

CERES/Aqua Edition1 Vs. CERES/Terra Edition2 ERBE-like TOA Fluxes

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Objectives

- Compare CERES/Aqua Edition1 and CERES/Terra Edition2 ERBE-like TOA Fluxes: Regional, Zonal, and Global Scale; Monthly and Annual Mean.
- Examine the Effects of Temporal Sampling On ERBE-like Radiation Fields: Terra (10:30 am) Vs. Aqua (1:30 pm)

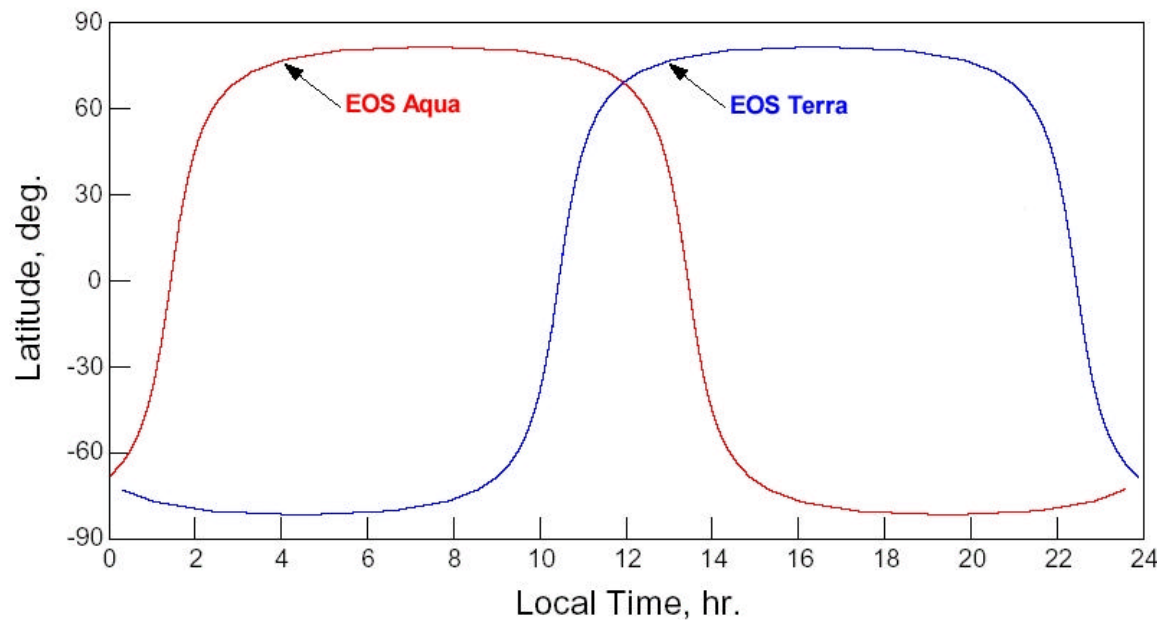


Datasets

- CERES/Aqua Edition1 and CERES/Terra Edition2 ERBE-like Dataset (7/2002 To 6/2003) → Latest Data Containing Instrument Drift Correction
- Extracted All-sky and Clear-sky Fluxes
- Combined FM1 and FM2 Data to Form A Single Terra Dataset
- Combined FM3 and FM4 Data to Form A Single Aqua Dataset



Terra (10:30am) and Aqua (1:30pm) Orbit



N.H. Polar Regions: Aqua (am), Terra (pm)

Both Orbits overlap at Near Noon and Midnight at Polar Regions

SW Temporal Sampling Differences Increase from North to South; Greatest in S.H.



