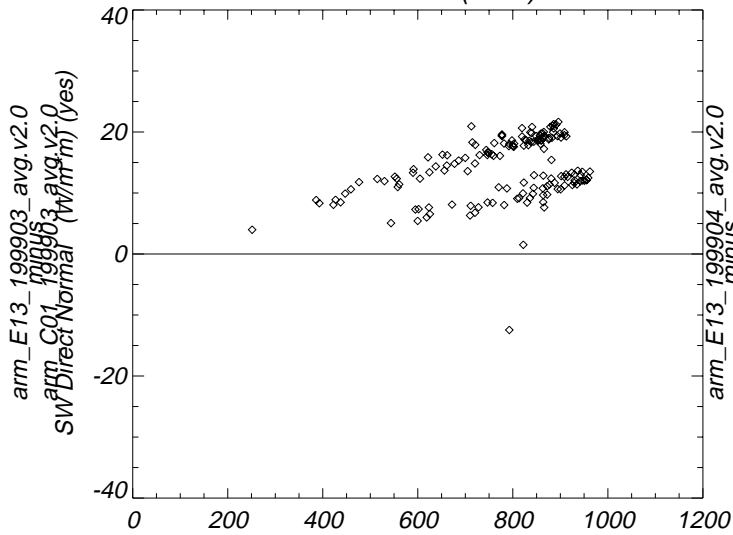
1999 / 01Y-X= 17.4( 4.3) N= 88.



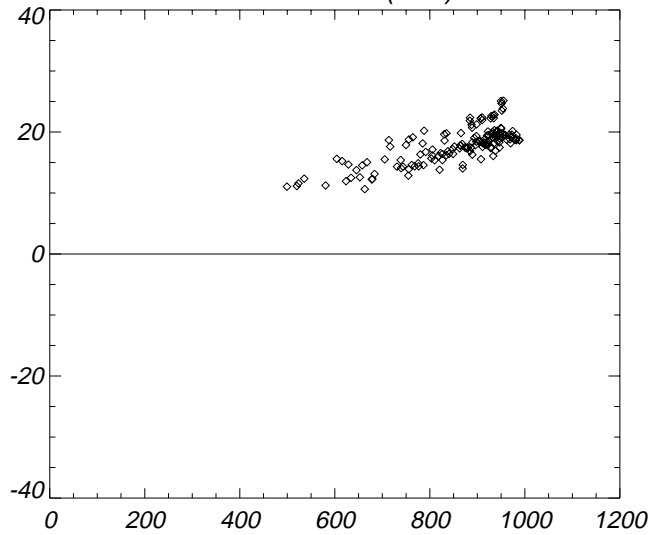
1999 / 02Y-X= 14.2( 3.6) N=226.



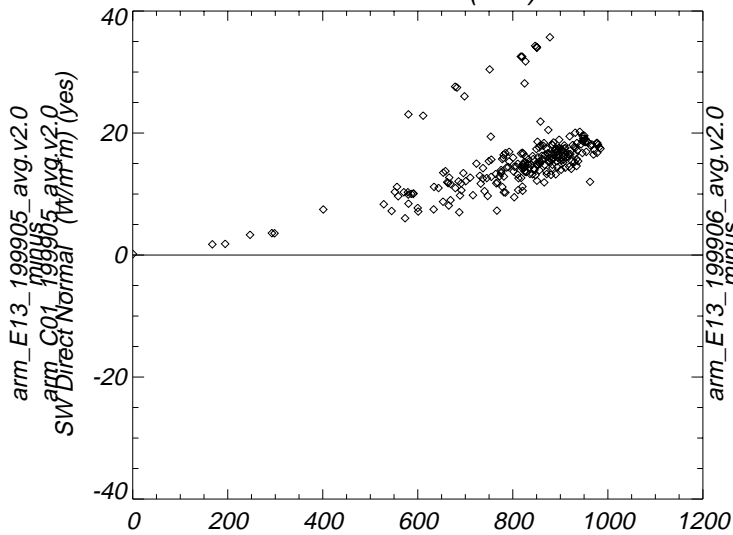
1999 / 03Y-X= 6.3(73.8) N=166.



