

Continuous Intercomparison of Radiation Codes (CIRC)

- Sponsored by ARM and endorsed by GEWEX Radiation Panel
- Aims to become the standard for documenting the performance of SW and LW RT codes in Large-Scale Models
- Goal is to have RT codes of IPCC models report performance against the CIRC cases
- Phase I to be launched in the following weeks: <http://www.circ-project.org>

Differences from previous intercomparisons:

- *Observation-tested* LBL calculations to be used as radiative benchmarks
- Benchmark results are publicly available
- ARM observations provide input (largely select BBHRP cases)
- Flexible structure and longer lifespan than previous intercomparisons

CIRC Practical Challenges

- For input and reference calculations to be credible, a reasonable level of agreement with observations is desirable
- BBHRP dataset (v.1.4.1) is small; very few BBHRP cases satisfy our criteria:
 - ✓ homogeneous* (1D)
 - ✓ closure at TOA and SFC for both SW and LW
- LBL calculations are not standard in BBHRP
- Input for LBL calculations is not always available from BBHRP (e.g., spectral surface albedo)
- Validation of LBL calculations

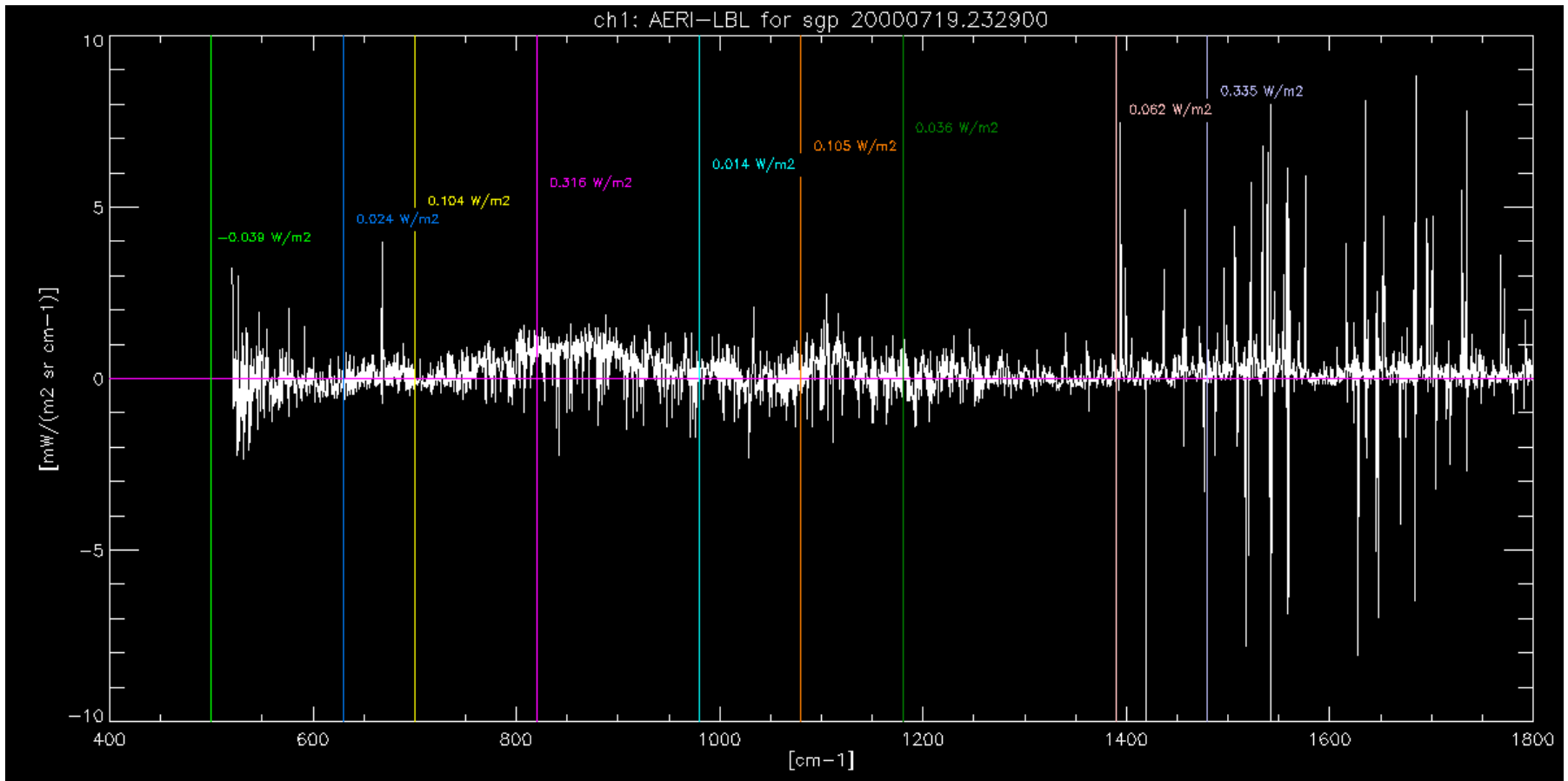
* See also *SPECTRE* paper by Ellingson and Wiscombe (BAMS 1996)

