

G5 - MOA Comparison

April 16, 2008

Methodology

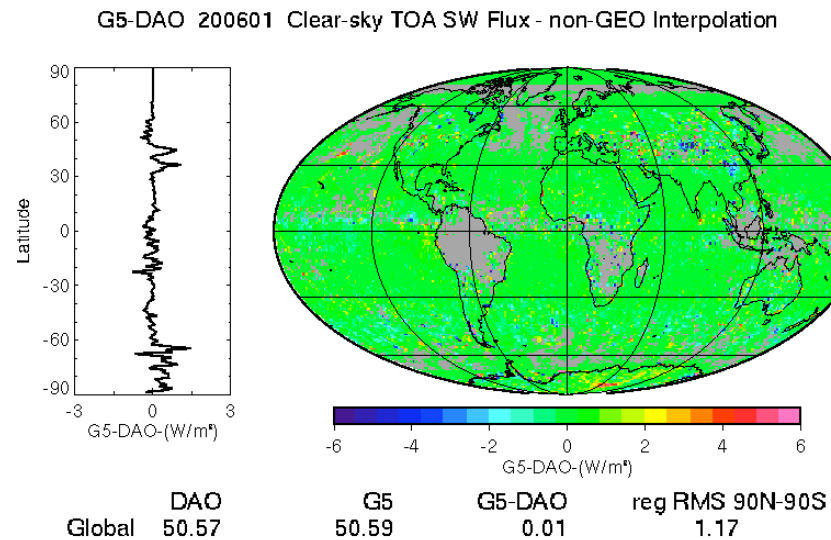
- DAAC processes SSF and SFC
- GGEO and SRBAVG run on SCF
- Run a complete months
 - Terra Jan06
 - Aqua Jan06
 - Terra Jul04
- Compare with SRBAVG Ed2D code
 - No 12 hours of overlap added in the G5 runs

GGEO broadband fluxes

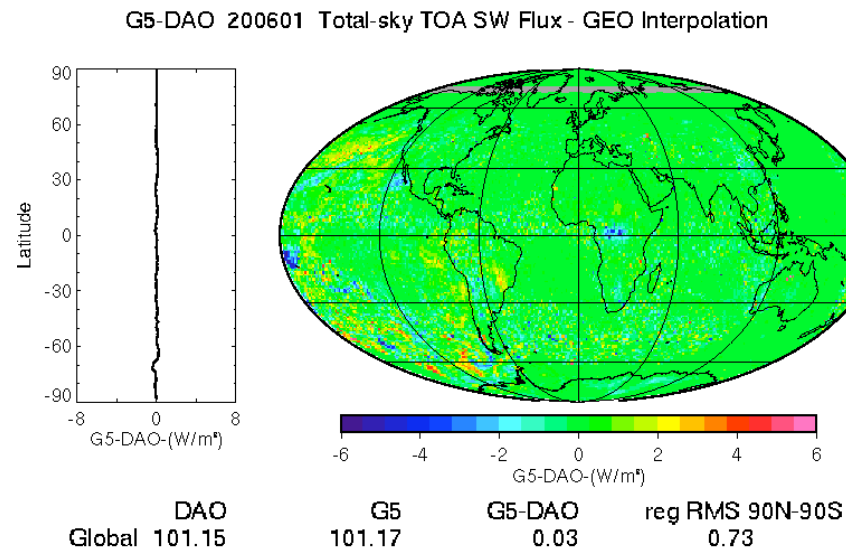
- GEO clear-sky identification is based on VIS & IR (day) and IR only (night) thresholds
- GEO clear-sky identification is determined by IR thresholds derived from G5 skin temperatures converted to TOA using correlated Ks
- Changes in scene identification, changes the ADM type and derived broadband fluxes
- However fluxes are normalized to CERES fluxes, expect no biases and some noise
- TISA main goal is to provide temporal interpolation that does not alter the CERES flux calibration
 - Secondary goal is to match the MODIS cloud properties

TOA SW, Aqua Jan06

Clear-sky nonGEO



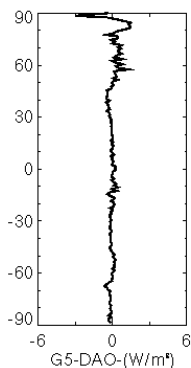
All-sky GEO



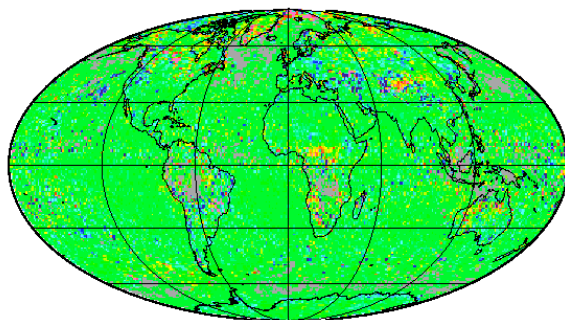
TOA LW, Aqua Jan06

Clear-sky nonGEO

G5-DAO 200601 Clear-sky TOA LW Flux - non-GEO Interpolation

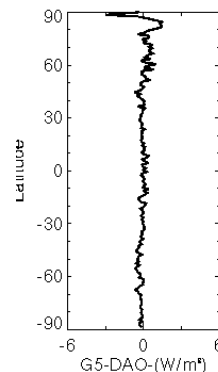


DAO
Global 262.93

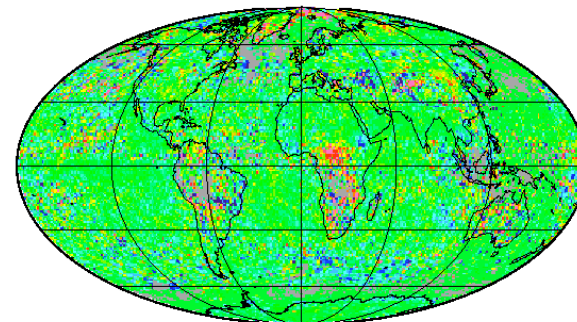


G5 262.92
G5-DAO -0.01
reg RMS 90N-90S 1.64

G5-DAO 200601 Clear-sky TOA LW Flux - GEO Interpolation



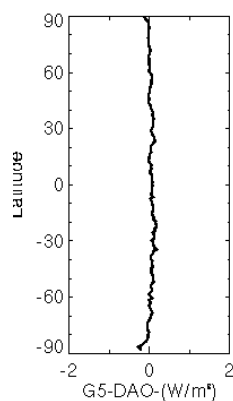
DAO
Global 258.58



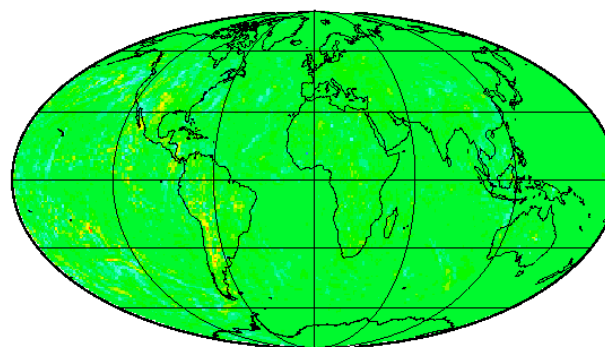
G5 258.53
G5-DAO -0.06
reg RMS 90N-90S 2.01

Clear-sky GEO

G5-DAO 200601 Total-sky TOA LW Flux - GEO Interpolation



DAO
Global 233.60



G5 233.66
G5-DAO 0.06
reg RMS 90N-90S 0.36

All-sky GEO

TOA Flux G5- MOA Comparison Table

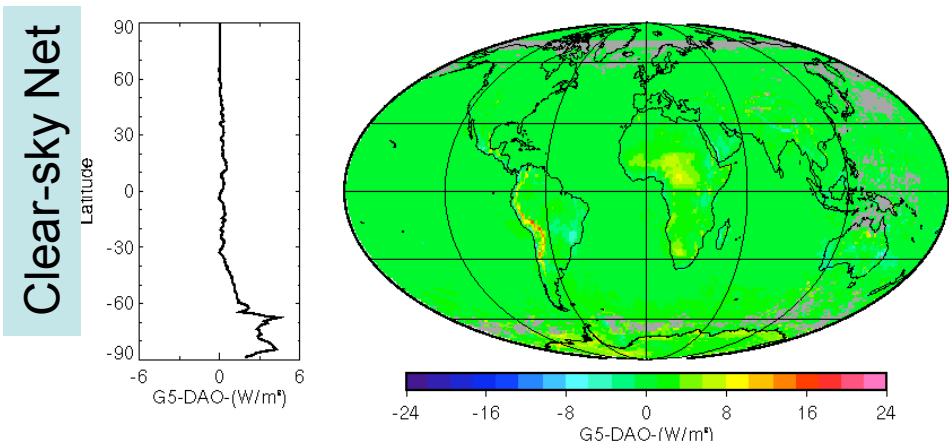
Bias RMS	Aqua Jan06	Terra Jan06	Terra Jul04
Clear-sky SW nonGEO 50.5	0.01 1.17	-0.03 1.35	0.02 1.45
Clear-sky LW nonGEO ~263	-0.01 1.64	-0.04 1.59	-0.11 2.00
Clear-sky LW GEO ~259	-0.06 2.01	-0.11 1.97	-0.20 2.40
All-sky SW GEO ~101	0.03 0.73	0.01 0.76	0.02 0.77
All-sky LW GEO ~234	0.06 0.36	-0.02 0.51	0.05 0.55

GGEO SFC fluxes

- For every hourbox use Model B parameterization to convert TOA to SFC fluxes
- Minor difference in SW surface fluxes
- LW surface fluxes are decoupled from the TOA and depend only on the lower atmosphere and are sensitive to skin temperature differences.

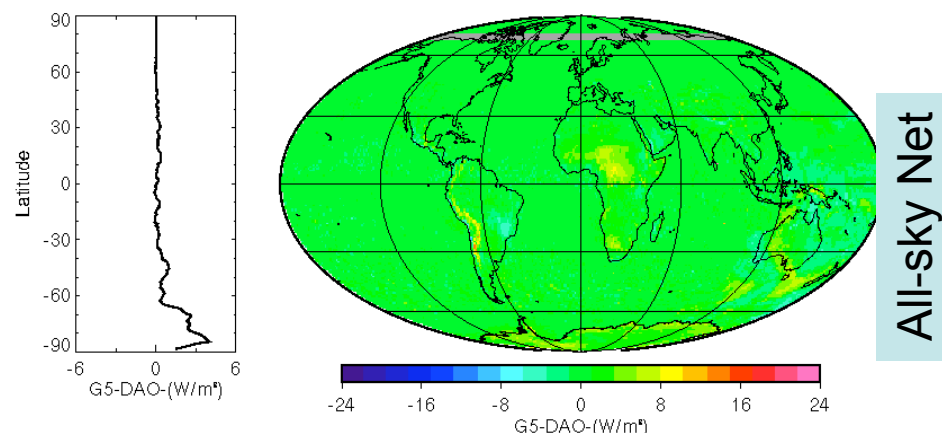
SFC SW, Aqua Jan06

G5-DAO 200601 Clear-sky Sfc Net SW Flux - Mod B



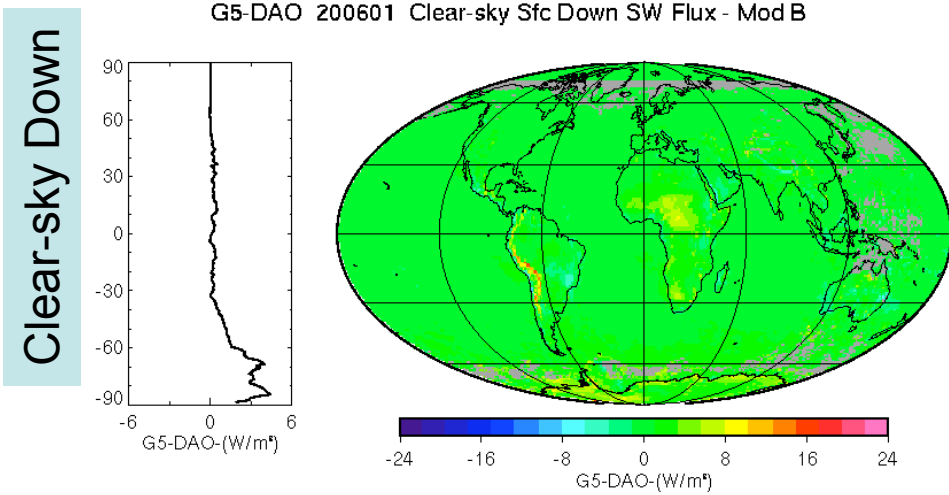
DAO	G5	G5-DAO	reg RMS 90N-90S
Global 223.68	224.14	0.45	1.45

