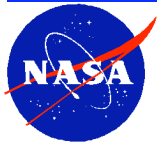


State of U.S. CCSP, NASA EOS, CERES, NPOESS, NPP

B. A. Wielicki

**CERES-II 1st Science Team Meeting
NCAR
March 29-31, 2004**



U.S Climate Change Science Program (CCSP)

- Draft 2 of the CCSP Strategic Plan out: major redraft
- NRC review indicated it was much improved, but no clear funding to implement is a major weakness.
- Observations Working Group (OWG) chartered under CCSP to oversee implementation of:
 - chapter 12 (observations)
 - chapter 13 (data management)
- OWG early activities:
 - co-chairs selected from NOAA and NASA.
 - terms of reference developed and in approval by agencies
 - select early action items to focus on for the first year
 - climate data record risks examined early: gaps (e.g. radiation budget), disappearing data (e.g. paleo corals, tree rings, glaciers).
 - assist with U.S. climate obs input to IWGEO 10-year plan/review.



NIST/NASA/NOAA/NPOESS Satellite Calibration Workshop (11/02)

- Workshop report in press (NIST). Electronic copy available.
- Planned for use by NOAA climate observations as guidance
 - not clear if NPOESS will accept climate calibration/stability metrics as “critical” requirements analogous to weather requirements
- Climate Data Records (CDRs) will be produced separately from EDRs (weather near-real time data) to allow for calibration corrections, drift removal, algorithm constant over time.
- Will be considered by CCSP Observations Working Group as part of climate observation system requirements



NASA Earth Observing System Status

- Terra and Aqua missions working well
- TRMM continues and likely to at least 2006
- GLAS encountered lidar lifetime problems: only a few months so expect little Terra/Aqua coincident data
- CALIPSO lidar design is ok: lower power/temperature design and fully life tested in space conditions (vacuum).
- CALIPSO lidar and Cloudsat radar expected to launch 4/05 and fly in formation with Aqua mission: CERES, AIRS/AMSU, AMSR
- Aqua MHB instrument failed shortly after launch other Aqua fine
- All Terra instruments and spacecraft fine.
- Aura to be launched 2004.
- Next ESSPs selected: land soil moisture and ocean salinity



CERES Program Status

- Recompetition of EOS mission algorithms/science in FY03.
- CERES algorithm proposal received “A”s on all science and technical areas, but questioned on budget levels: entire proposal had to fit in 40 pages, so budget detail sacrificed.
- Selected for CERES-II algorithm team to complete data products, but budget cuts of 10% in FY03 and further 20% in FY04, followed by additional 5%/yr thereafter. 20% staff reductions in FY03/04.
- Full cost accounting implementation: lots of chaos.
- Added CERES Co-Is from science investigations: 40 total including algorithm/qc/validation team.



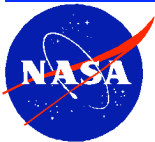
NPOESS status

- Merged NOAA/DoD weather satellite system
- Also to be used for Climate Data Records
- Copies of CERES called ERBS (Earth Radiation Budget Sensor) to be flown in the 1:30pm sunsynchronous orbit
- ERBS launch in 2011
- Plan is to use CERES SSF and CRS data products in near real time for EDRs (weather quality data for TOA and surface fluxes)
- CERES team working with Raytheon to convert code.
- Later re-analyze into Climate Data Records (CDRs) but not clear if NASA or NOAA will fund CDRs. Will likely vary with climate variable.
- For ERBS processing and distribution of CDRs may happen on LaRC Atmospheric Sciences Data Center.
- NPOESS archive at NOAA currently planned to be run by NESDIS. May be a challenge with weather versus climate priorities/requirements

