SARB and Surface-only Working Groups

0900 January 22, 2002
Royal Meteorological Institute, Brussels

SARB Agenda

Group recommendation on disposition of

CRS Beta2 (Jan.-Aug. 98 done with bugs)

CRS Beta3 (better code in production)

Changes to tuning sigmas (a priori uncertainties)

Ignatov: higher sigma for land AOT

Limitation of flux vs. radiance tuning

Seek resources to apply 4-stream SW code?
(we now use 2-stream).

Group recommendation on CRS Beta2

Jan.-Aug. 98 done & ready to release

Bugs in ice cloud and cloud top tuning

CRS Beta2 (May 1, 1998):

CERES- FuLiou	All-sky	Ovrcst Ice
	Untuned	Untuned
SW flux		
bias	4.4	25.3
rms	24.4	37.7

CRS Beta3

Debugged & in production
Better LW code
Better ocean surface spectral albedo input

CRS Beta3 May 1, 1998

CERES- FuLiou	All-sky	Ovrcst Ice	Ovrcst Liq
	Untuned	Untuned	Untuned
SW flux			
bias	-1.8	-2.8	-7.3
rms	20.1	24.7	22.1

Changes to tuning sigmas (a priori uncertainties)

TOA — all footprints	Sigma (%)	Minimum sigma (MKS)	Adjustable parameter
	1.0 %	2.0 Wm-2	reflected SW flux
Beta3	1.0 %	2.0 Wm-2	broadband LW flux
	2.0 %	1.0 Wm-2	window WN flux
	5.0 %	0.3 Wm-2 sr-1	broadband LW radiance
	5.0 %	0.3 Wm-2 sr-1	filtered window radiance

Cloudy footprints	Sigma	Adjustable parameter
	0.15	d ln(tau) tau=optical depth
	2.0 K	cloud top temperature
	0.05	total cloud fraction in footprint
	0.025	fraction swap of 2 types in footprint (i.e., increase Cu and decrease Ci)

Clear footprints	Ocean	Land	Adjustable parameter
	1.0 K	4.0 K	surface skin temperature
	0.15	0.10	d ln(PW) PW: surface to 500 hPa
	0.15	0.10	d ln(UTH) upper tropos. humidity
	0.002	0.015	surface albedo
	0.50	0.10	d ln(AOT) aerosol optical depth

Ignatov: higher sigma for land AOT d ln (AOT) -> 0.50

Current clear sky LW tuning pushes 3 adjustments of

skin temperature, PW , UTH

heavily on just 2 variables: OLR & LW WN (window) flux.

Is it better to freeze SST with microwave (SSM/I or TMI) and then weigh 2 adjustments (PW & UTH) on OLR and LW WN flux?

Limitations of constraining too tightly to TOA

CERES - FuLiou	sigma for TOA fluxes	
	1% Beta3	0.25%
Tuned Fluxes		
SW reflected		
bias	-1.0	-4.2
rms	10.6	15.5
OLR		
bias	0.6	0.2
rms	3.8	3.9

Table shows that tight sigma (0.25%) ruins SW tuning

Next figure shows another problem:

Why stress tuning to flux (OLR in Wm-2) when the code is better at LW radiances (Wm-2sr-1)?

To fix the OLR, we move other parameters (skin temperature and PW) further from reality.

Seek resources to apply 4-stream SW code?

We now use 2-stream for SW and 2/4 stream for LW

Most of our error is SW.

Notes added after the WG met:

Group recommendation on disposition of

CRS Beta2 (Jan.-Aug. 98 done with bugs)

CRS Beta3 (better code in production)

Group consisted of G. L. Smith, S. K. Yang, F. G. Rose, D. Randall, L. Donner, and T. P. Charlock. Group sees little value in official release of CRS Beta2, especially considering that the clearly better CRS Beta3 could be released within one month. If you release CRS Beta2, you will have to make excuses for its bugs and lackluster performance for ice clouds. CRS Beta3 looks okay so far. We should plan to release CRS Beta3 shortly.

Changes to tuning sigmas (a priori uncertainties)

Ignatov: higher sigma for land AOT

Limitation of flux vs. radiance tuning

Group said that the sigma (uncertainty) for land, which is now lower than the sigma for ocean, should be equal to or larger than the sigma for ocean; but this issue is just a formality. On flux vs radiance tuning, the group had no outstanding recommendation.

Seek resources to apply 4-stream SW code?

Group said that if Charlock wants to seek the resources for this, an objective test should be conducted first.