G5-DAO 200601 Total-sky Sfc Net SW Flux - Mod B



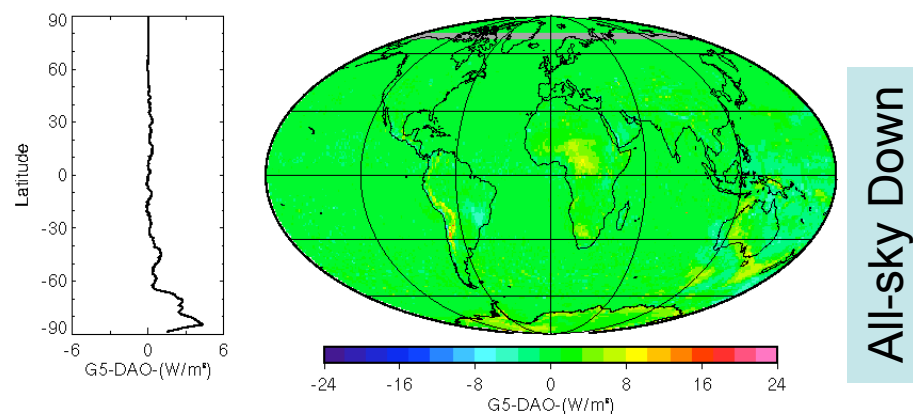
DAO	G5	G5-DAO	reg RMS 90N-90S
Global 175.97	176.25	0.29	1.42

G5-DAO 200601 Clear-sky Sfc Down SW Flux - Mod B



DAO	G5	G5-DAO	reg RMS 90N-90S
Global 255.90	256.38	0.46	1.48

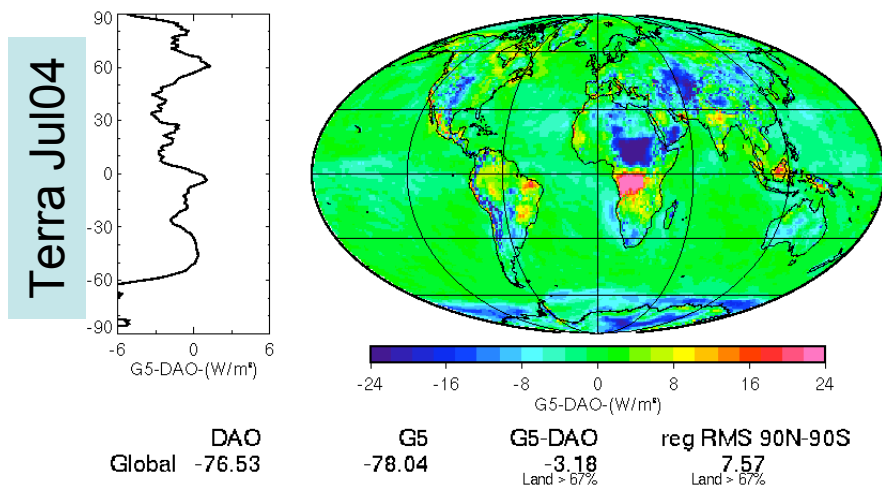
G5-DAO 200601 Total-sky Sfc Down SW Flux - Mod B



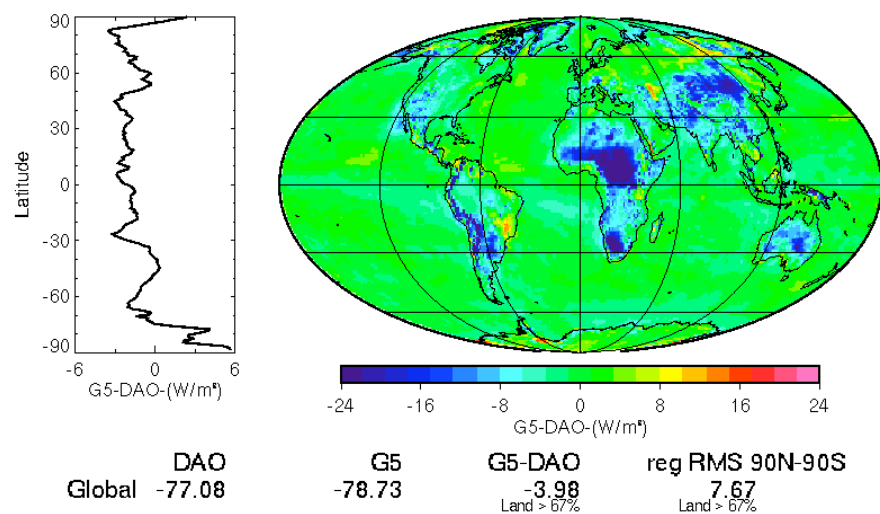
DAO	G5	G5-DAO	reg RMS 90N-90S
Global 201.40	201.69	0.29	1.49

Clear-sky SFC NET LW, ModB

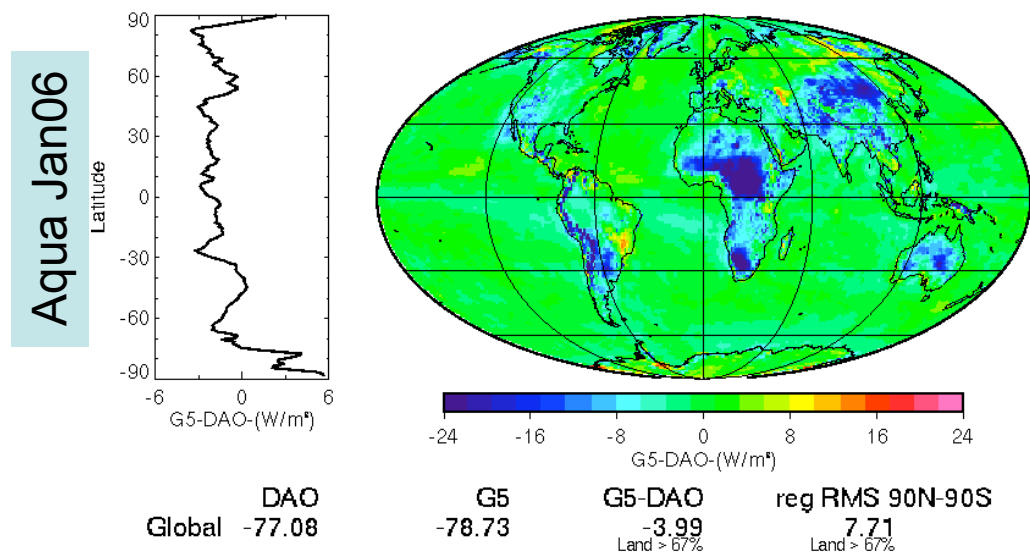
G5-DAO 200407 Clear-sky Sfc Net LW Flux - Mod B



G5-DAO 200601 Clear-sky Sfc Net LW Flux - Mod B



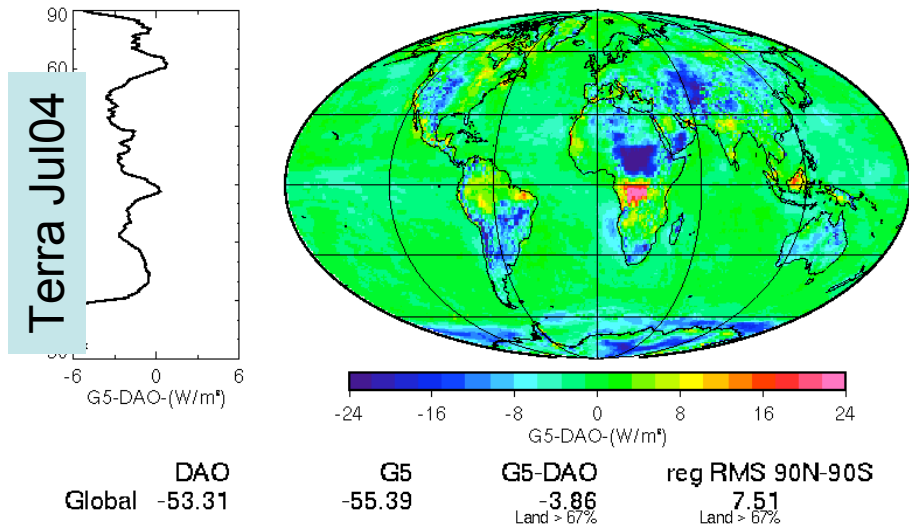
G5-DAO 200601 Clear-sky Sfc Net LW Flux - Mod B



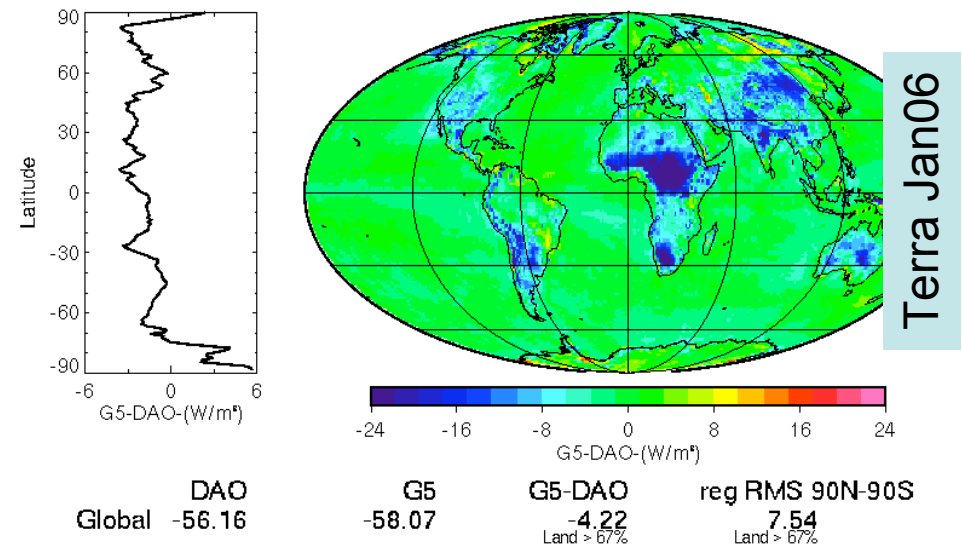
DAO=CER_SRBVG1_Aqua-FM3-MODIS_Edition2C_023031.200601

All-sky SFC NET LW, ModB

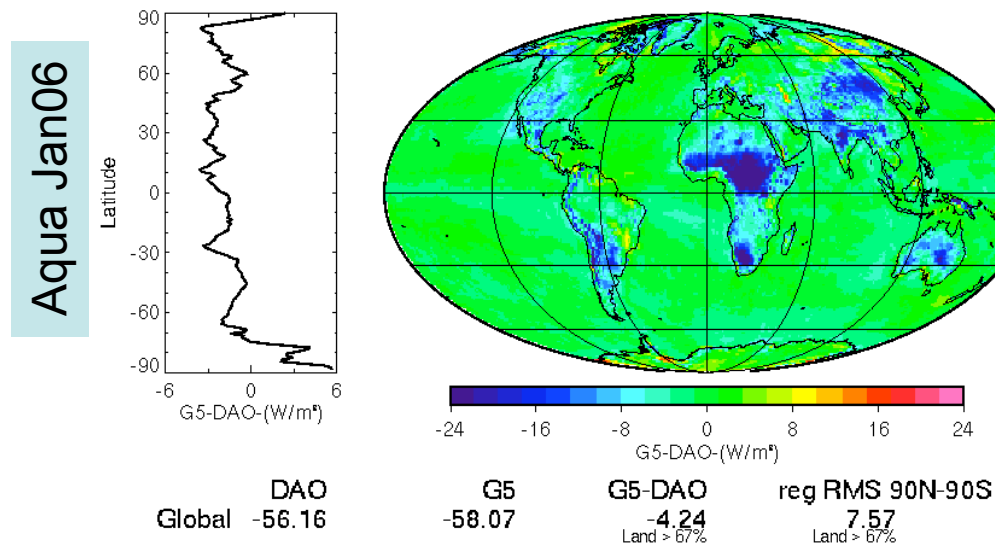
G5-DAO 200407 Total-sky Sfc Net LW Flux - Mod B