Monthly Mean Comparisons



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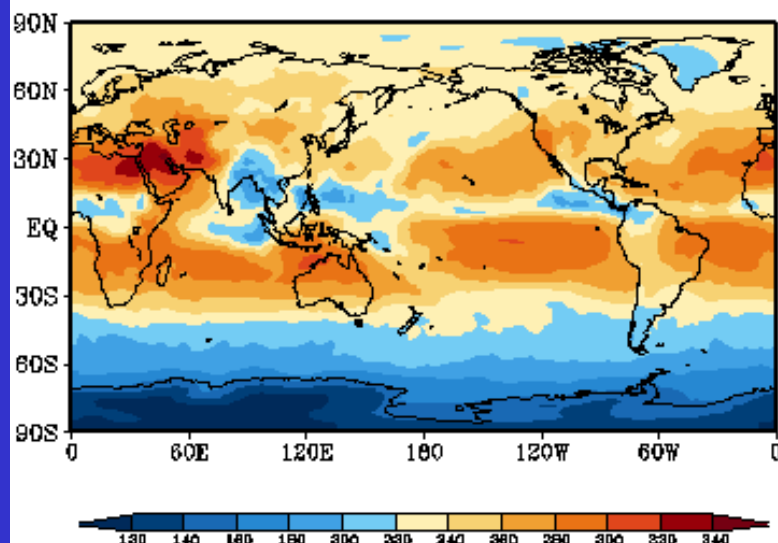


Terra and Aqua Longwave Flux, July 2002

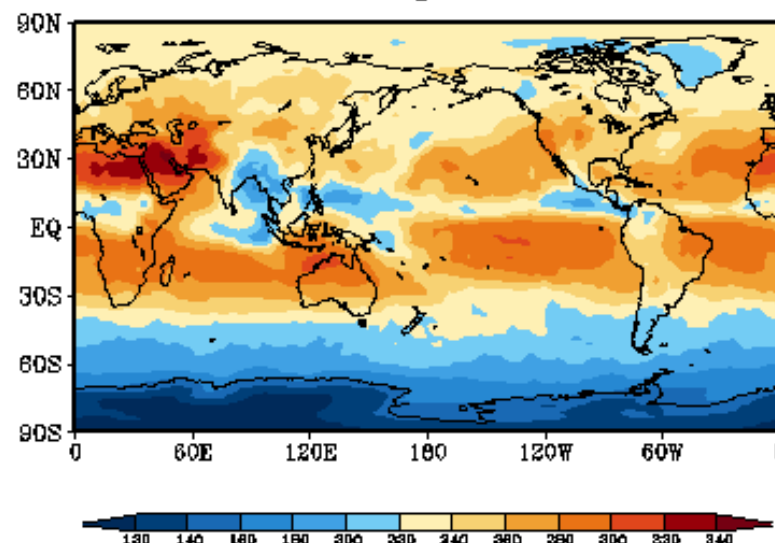
CERES All-sky Outgoing Longwave Radiation

