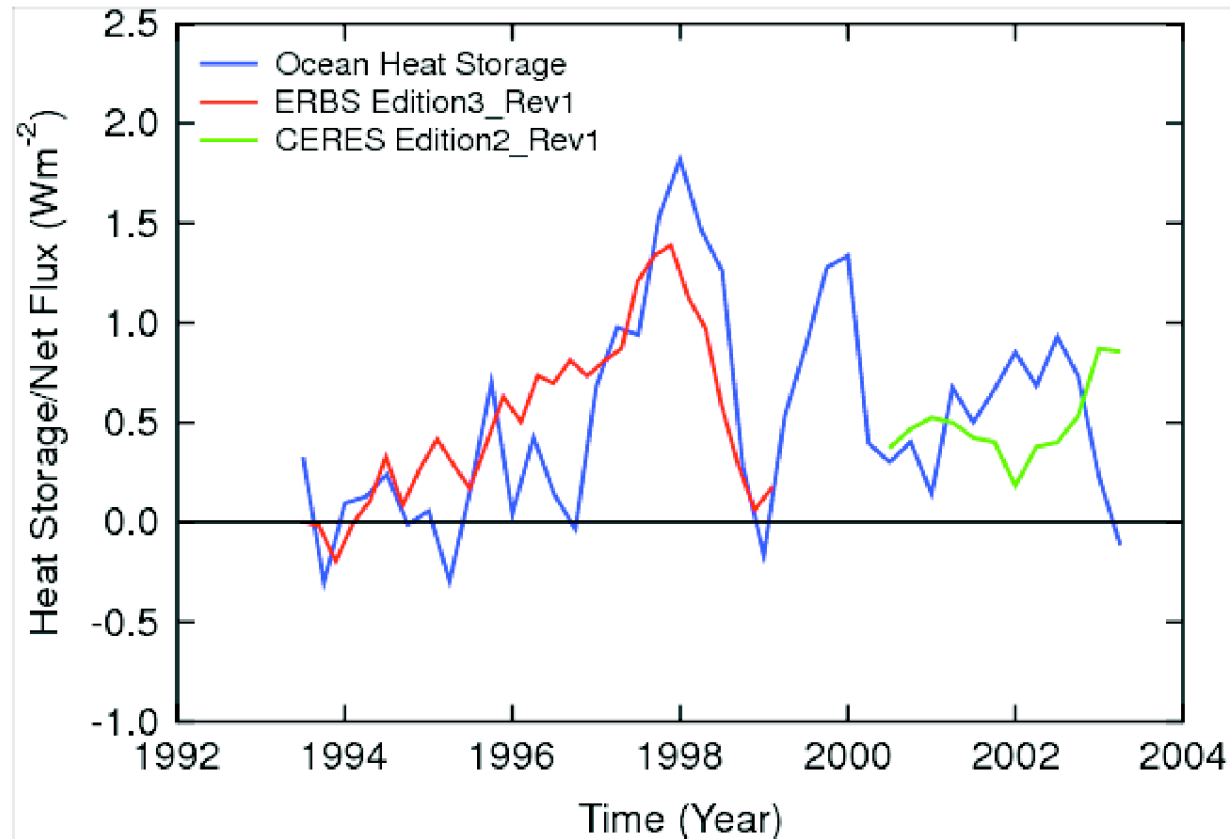


CERES Global Net Radiation: Absolute Accuracy

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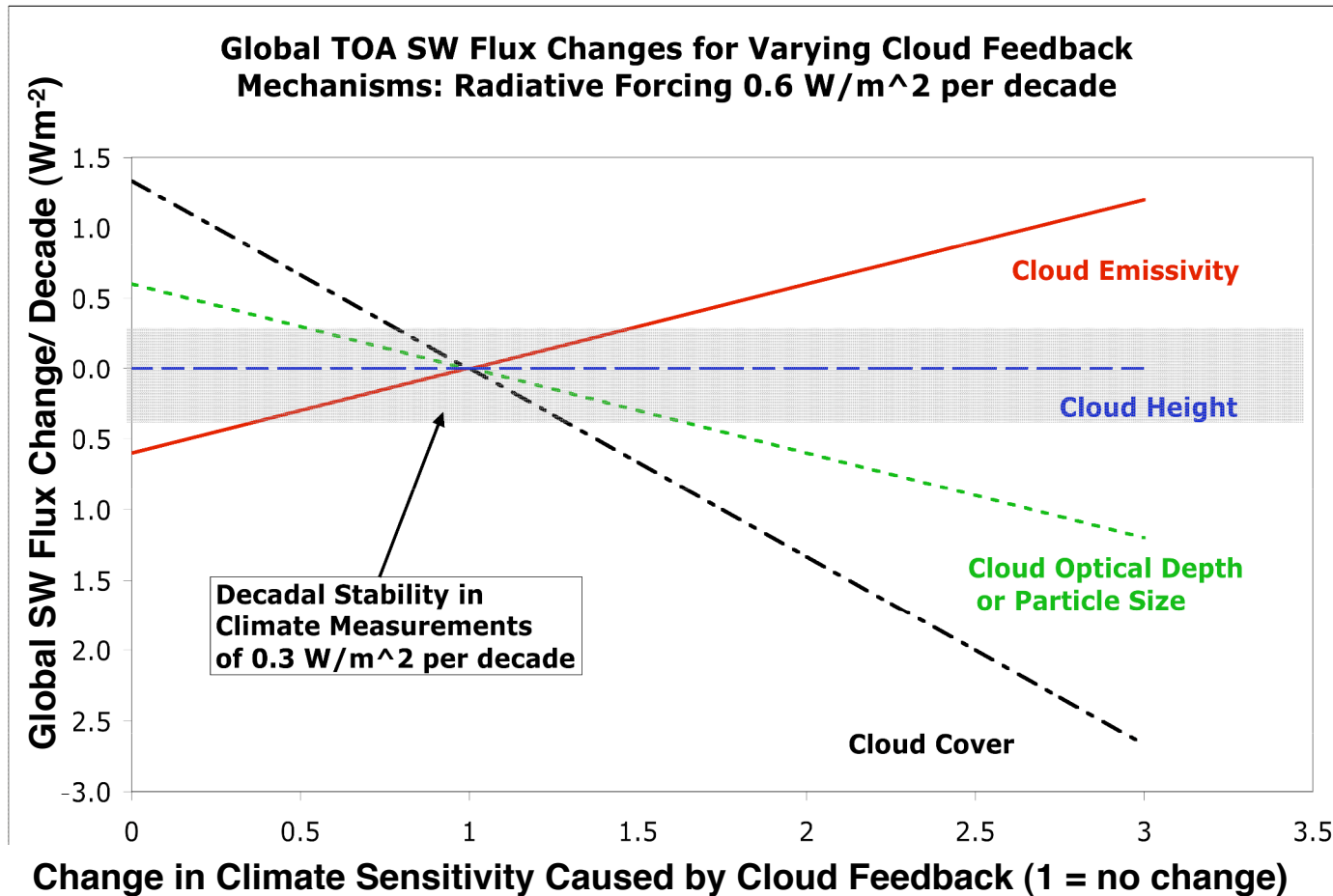
Global Radiation and Ocean Heat Storage: What does it mean?



Decadal variability in ocean heat storage determined by stability not absolute accuracy.

Wong et al., 2005 submitted, J. Climate

How accurate must measurements be to constrain equilibrium global cloud feedback?



Decadal changes in cloud feedback are changes in SW, LW, and Net cloud radiative forcing. To avoid aliasing: keep absolute accuracy within a factor of 5 to 10 of stability: i.e. 1.5 to 3 Wm⁻² (Ohring et al., BAMS, Sept 2005)

So what is the absolute accuracy of global net flux?

- ERBE scanner was about 5 Wm^{-2} (heating) and was within its accuracy bound given calibration (4), angular sampling, and time sampling limitations.
- CERES goal is to reduce individual error sources to 1 Wm^{-2} or less, and total net error to 3 Wm^{-2} or less.

	SW	LW	Net
– calibration (absolute accuracy)	+/- 1.0	+/- 1.0	+/- 2.0
– spectral correction	+/- 0.5	+/- 0.3	+/- 0.8
– spatial sampling	0	0	0
– angle sampling (new ADMs)	+ 0.5	- 0.1	+0.4
– improved reference altitude (20km)	+/- 0.1	+/- 0.2	+/- 0.3