G5-DAO 200601 Total-sky Sfc Net LW Flux - Mod B



G5-DAO 200601 Total-sky Sfc Net LW Flux - Mod B

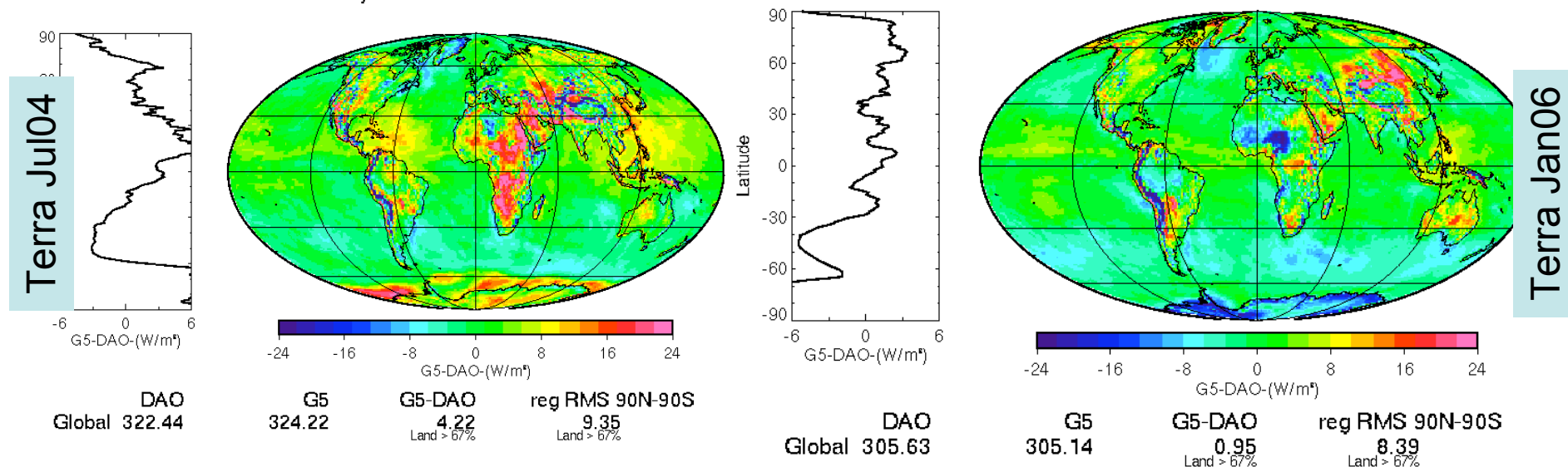


DAO=CER_SRBVG1_Aqua-FM3-MODIS_Edition2C_023031.200601

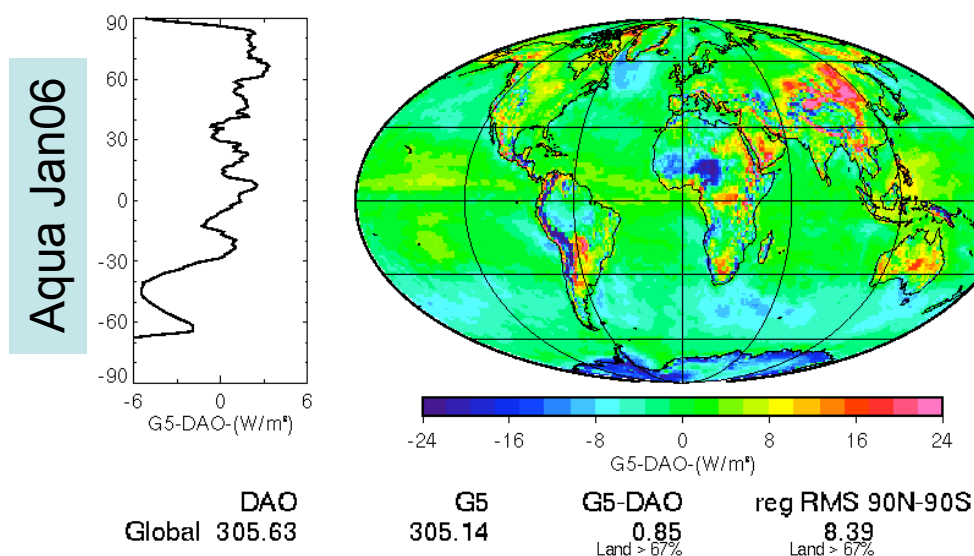
Clear-sky SFC Down LW, ModB

G5-DAO 200601 Clear-sky Sfc Down LW Flux - Mod B

G5-DAO 200407 Clear-sky Sfc Down LW Flux - Mod B



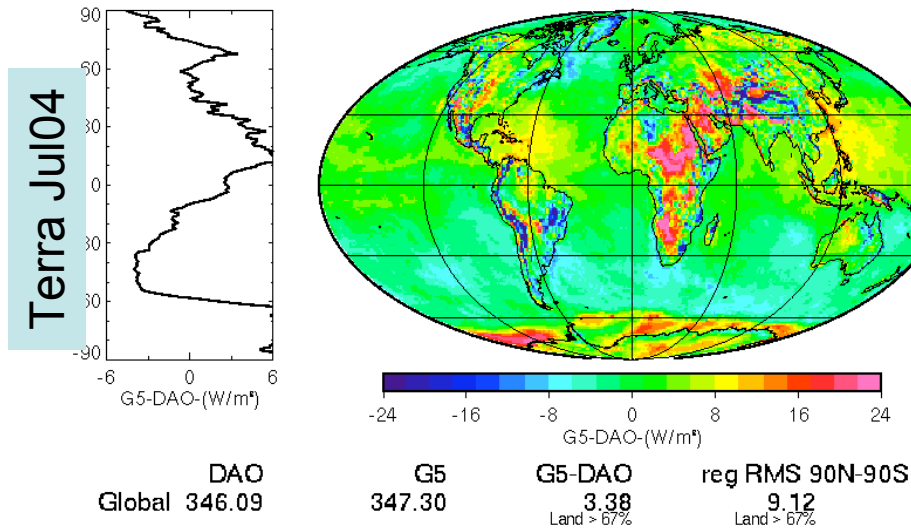
G5-DAO 200601 Clear-sky Sfc Down LW Flux - Mod B



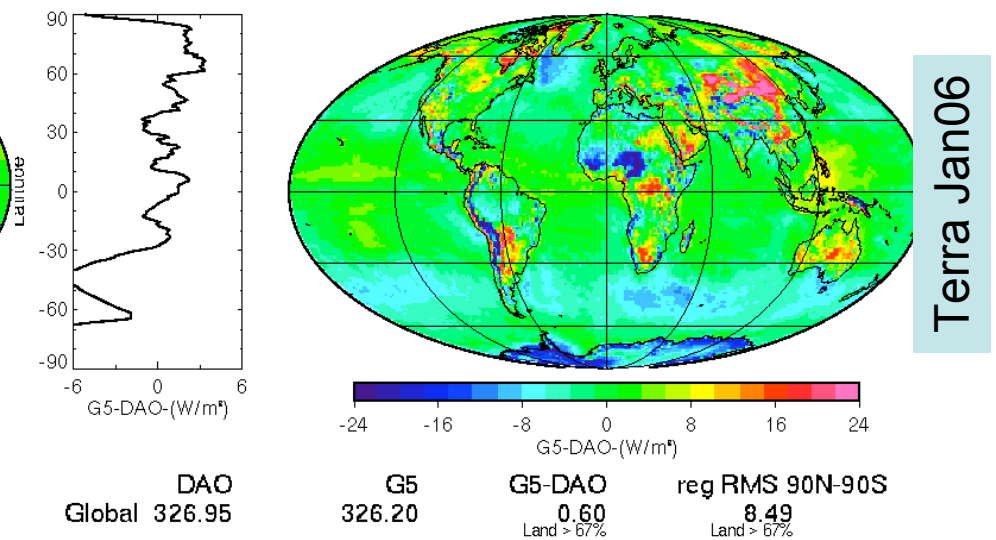
DAO=CER_SRBAVG1_Aqua-FM3-MODIS_Edition2C_023031.200601

All-sky SFC Down LW, ModB

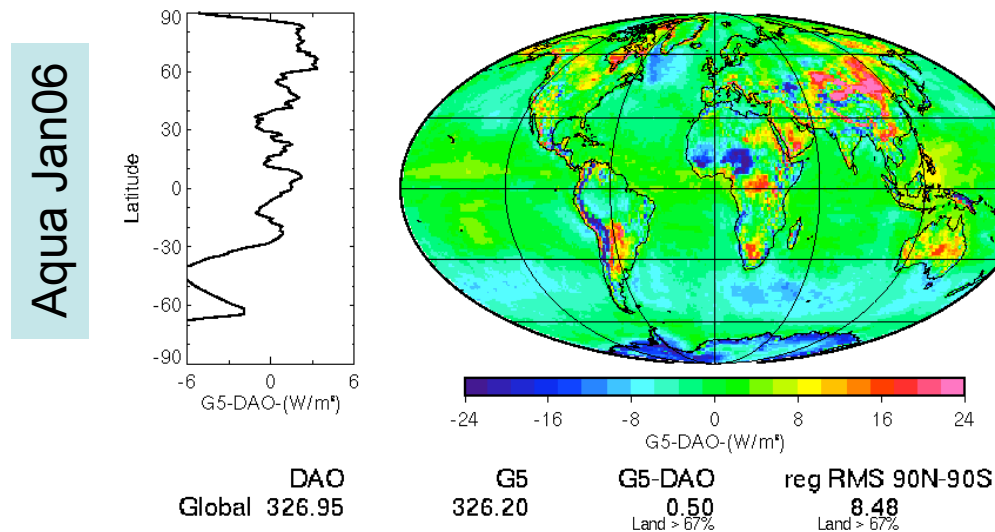
G5-DAO 200407 Total-sky Sfc Down LW Flux - Mod B



G5-DAO 200601 Total-sky Sfc Down LW Flux - Mod B



G5-DAO 200601 Total-sky Sfc Down LW Flux - Mod B



DAO=CER_SRBAVG1_Aqua-FM3-MODIS_Edition2C_023031.200601

SFC Flux G5- MOA Comparison Table

Land Bias ModelB Land RMS	Aqua Jan06	Terra Jan06	Terra Jul04
Clear-sky Net SW ~212	0.94 2.23	0.92 2.19	0.00 2.21
All-sky Net SW ~170	0.80 1.98	0.78 1.95	-0.02 1.99
Clear-sky DN SW ~240	0.94 2.22	0.92 2.19	0.02 2.17
All-sky DN SW ~192	0.80 2.04	0.79 2.04	0.01 2.09
Clear-sky Net LW ~ -76	-3.99 7.71	-3.98 7.67	-3.18 7.57
All-sky Net LW ~ -53	-4.24 7.57	-4.22 7.54	-3.86 7.51
Clear-sky DN LW ~322	0.85 8.39	0.95 8.39	4.22 9.35
All-sky DN LW ~ 346	0.50 8.48	0.60 8.49	3.38 9.12

GEO cloud property differences

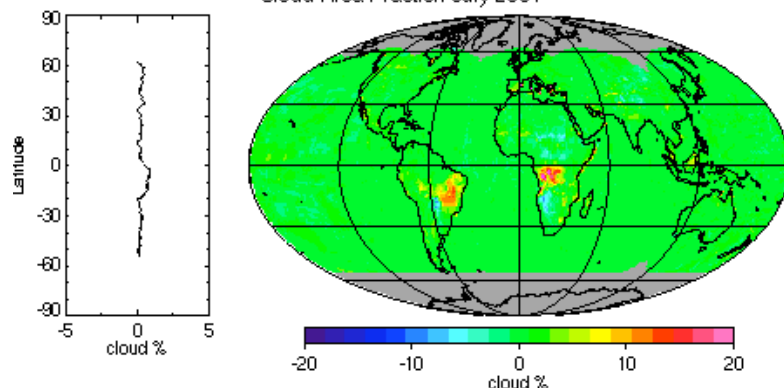
- Run SRBAVG with only GEO cloud properties
- 8 3-hourly GMT images per day
- MTSAT not used in the Jan06 comparison
- Same GEO product used for both Terra and Aqua datasets
- GEO cloud properties not normalized with MODIS
- At night an emissivity of 1 is used, during day the Tcld is adjusted to take into account emissivity
- Most cloud property differences occur over land

GEO cloud amount

July 2004 daytime

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Daytime)