July 2002

Terra



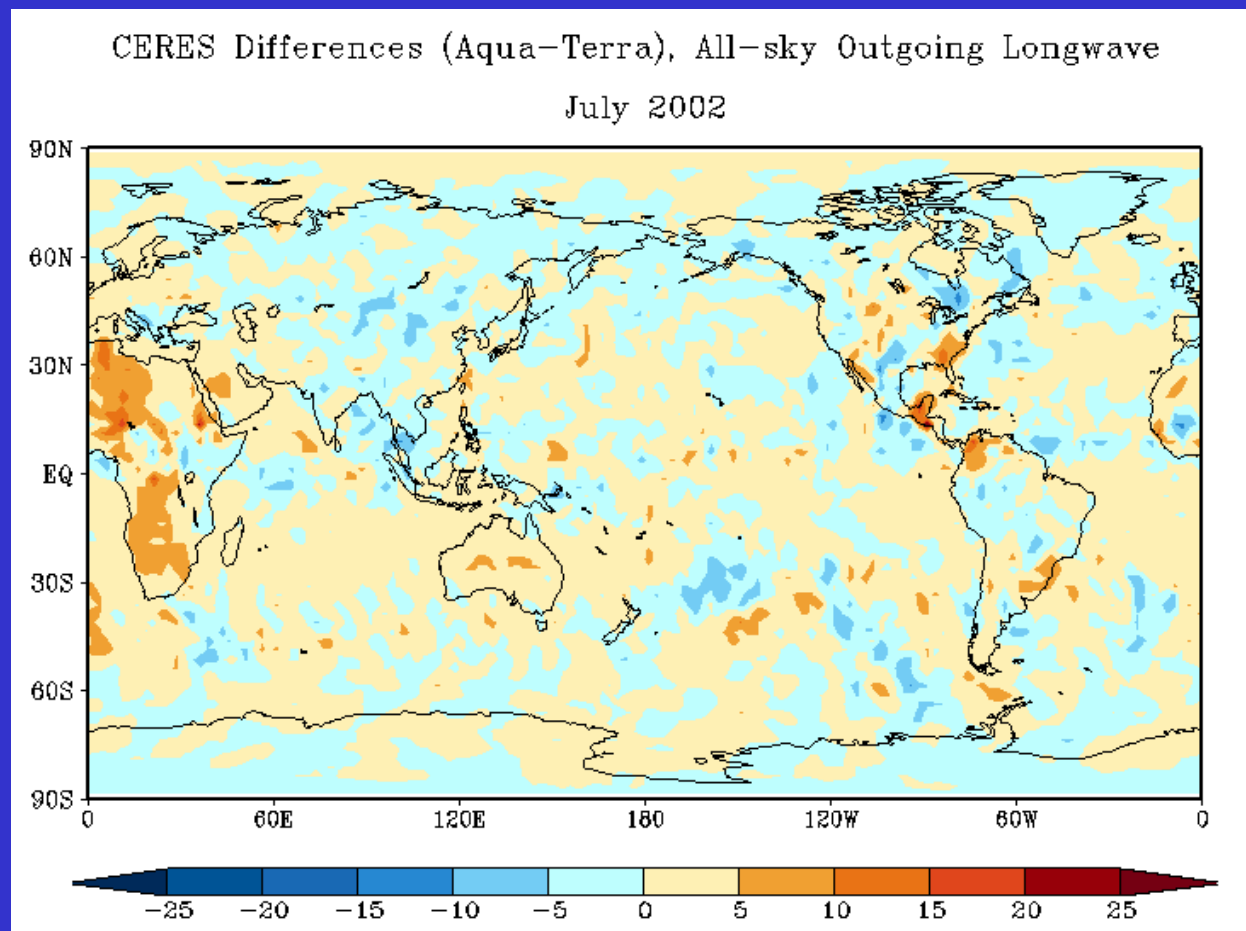
Aqua