– twilight shortwave flux (adds 0.25)	+ 0.1	0	+ 0.1
– spherical earth near sunset/sunrise	+ 0.3 to 0.7	0	+ 0.3 to 0.7
– cloud optical depth biases (solar zenith albedo)	+ 0.7	0	+ 0.7
– new solar constant (1361 vs 1365)	+ 0 to 1.0	0	+ 0 to 1.0
– time sampling (geo biases) +/- 0.4	+1.0	+ 0.6 to 1.4	
– ocean heat storage constraint (2000-2002)			+ 0.4 to 1.0
– expected range in SRBAVG Ed2D product global net for 2000 to 2002:	-4.0 +/- 3.4	or	-0.6 to 7.4
– Observed CERES ERBE-Like Ed2 (Mar. 2000 to Feb 2002)			+ 3.8
– Observed CERES SRBAVG Ed2B			+ 6.4

What about interannual variability in global net fluxes?

- ERBS WFOV is basically just the Total channel calibration (0.1% or 0.3 W/m^2 over 15 years) plus diurnal sampling noise for 60S to 60N, 5 precession cycles per year. Estimate $\sim 0.3 \text{ Wm}^{-2}$ or better for interannual.
- ERBS active cavity 60N to 60S data is available from late 1999 through current, but needs revised algorithm to account for 15 degree tilt relative to nadir. Proposal to revise, and to continue ERBS overlap with CERES
- What is CERES interannual uncertainty in net flux year to year?
 - Calibration stability dominated: $\sim 0.5 \text{ Wm}^{-2}$ until further testing of RAPS vs crosstrack is carried out.