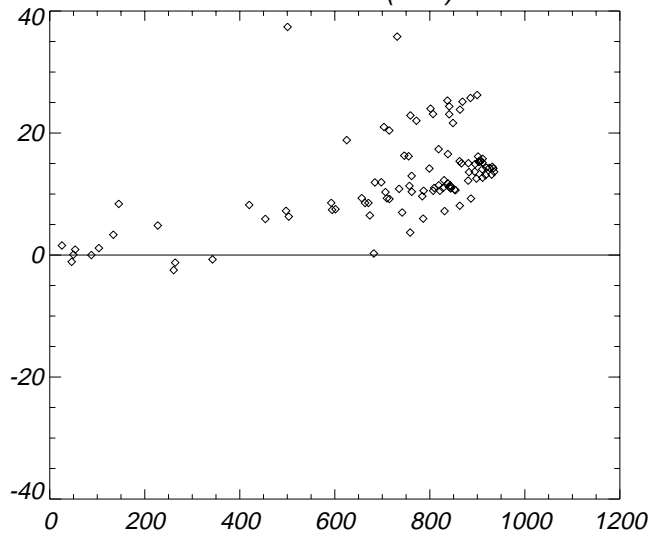
1999 / 04Y-X= 18.0( 4.2) N=156.



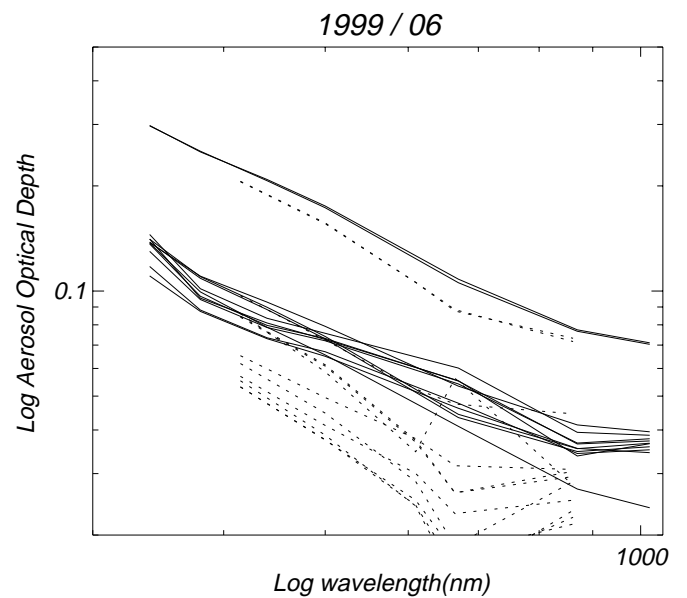
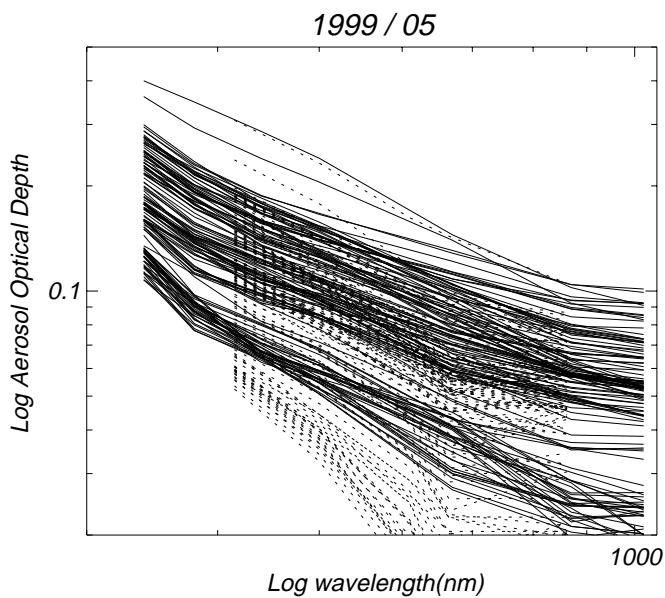
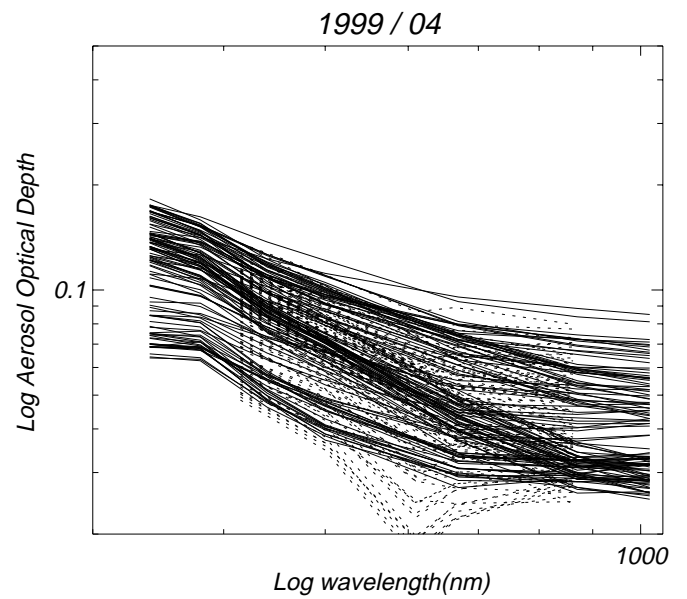
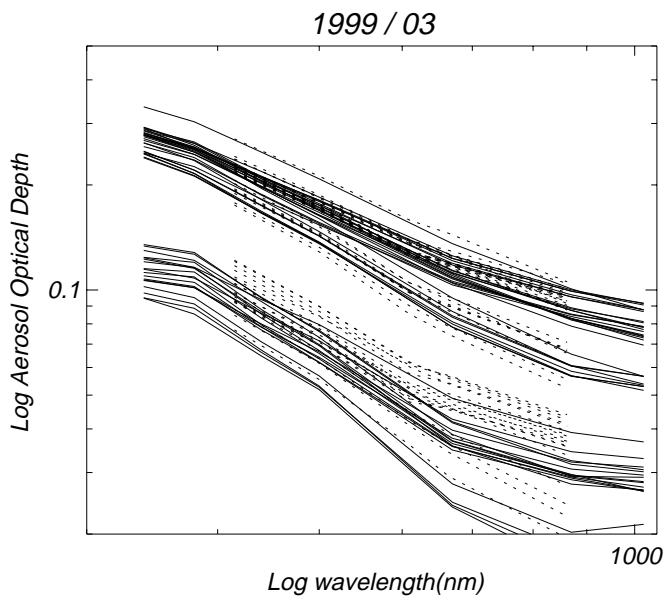
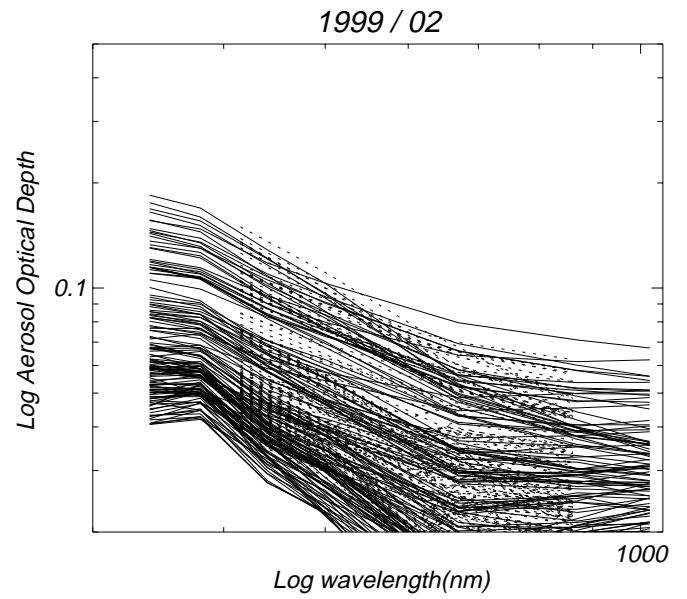