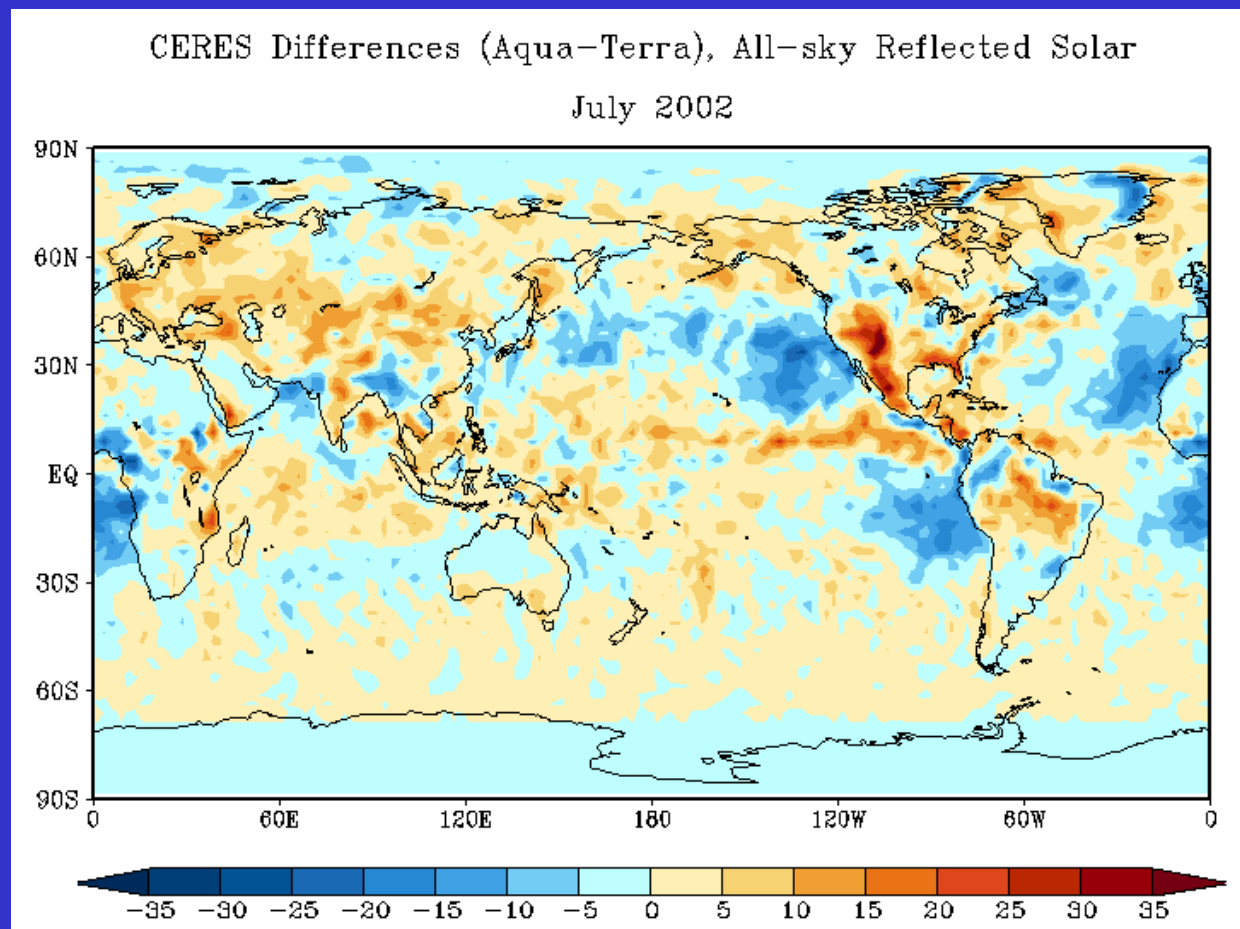
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