Cloud Area Fraction July 2004

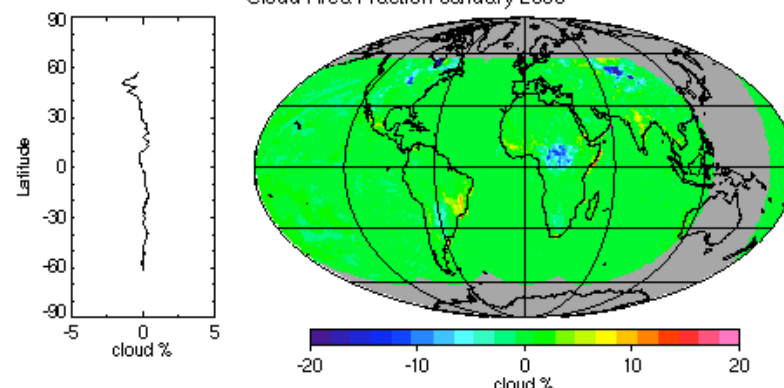


	DAO	G5	BIAS	land BIAS	land RMS
Global	64.09	63.77	0.32	0.76	2.45
60N-60S	64.01	63.69	0.32		
30N-30S	57.53	57.15	0.38		

Ghostview, version 1.5

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Daytime)

Cloud Area Fraction January 2006



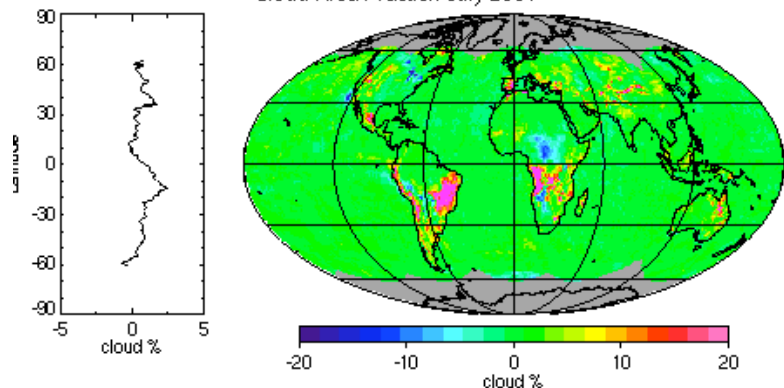
	DAO	G5	BIAS	land BIAS	land RMS
Global	65.00	65.01	-0.00	-0.24	2.60
60N-60S	64.72	64.72	-0.00		
30N-30S	57.84	57.71	0.12		

Jan 2006 daytime

July 2004 nighttime

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Night time)

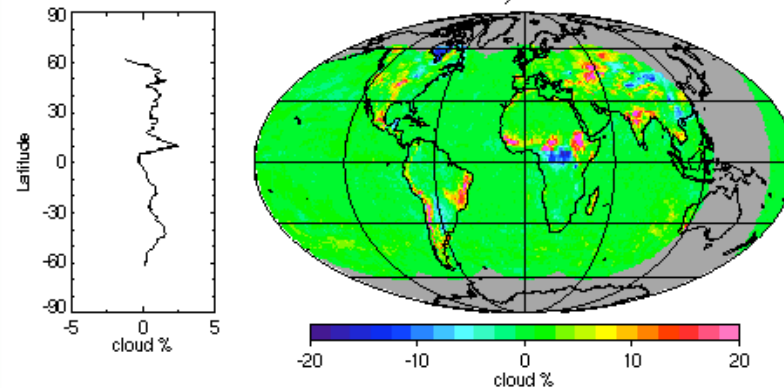
Cloud Area Fraction July 2004



	DAO	G5	BIAS	land BIAS	land RMS
Global	53.43	52.68	0.76	2.29	6.56
60N-60S	53.17	52.40	0.77		
30N-30S	48.65	47.82	0.83		

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Night time)

Cloud Area Fraction January 2006



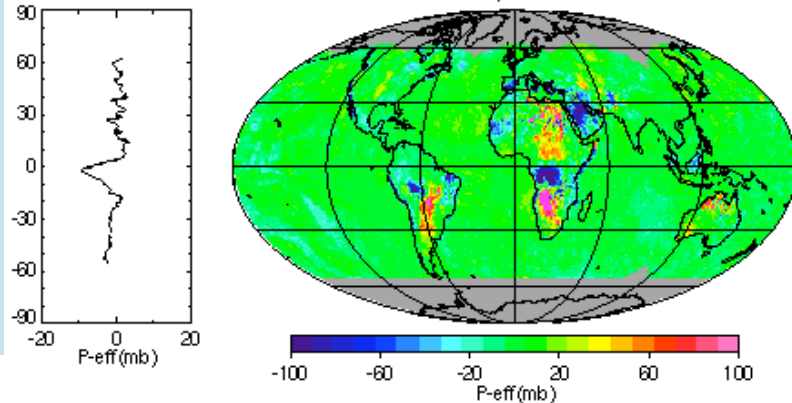
	DAO	G5	BIAS	land BIAS	land RMS
Global	55.85	55.17	0.68	1.77	5.62
60N-60S	55.63	54.93	0.71		
30N-30S	49.64	49.06	0.59		

Jan 2006 nighttime

GEO Effective Pressure

July 2004 daytime

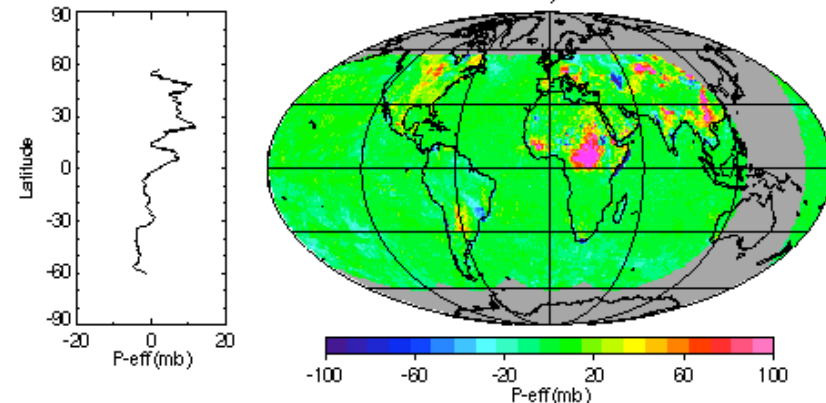
SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Daytime)
Cloud Effective Pressure July 2004



	DAO	G5	BIAS	land BIAS	land RMS
Global	626.74	627.61	-0.86	0.23	37.60
60N-60S	626.89	627.77	-0.88		
30N-30S	599.22	600.34	-1.12		

Ghostview, version 1.5

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Daytime)
Cloud Effective Pressure January 2006



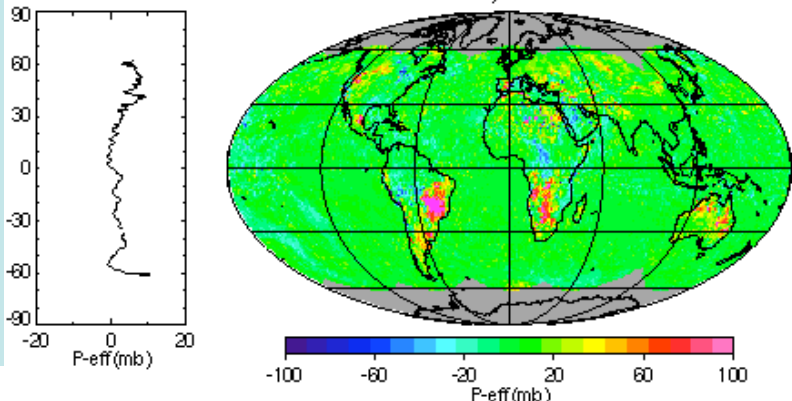
	DAO	G5	BIAS	land BIAS	land RMS
Global	625.22	623.51	1.72	10.78	30.00
60N-60S	624.41	622.65	1.76		
30N-30S	588.98	586.72	2.26		

Ghostview, version 1.5

Jan 2006 daytime

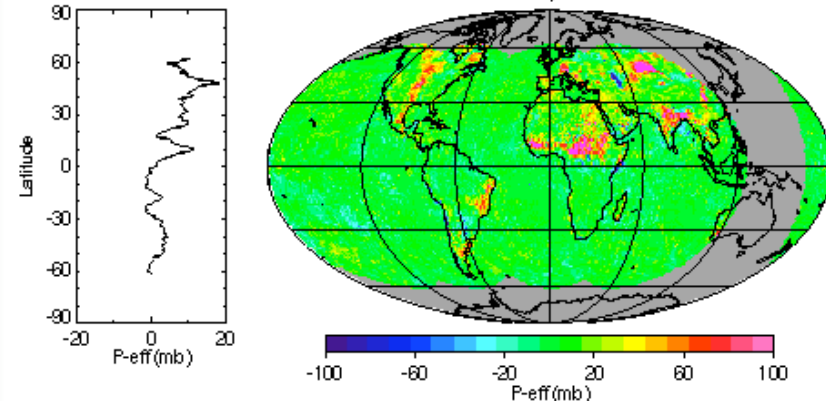
July 2004 nighttime

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Night time)
Cloud Effective Pressure July 2004



	DAO	G5	BIAS	land BIAS	land RMS
Global	590.26	587.91	2.35	9.88	27.43
60N-60S	589.94	587.69	2.25		
30N-30S	560.91	559.98	0.93		

SRBAVG2_TERRA DAO - SRBAVG2_TERRA G5 (Night time)
Cloud Effective Pressure January 2006

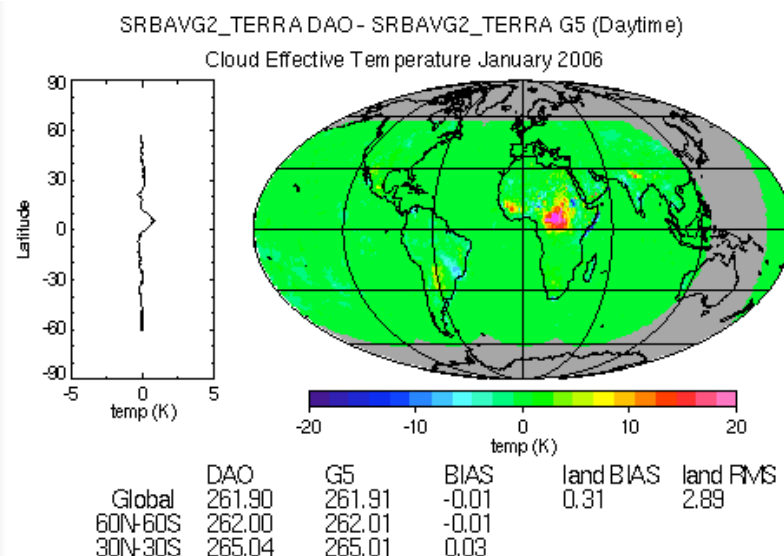
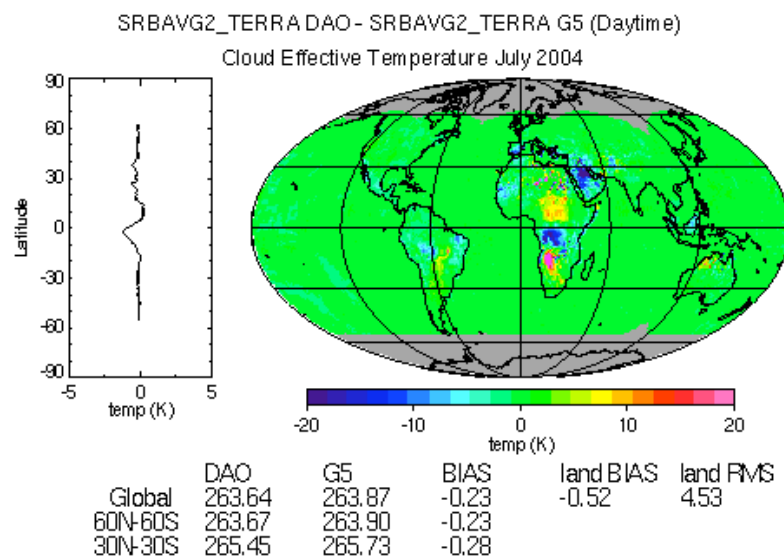


	DAO	G5	BIAS	land BIAS	land RMS
Global	587.89	583.57	4.32	14.99	31.14
60N-60S	586.56	582.21	4.35		
30N-30S	543.70	541.03	2.68		