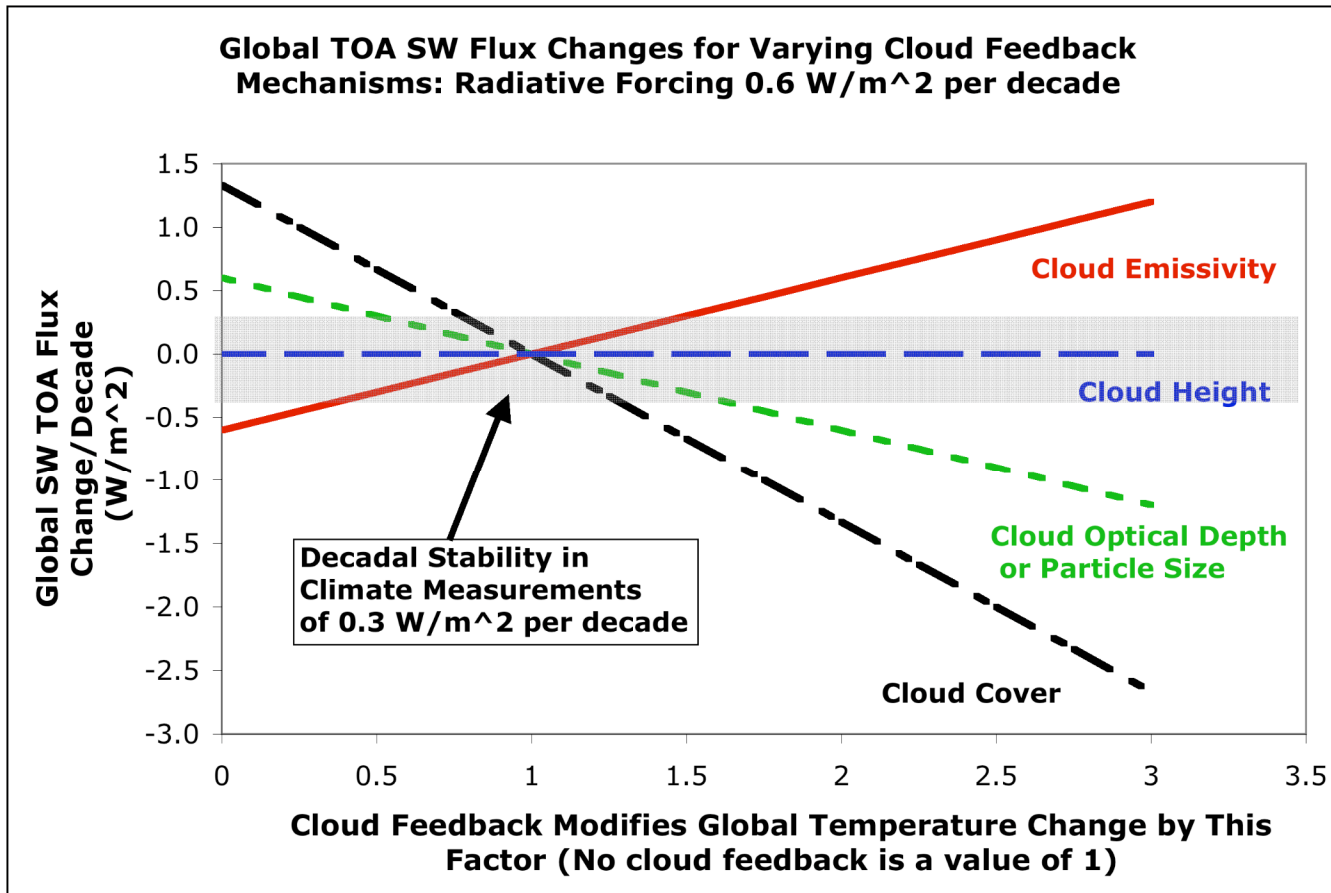


NPP Status

- Gap risk from CERES on Aqua/Terra nominal lifetime to 2008 versus NPOESS launch in 2011. Gap risk estimated from past instrument and spacecraft lifetimes at 50%.
- Gap issue is overlap and intercalibration: instrument stability greatly exceeds absolute accuracy (analogous to solar constant)
 - Absolute calibration: 1% SW, 0.5% LW, so non-overlapped data can permit changes of up to 2 Wm² SW flux, and 2.5 Wm⁻² LW flux
 - CERES stability/decade estimated at ~ 0.5% SW and 0.2% LW
 - Radiative forcing (IPCC) ~ 0.6 Wm⁻² per decade
 - 50% net cloud feedback is ~ 0.3 Wm⁻² per decade change in CRF.
 - CERES stability controls uncertainty in decadal CRF change to SWCF = 50*0.005 = 0.25 Wm⁻², LWCF = 30*0.002 = 0.06 Wm⁻², NetCF = 0.25 Wm⁻².
 - Without overlap uncertainty bound is:
SWCF = 50*0.02 = 1 Wm⁻², LWCF = 30*0.01 = 0.3 Wm⁻² LWCF,
NetCF = 1.3 Wm⁻²



How does cloud feedback uncertainty map into climate measurement requirements?



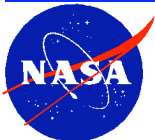
Answer:
Varies with:

Radiative Flux

Cloud
Property
Changing

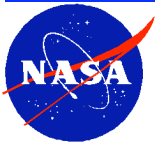
SWCF/LWCF
Change

Global Mean
Clouds Shown
Here



NPP Status Continued

- CERES has one more instrument copy in storage
- NASA studied cost/implementation of adding CERES FM-5 to the NPP gap filling mission with launch late 2006, 6-year lifetime
- Summer, 2004 NASA added CERES FM-5 to NPP, concluded cost would be factor of 3 less than launching on its own smallsat, and factor of 10 less than original CERES development effort per year of global data.
- Fall, 2004 NASA's ESE budget took reductions in the new exploration program, and had cost over-runs on new missions
 - removed CERES copy from NPP mission
 - delayed Global Precipitation Mission 2 years
 - eliminated ocean scatterometer gap mission.



NPP Status Continued

- Requirement to avoid climate record gaps, especially for calibration in records such as radiation budget:
 - CCSP Chapter 12 (2003)
 - Global Climate Observing System 2nd Adequacy Report (2003)
 - Several recent previous NRC reports
- GEWEX Radiation Panel recommending to eliminate 50% gap risk (2002, re-iterated in 2003)
- U.S. CLIVAR planning similar recommendation
- Will be considered by new CCSP OWG in next 2 months
- Likely 6 month or longer delay in NPP: NPOESS imager and sounder development behind original schedule.
- Train has left the station slowly and we are now running after it!
- Can we get a climate modeling community statement as users?