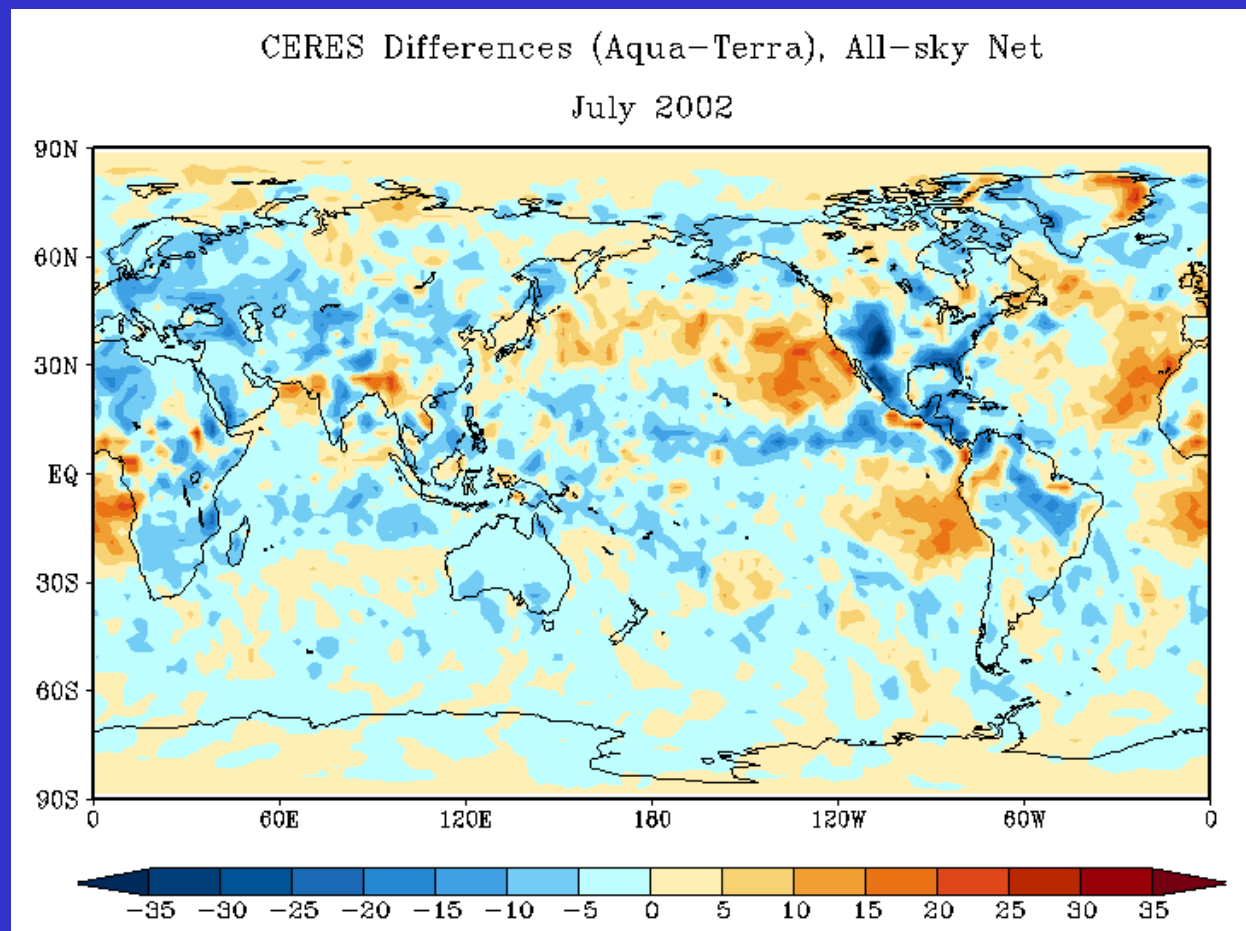
Aqua - Terra LW Differences, July 2002