Jan 2006 nighttime

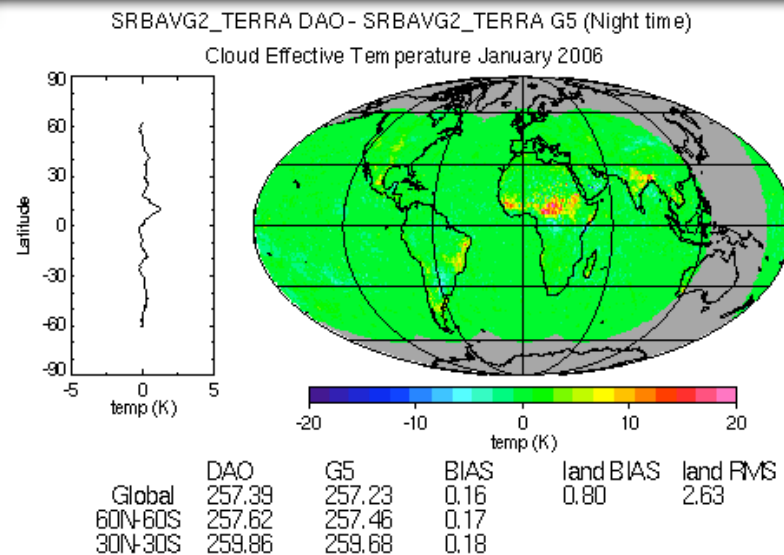
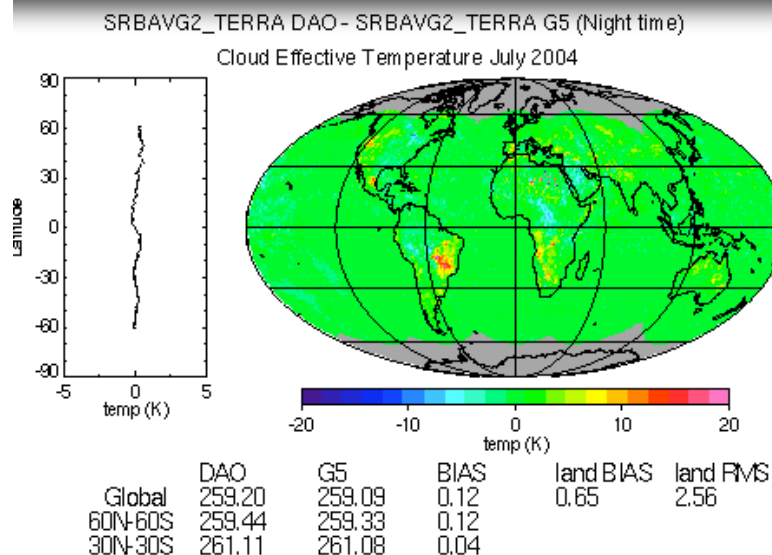
GEO Effective Temperature

July 2004 daytime



Jan 2006 daytime

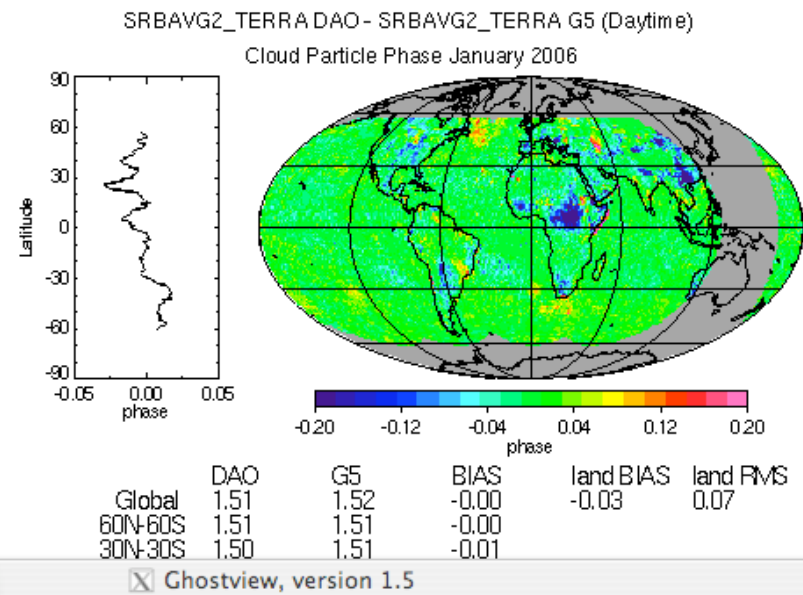
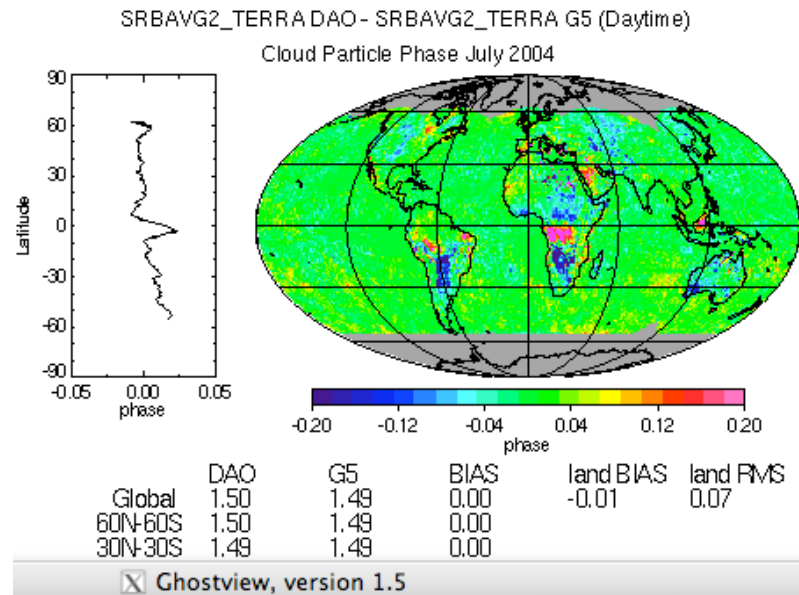
July 2004 nighttime



Jan 2006 nighttime

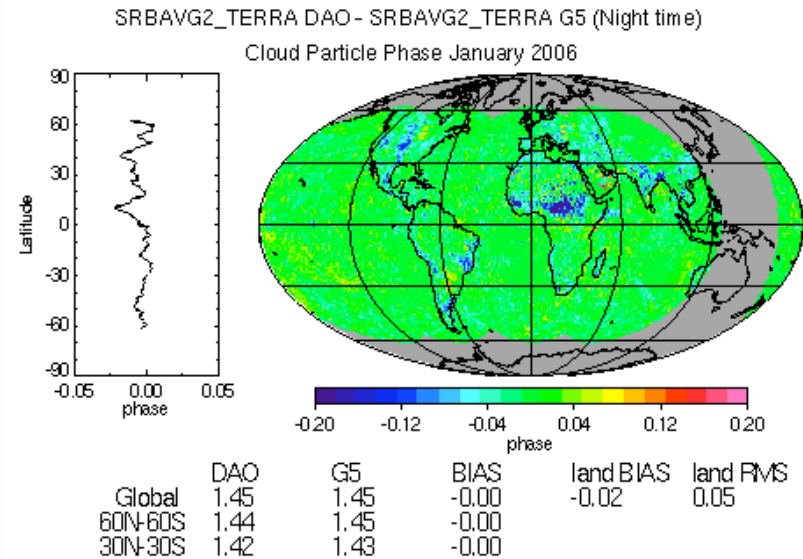
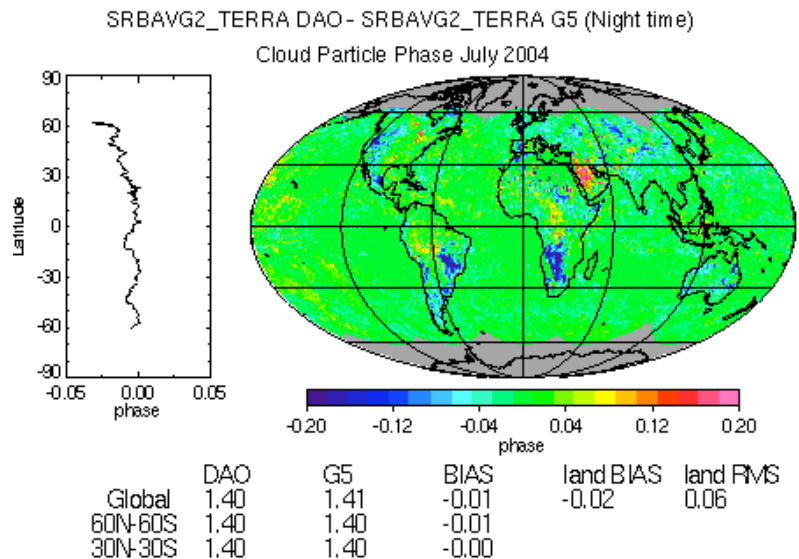
GEO Cloud Phase

July 2004 daytime



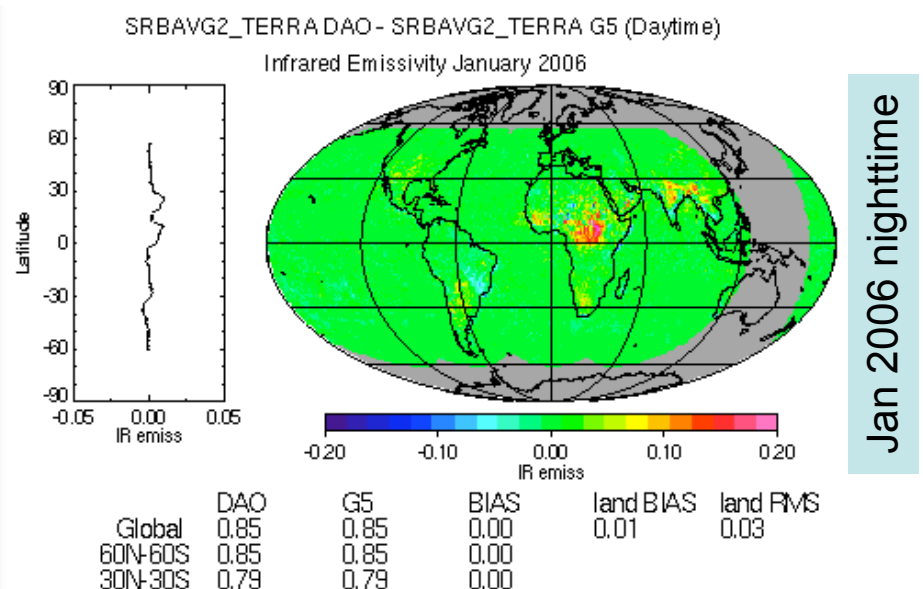
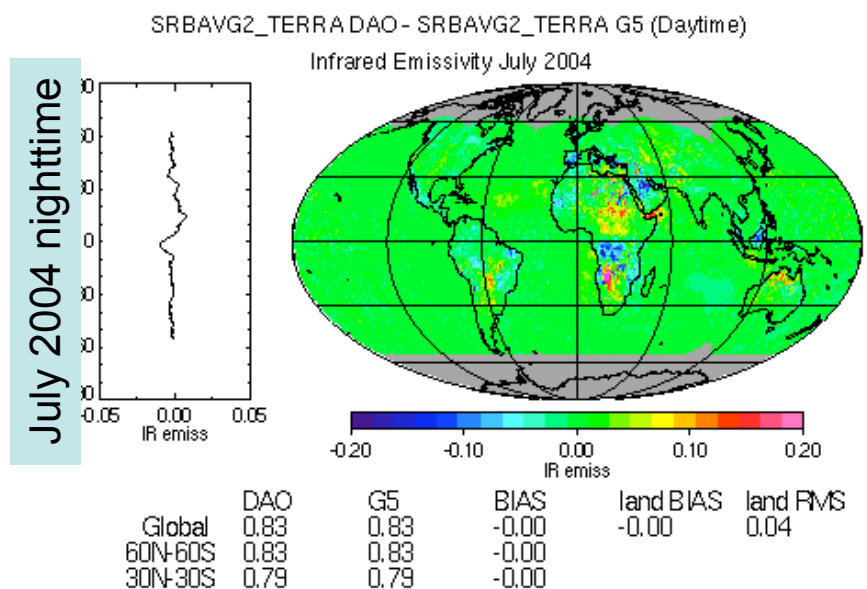
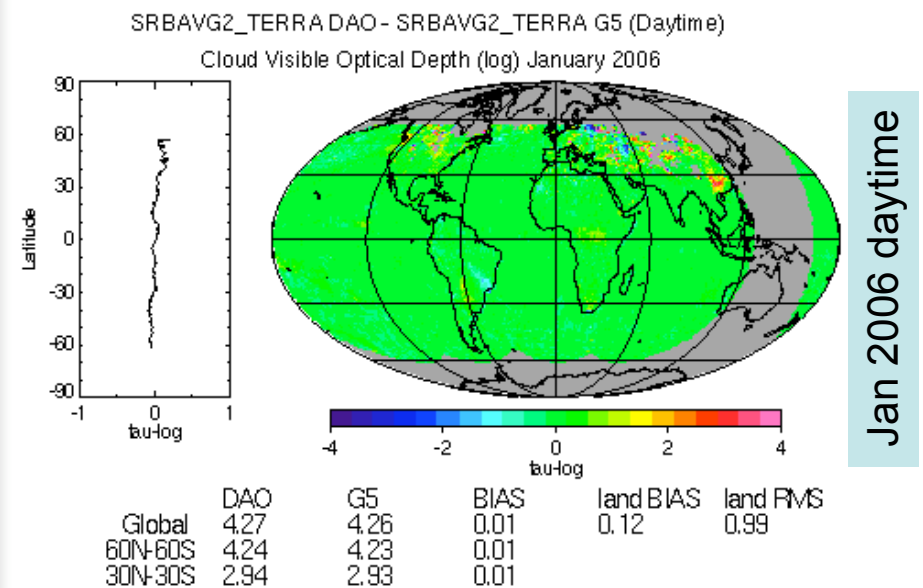
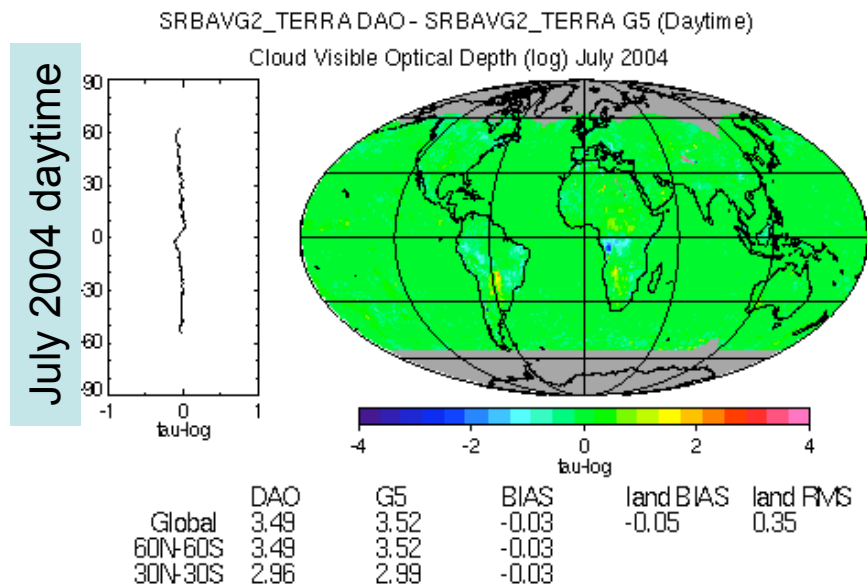
Jan 2006 daytime