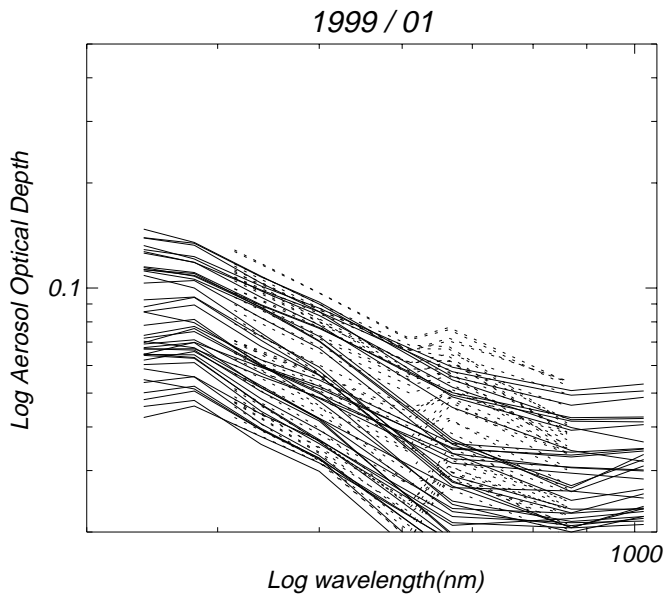
1999 / 05Y-X= 15.2( 5.2) N=243.



1999 / 06Y-X= 13.4( 8.8) N=104.



# ARM CENTRAL FACILITY CIMEL Vs. MFRSR



Diffuse(adj)  
ARM\_SGP\_E13 : CIMEL(7)AOTs : Jan1999-May2000 Cave Flux Data  
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N= 915 Model-Obs= 7.6 ( 5.9)