Aqua - Terra SW Differences, July 2002

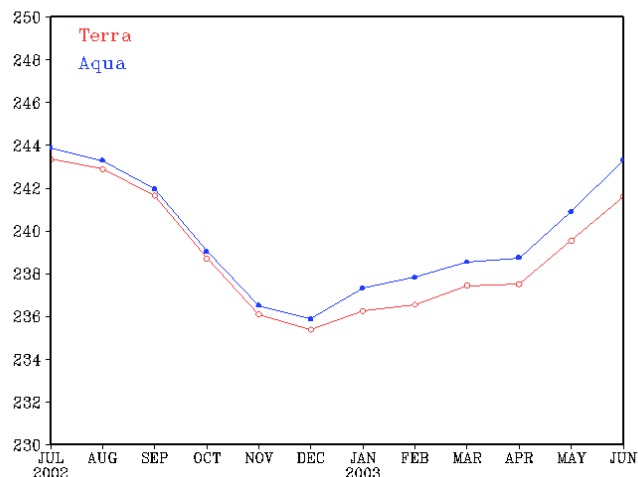


Aqua - Terra Net Differences, July 2002

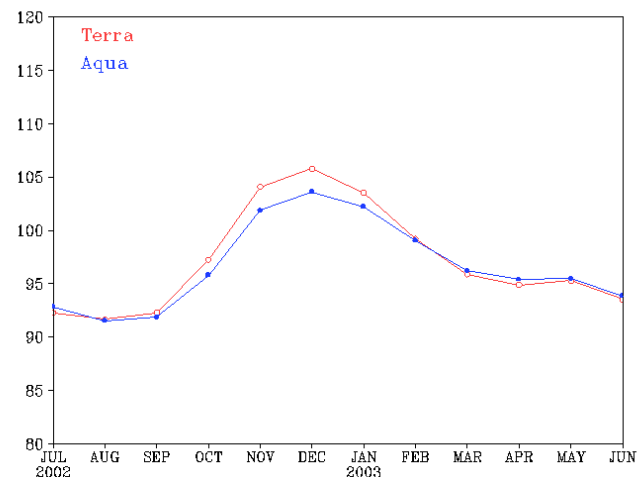


Time Series of Global Mean Fluxes

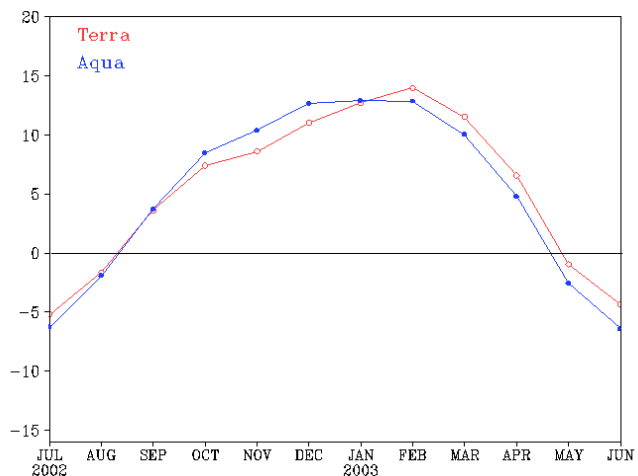
CERES Global Mean All-sky Outgoing Longwave
July 2002 to June 2003



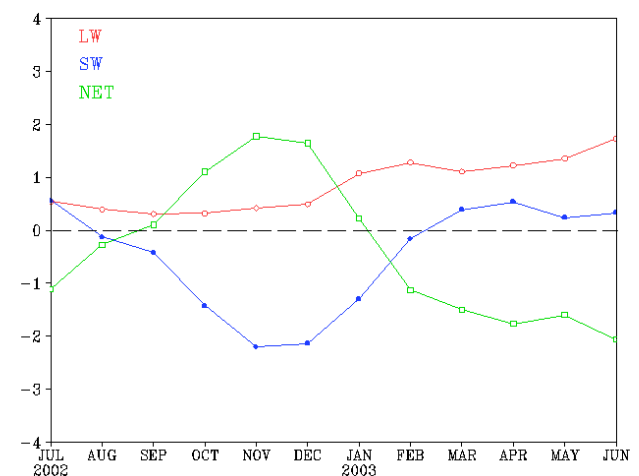
CERES Global Mean All-sky Reflected Solar
July 2002 to June 2003



