CERES-SOFA Priorities

1) Terra & Aqua validation, quality control & maintenance.
2) Incorporate MATCH aerosol climatological maps into SW models A & B (Implementation imminent).
3) Improve SW model B algorithm to better handle cloud fields.
4) Incorporate Zhou & Cess algorithm. Initial attempt uncovered flaws in original model. Will work with Y. Zhou, as time permits, to create improved algorithm.
5) Improve surface emissivity maps to take into account new data and seasonal effects.
6) Improve molecular absorption parameters for SW & LW models B using HITRAN 2004 database.
7) CERES Window Channel inter-comparison???

Recent Changes to the SOFA Algorithms

SW Models

1) Model A: Replaced the GFDL aerosol optical depths with 550nm MATCH* climatological aerosol optical depths.
2) Model B: Replaced WCP-55 aerosol optical depths, and Staylor's single scattering albedos and asymmetry parameters with corresponding climatological broadband properties derived from MATCH* aerosol optical depths and OPAC spectral optical properties.
3) Model B: Replaced monthly climatological ERBE clear-sky TOA albedos with corresponding values derived from 46 months of Terra data.
4) Model B: Replaced ERBE-era 4-class surface type map with a new surface map based on a 10-min land-water map and IGBP surface classifications.

* MATCH incorporates measurements for the period of 2000-2004.

LW Models

1) Model A: No changes
2) Model B: Modified routine to handle clouds over high altitude areas such as Tibet whenever cloud base pressures are unavailable.

Zhou-Cess Longwave Algorithm

$$SDLW = a + b*SULW + c*\ln(PWV) + d*[\ln(PWV)]^2 + e*\ln(1+f*LWP)$$

$$a = 123.86,\ b = 0.444,\ c = 56.16,$$

$$d = -3.65,\ e = 5.30,\ f = 1226.0,$$

Longwave Clear-Sky

Sites # of Points		LWA	LWB	LWC
Continental	Bias Wm^{-2} (%)	-4.65 (-1.54)	-7.47 (-2.47)	4.54 (1.50)
16608	σ Wm^{-2} (%)	13.2 (4.4)	13.2 (4.4)	16.3 (5.4)
Coastal	Bias Wm^{-2} (%)	3.15 (1.12)	-2.99 (-1.06)	15.44 (5.48)
824	σ Wm^{-2} (%)	12.7 (4.5)	13.1 (4.6)	14.5 (5.1)
Ant-Arctic	Bias Wm^{-2} (%)	-8.79 (-5.87)	-5.89 (-3.93)	-29.14 (-19.45)
630	σ Wm^{-2} (%)	12.8 (8.6)	12.3 (8.2)	24.2 (16.2)
Desert	Bias Wm^{-2} (%)	2.28 (0.70)	-2.09 (-0.64)	2.10 (0.65)
2763	σ Wm^{-2} (%)	20.1 (6.2)	19.0 (5.8)	22.1 (6.8)
Island	Bias Wm^{-2} (%)	-0.50 (-0.13)	2.98 (0.76)	2.66 (0.67)
242	σ Wm^{-2} (%)	10.9 (2.8)	12.0 (3.0)	9.2 (2.3)
Global	Bias Wm^{-2} (%)	-3.51 (-1.17)	-6.42 (-2.13)	3.62 (1.20)
21067	σ Wm^{-2} (%)	14.9 (4.9)	14.7 (4.9)	20.2 (6.7)

Zhou-Cess Longwave Algorithm

Possible revision to prevent low water vapor runaway

$$SDLW = a + b*SULW + c*\ln(1+PWV) + d*[\ln(1+PWV)]^2 + e*\ln(1+f*LWP)$$