July 2004 nighttime



Jan 2006 nighttime

GEO Optical Depth and IR emissivity

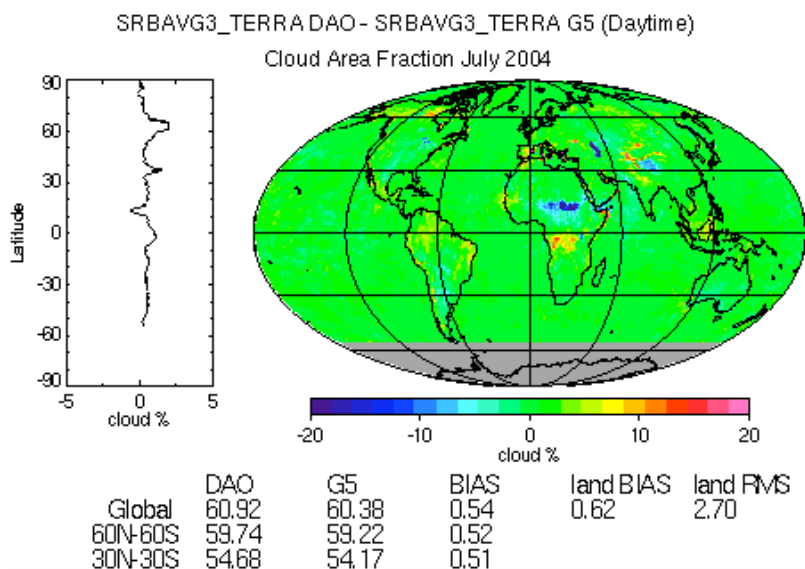


SSF cloud property differences

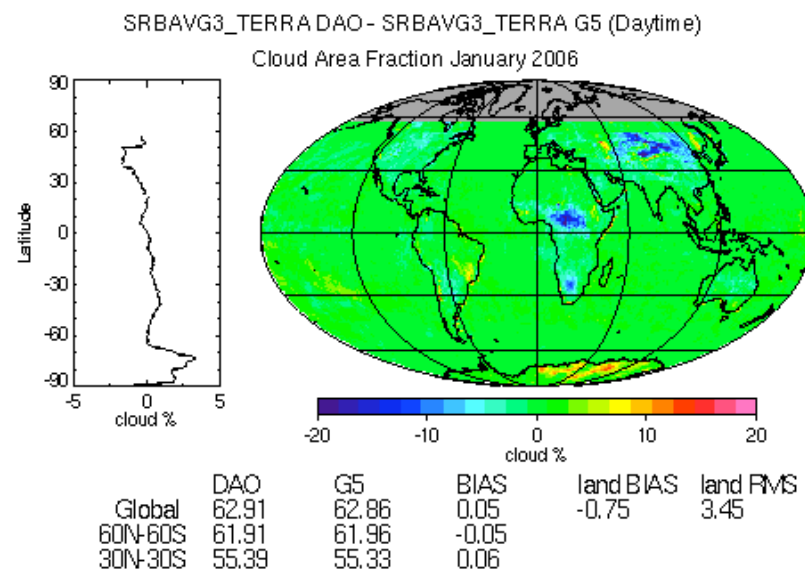
- No major differences between Aqua and Terra during Jan 2006
- Very little difference for IWP, LWP, and particle sizes

SSF cloud amount

July 2004 daytime

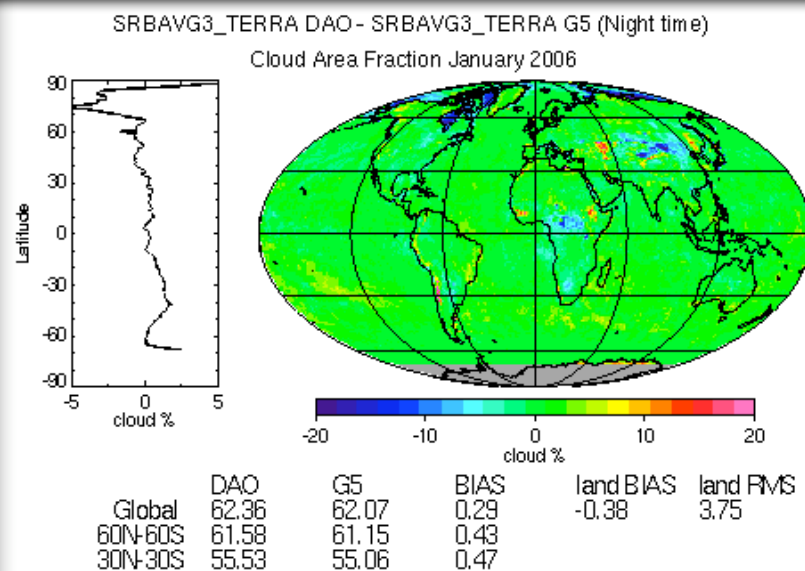
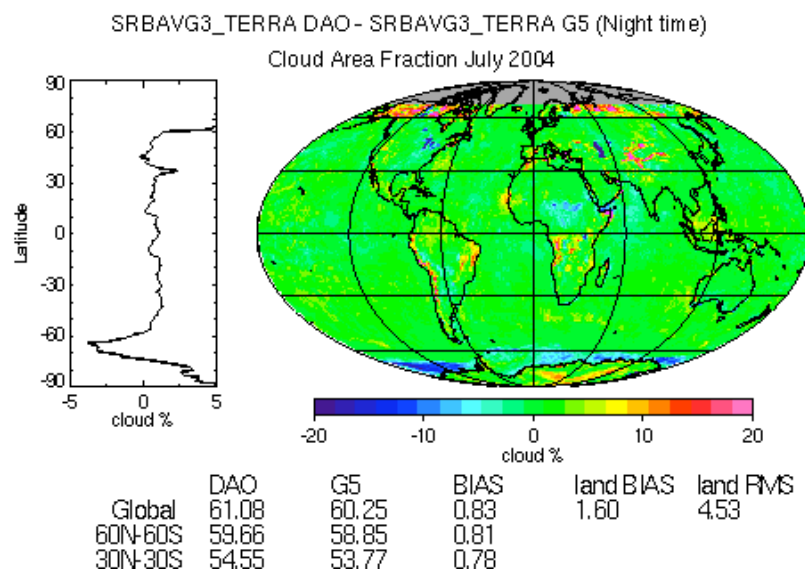