CIRC Phase I cases

obs - LBL

Case	SZA	PWV (cm)	τ_{aer}	LWP (gm^{-2})	LW_{SFC}	LW_{TOA}	SW_{SFC}	SW_{TOA}
SGP 3/17/00	45.5 °	1.90		263.4	1.1%	-3.0%	4.9%	-0.9%
SGP 5/4/00	40.6 °	2.31	0.09		1.0%	-1.2%	-0.1%	-8.7%
SGP 7/19/00	64.6 °	4.85	0.18		0.6%	-1.4%	-1.1%	8.4%
SGP 9/25/00	47.9 °	1.23	0.04		0.4%	-0.5%	0.5%	-3.1%
NSA 5/3/04 (also 2xCO ₂)	55.1 °	0.29	0.13		1.2%	-0.6%	-0.8%	0.7%
PYE 7/6/05	41.2 °	2.42		39.1	0.2%	0.6%	-0.4%	-0.1%

LW QC: Spectral comparison with obs



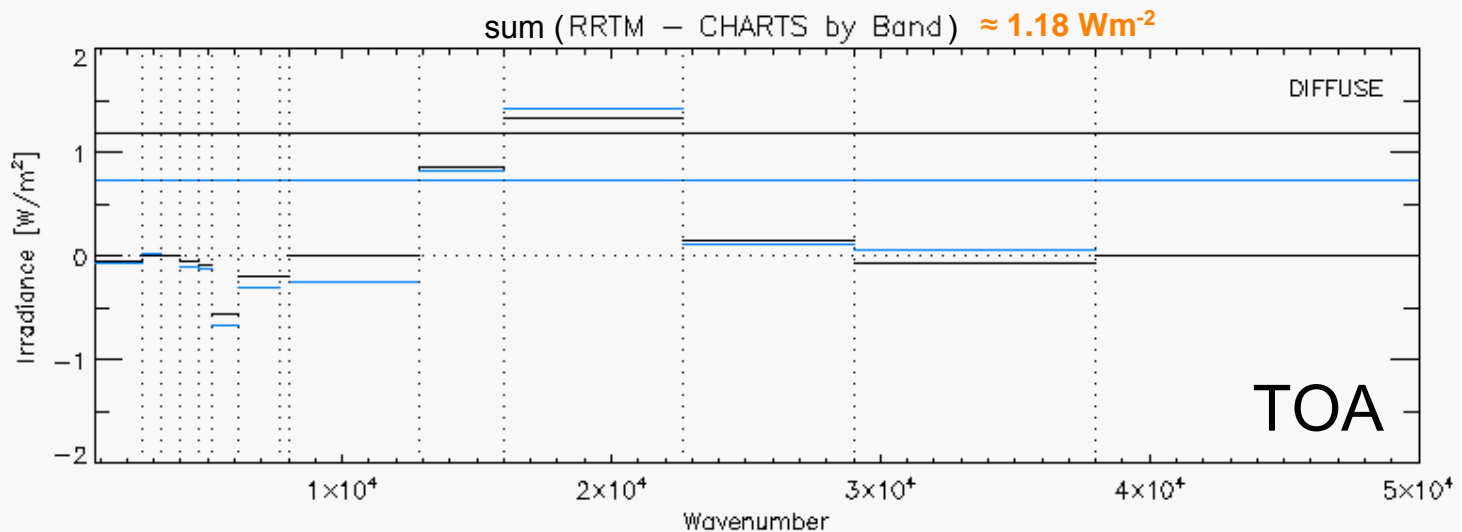
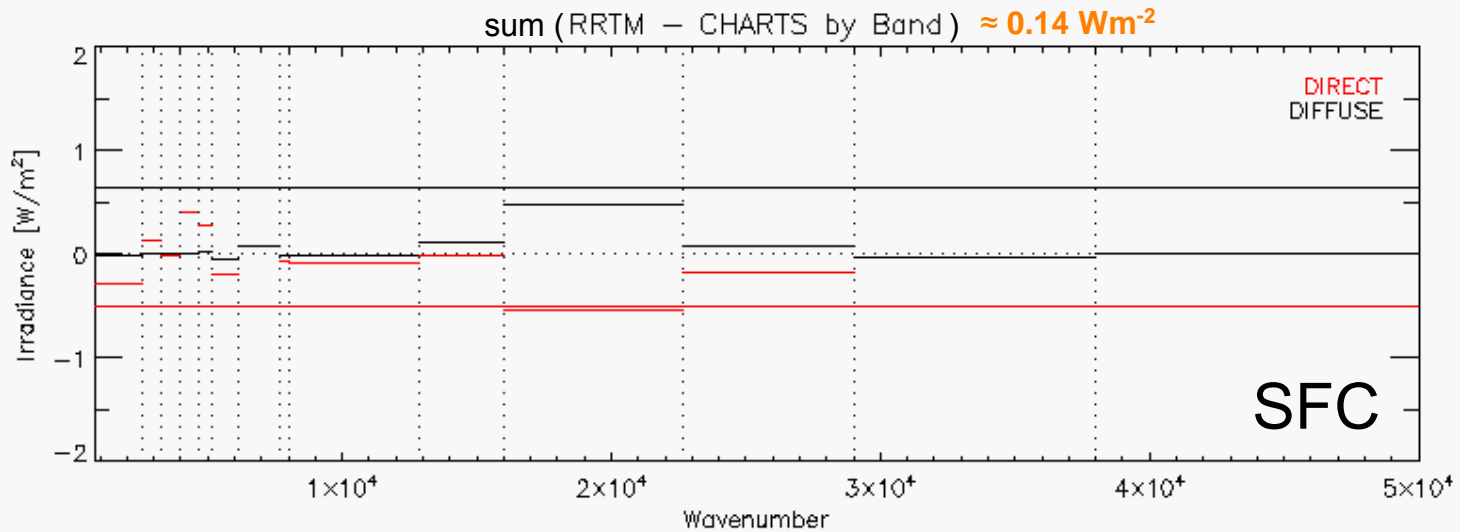
LBLRTM vs AERI