Ghostview, version 1.5



Jan 2006 daytime

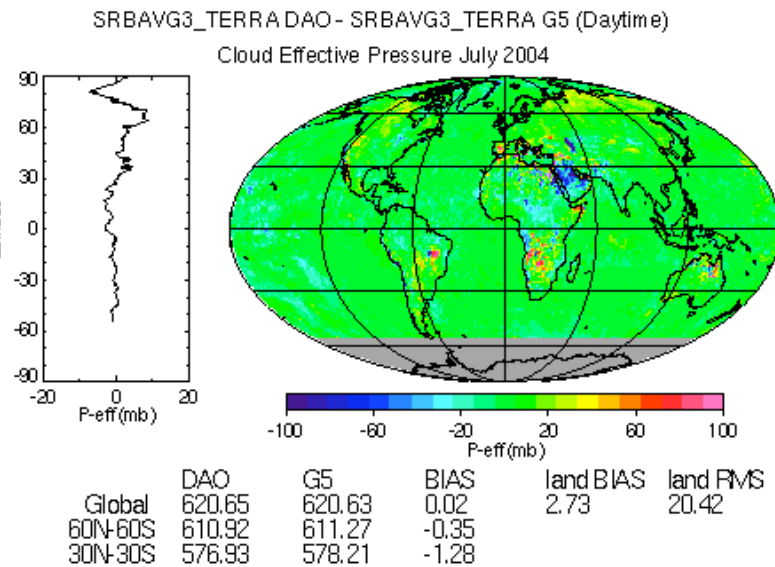
July 2004 nighttime



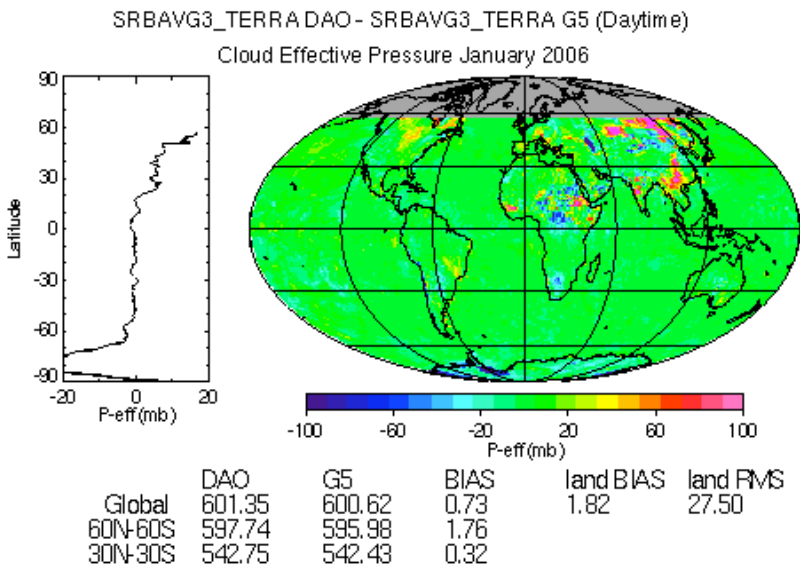
Jan 2006 nighttime

SSF cloud pressure

July 2004 daytime

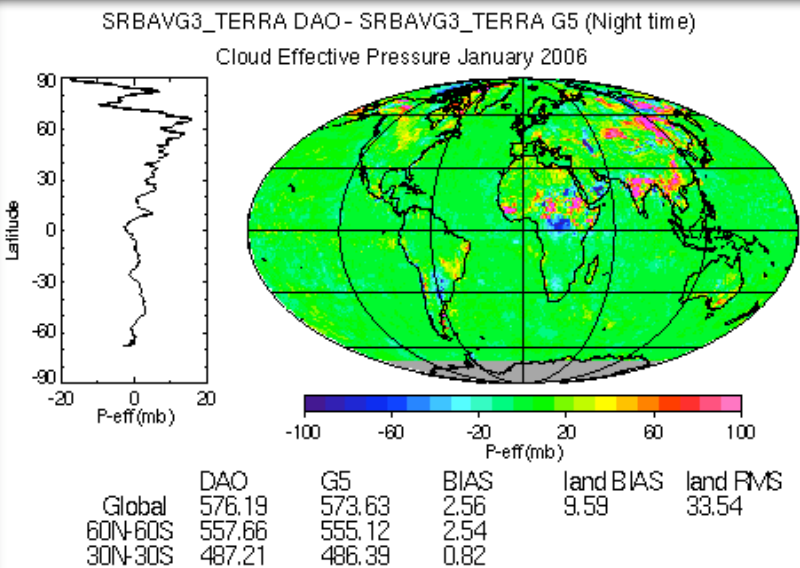
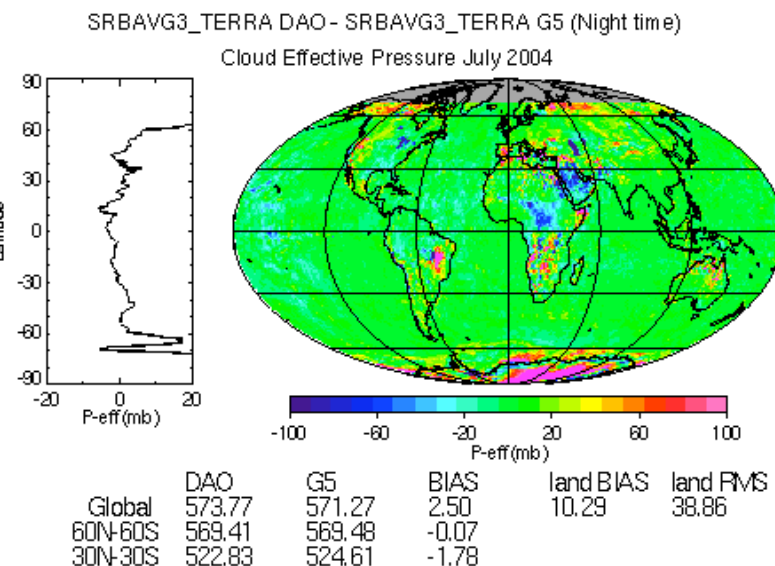


Ghostview, version 1.5



Jan 2006 daytime

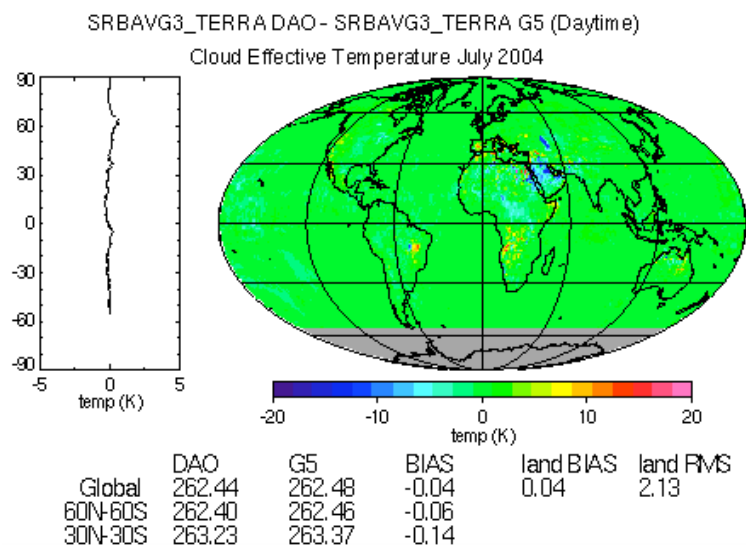
July 2004 nighttime



Jan 2006 nighttime

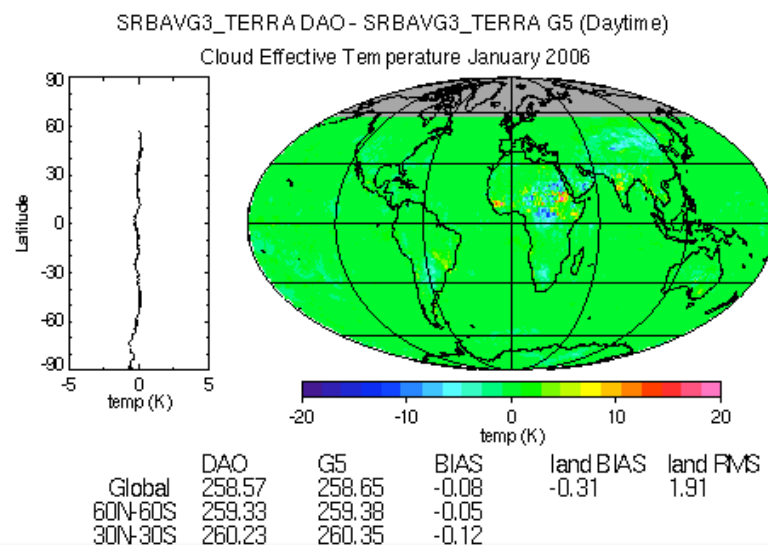
SSF cloud temperature

July 2004 daytime



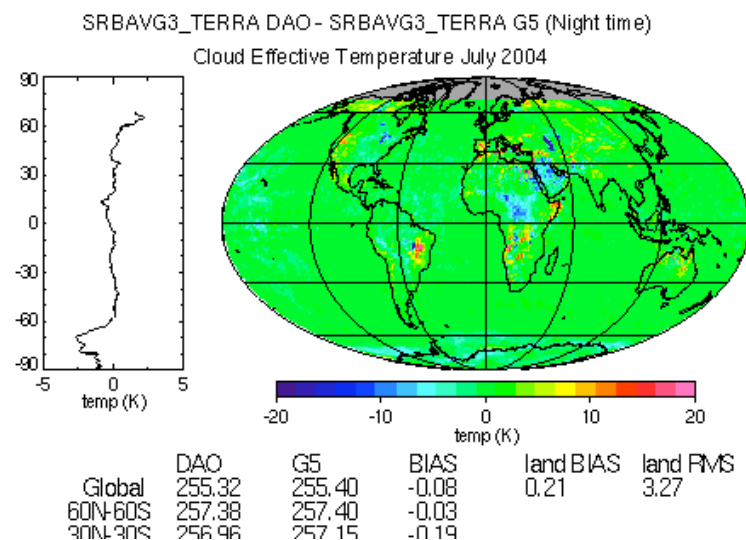
Ghostview, version 1.5

Jan 2006 daytime

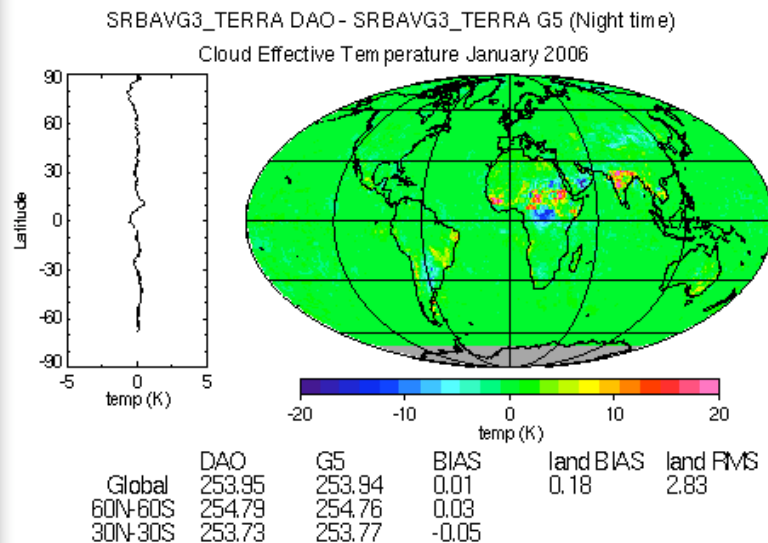


Ghostview, version 1.5

July 2004 nighttime

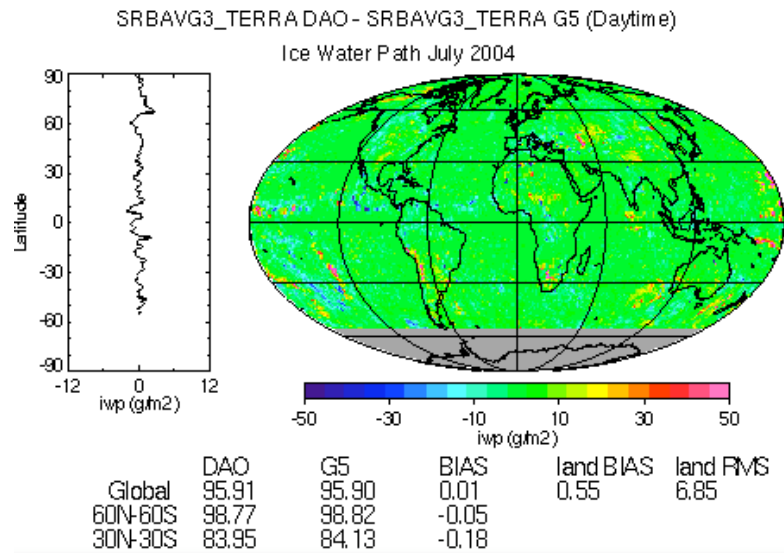


Jan 2006 nighttime

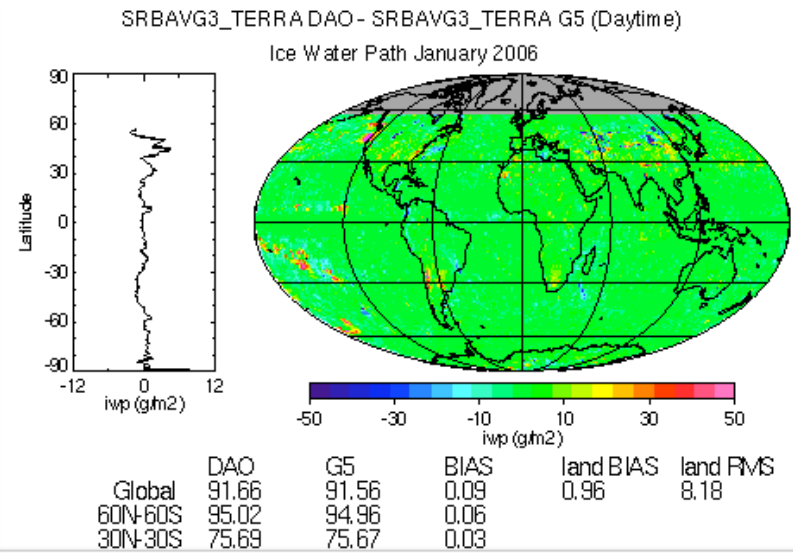


SSF cloud IWP

July 2004 daytime



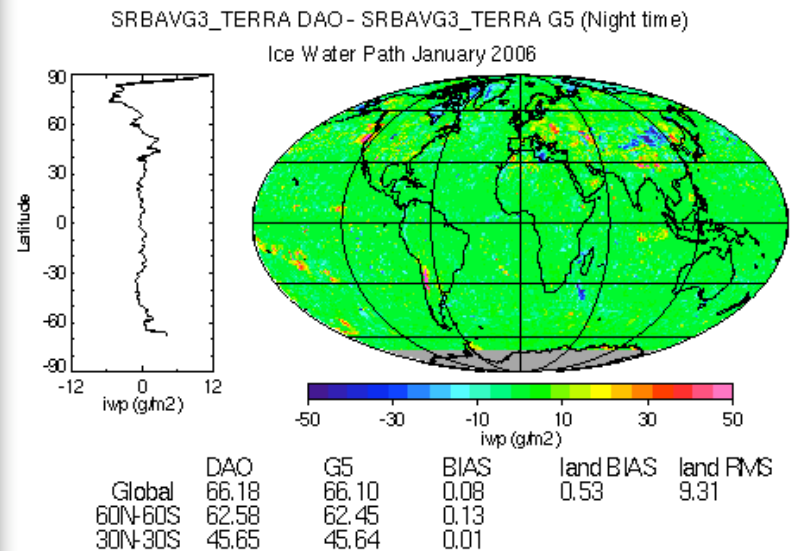
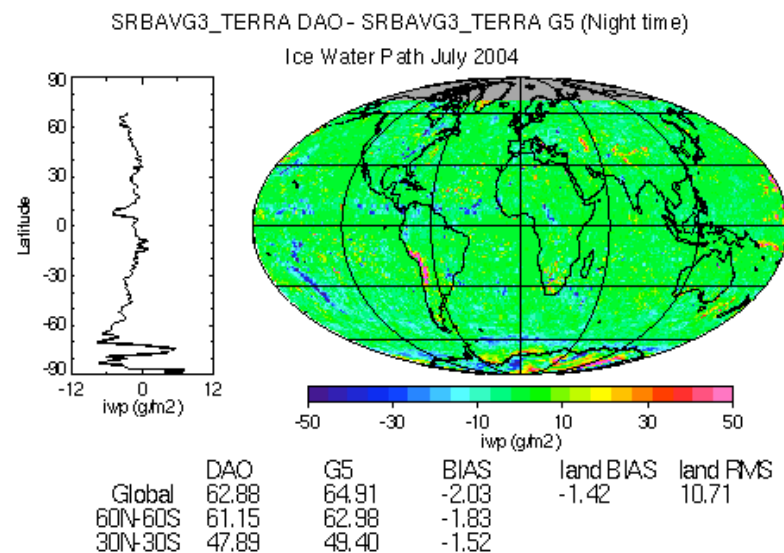
Ghostview, version 1.5



Ghostview, version 1.5

Jan 2006 daytime

July 2004 nighttime

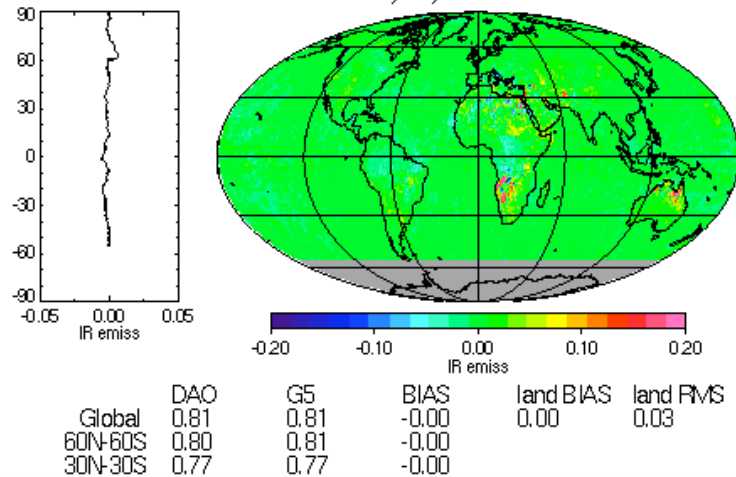


Jan 2006 nighttime

SSF cloud emissivity

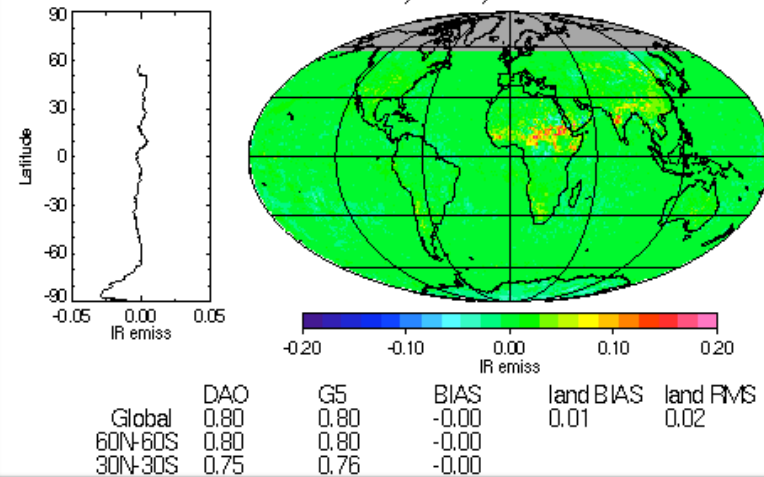
July 2004 daytime

SRBAVG3_TERRA DAO - SRBAVG3_TERRA G5 (Daytime)
Infrared Emissivity July 2004



Ghostview, version 1.5

SRBAVG3_TERRA DAO - SRBAVG3_TERRA G5 (Daytime)
Infrared Emissivity January 2006

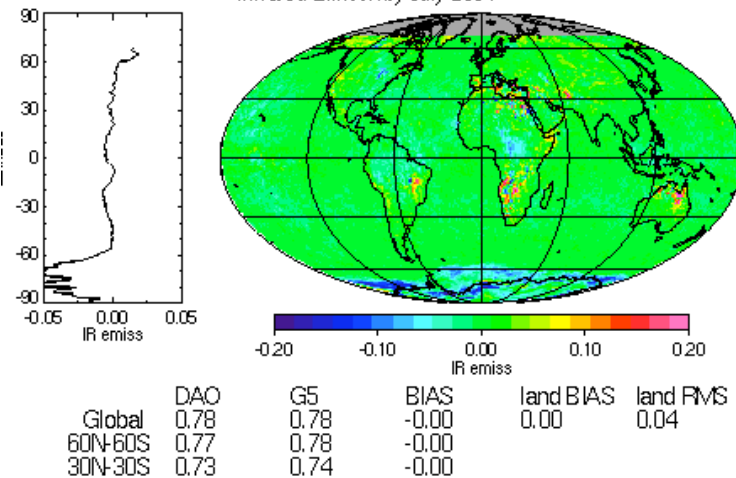


Ghostview, version 1.5

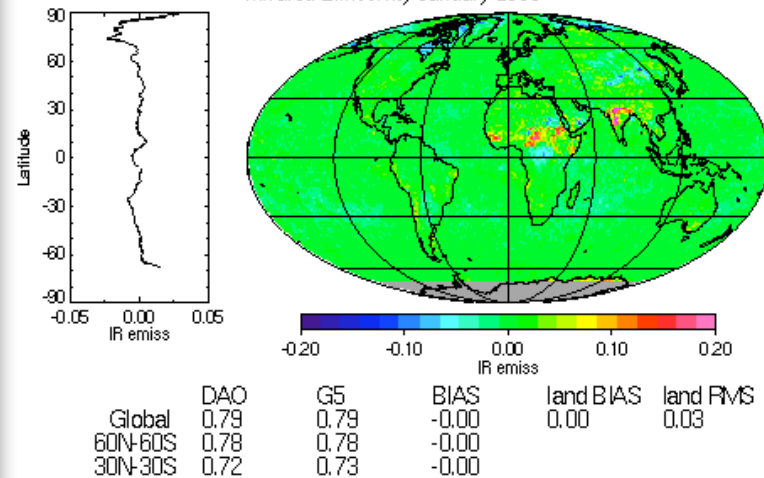
Jan 2006 daytime

July 2004 nighttime

SRBAVG3_TERRA DAO - SRBAVG3_TERRA G5 (Night time)
Infrared Emissivity July 2004



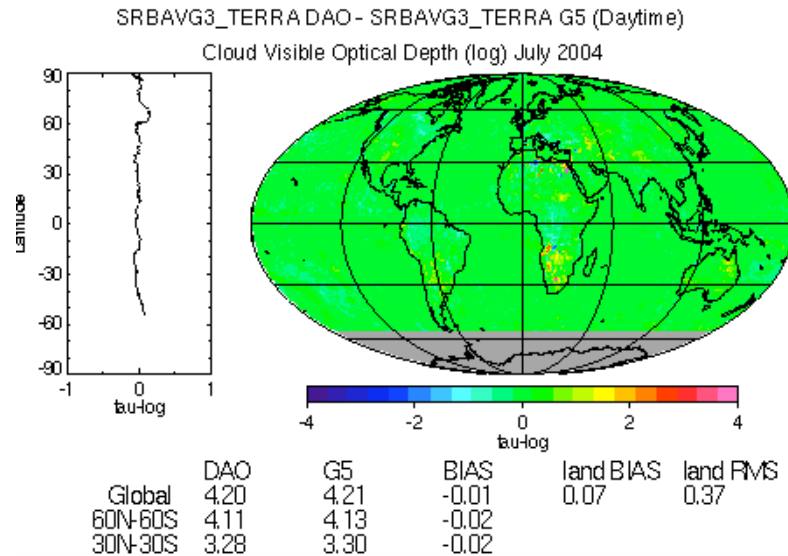
SRBAVG3_TERRA DAO - SRBAVG3_TERRA G5 (Night time)
Infrared Emissivity January 2006



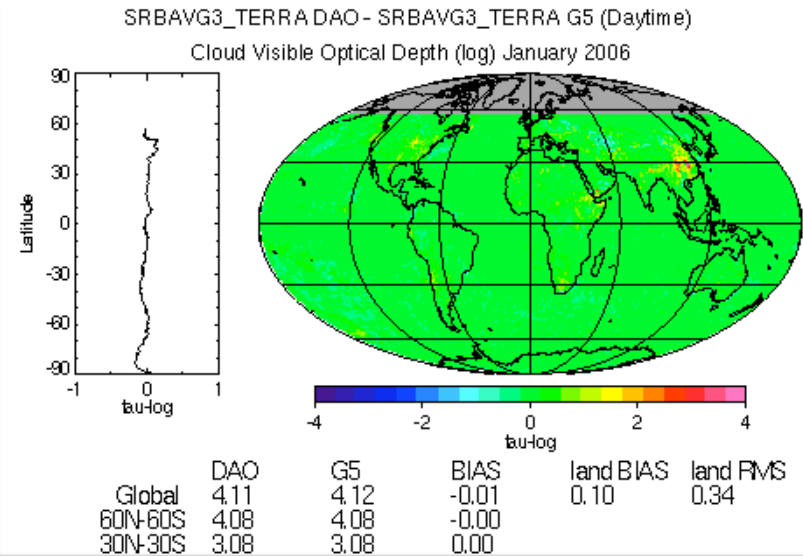
Jan 2006 nighttime

SSF cloud optical depth

July 2004 daytime



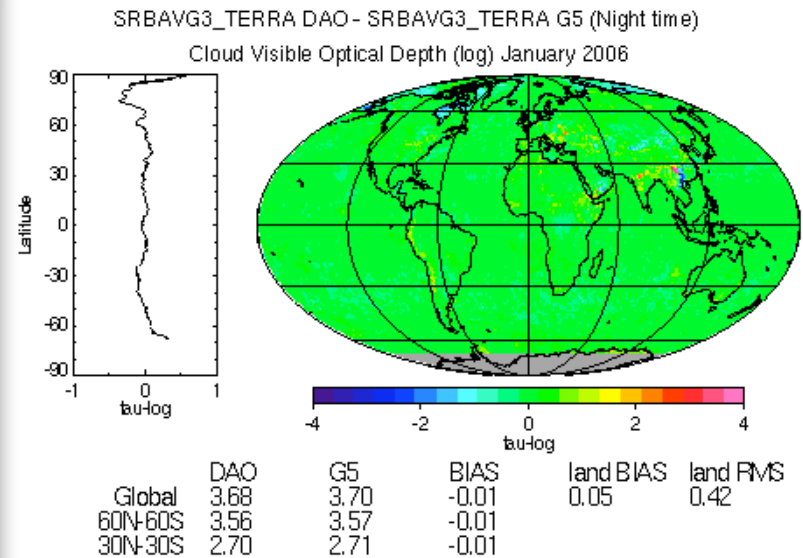
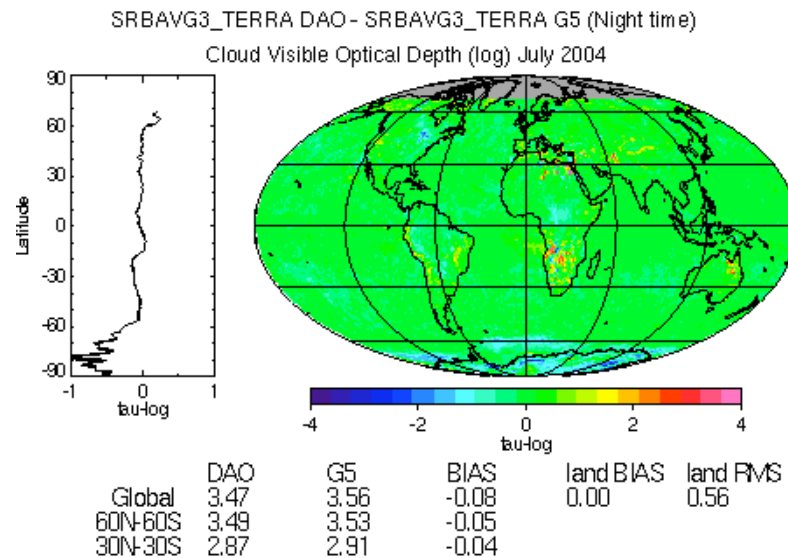
Ghostview, version 1.5



Ghostview, version 1.5

Jan 2006 daytime

July 2004 nighttime



Jan 2006 nighttime