(runs and plot by T. Shippert)

7/19/2000, SGP: Warm and moist

$LW_{TOA} = 292.6$ (LBLRTM), 288.6 (obs)
 $LW_{SFC} = 439.3$ (LBLRTM), 441.8 (obs)

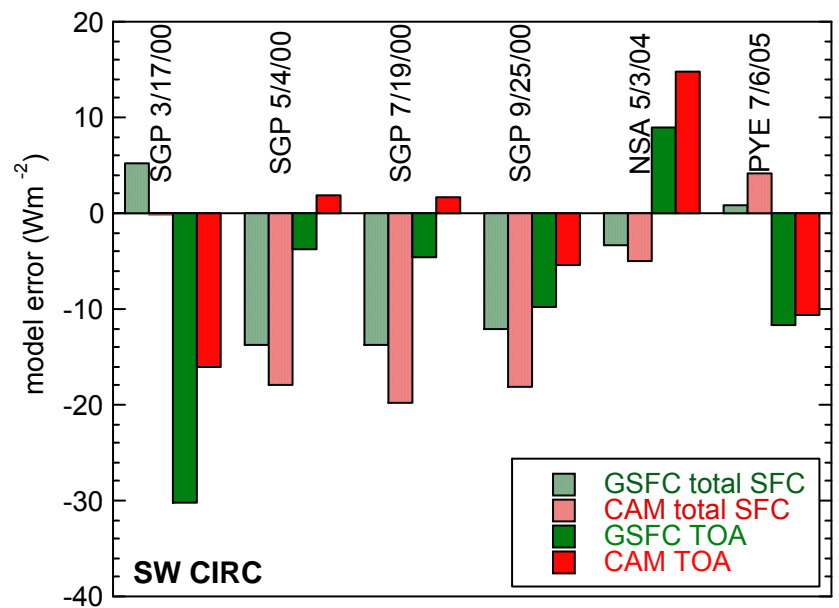
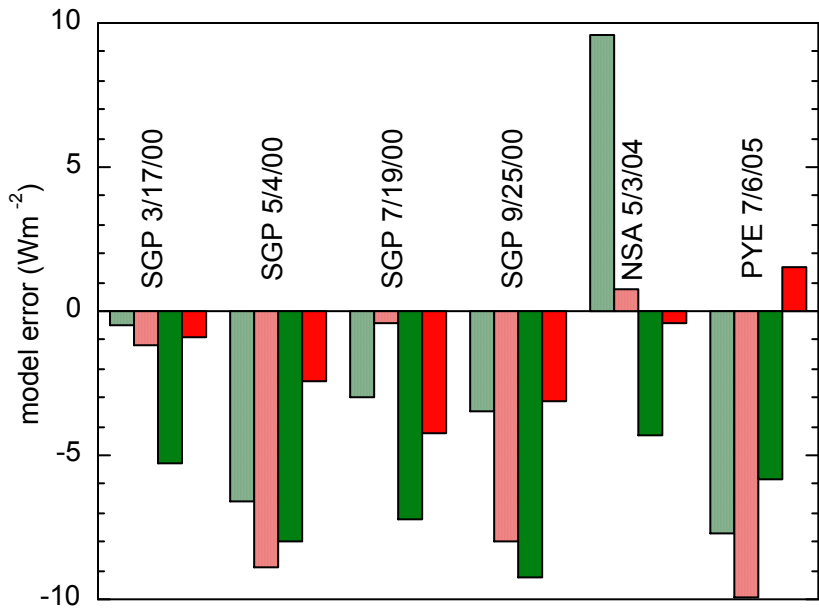
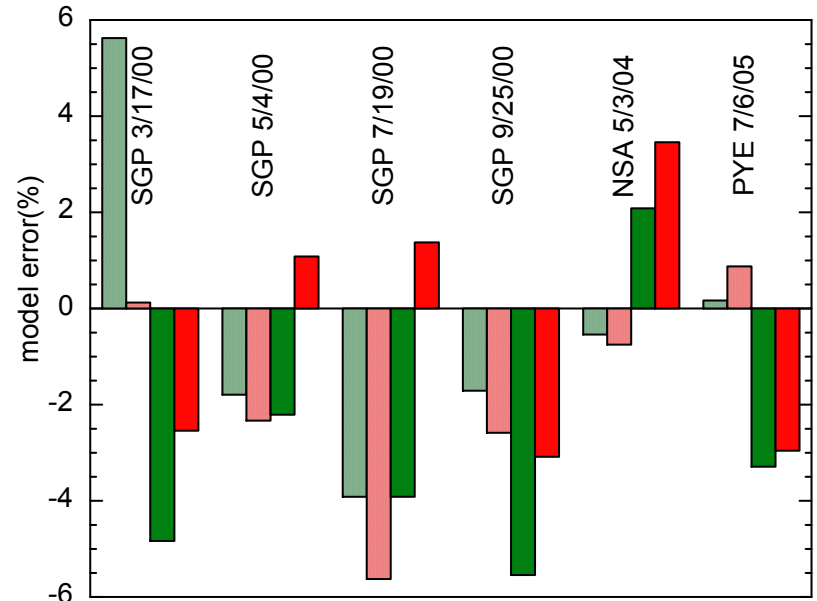
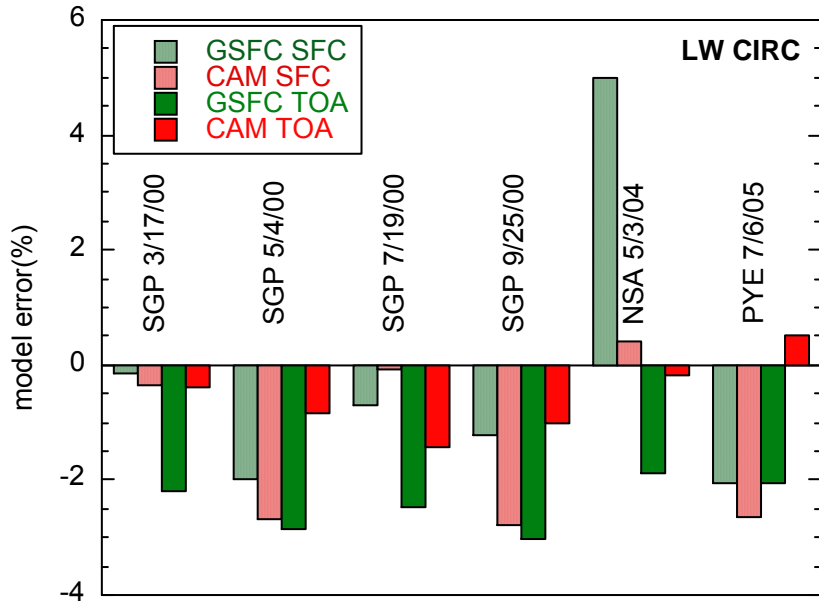
SW QC: Spectral comparison with RRTM



7/19/2000, SGP: Warm and moist

(runs and plots by J. Delamere)

Phase I dry run with two RT codes



CIRC modus operandi (Phase I)

- Input & output (TOA and SFC fluxes at 1 cm^{-1}) and instructions on how to run the cases will be openly available at CIRC website
- Only registered users (considered as formal participants) will enjoy certain privileges:
 - ✓ e-mail notifications about changes, updates, and corrections to the CIRC dataset.
 - ✓ priority to participate in workshops and publications
- Registered users may have to submit results within predetermined deadlines.
- Submitted results and intercomparison analysis will be posted on website
- Implementation details and performances of participating codes will be documented and evaluated

Additional slides