CERES Global Mean All-sky Net
July 2002 to June 2003

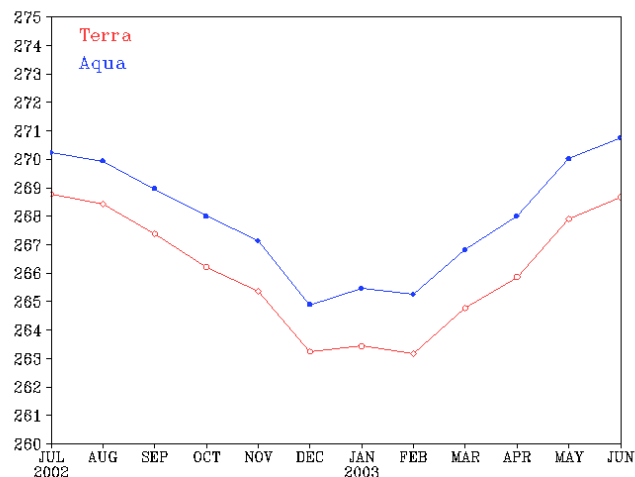


CERES Global Mean All-sky Flux Differences (Aqua-Terra)
July 2002 to June 2003

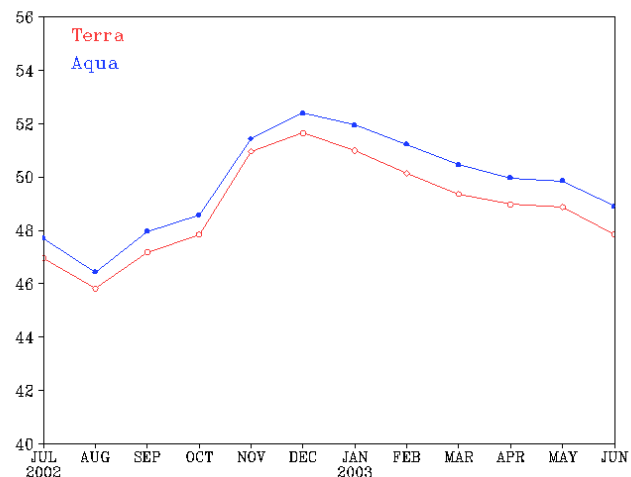


Time Series of Global Mean Clear Fluxes

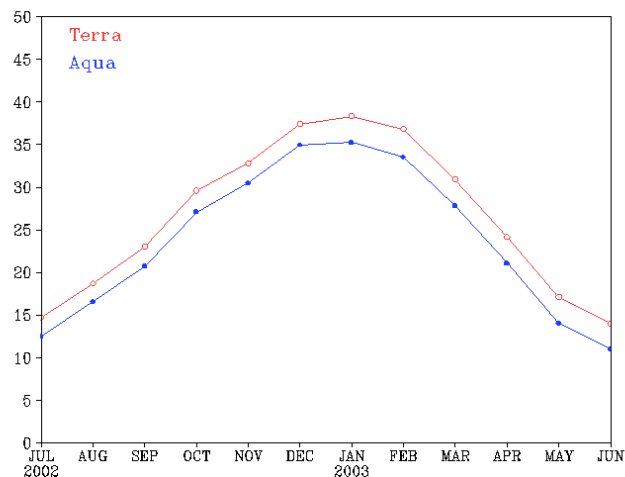
CERES Global Mean Clear-sky Outgoing Longwave
July 2002 to June 2003



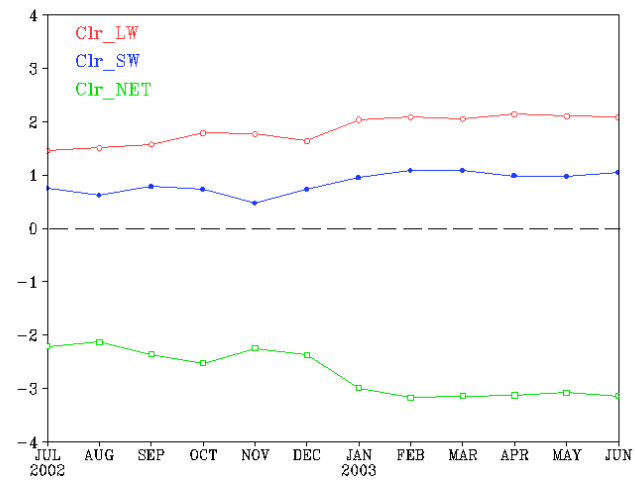
CERES Global Mean Clear-sky Reflected Solar
July 2002 to June 2003



CERES Global Mean Clear-sky Net
July 2002 to June 2003

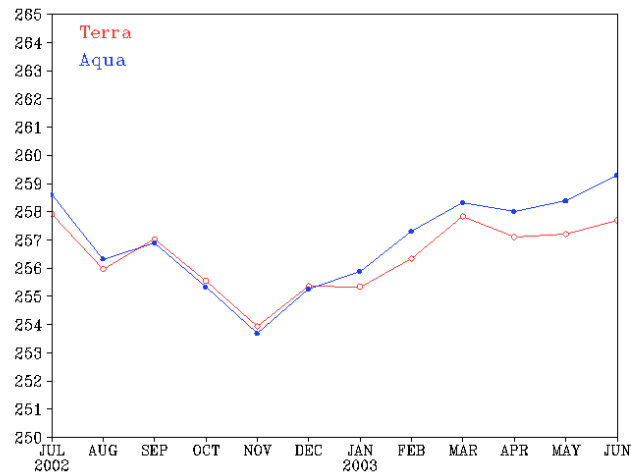


CERES Global Mean Clear-sky Flux Differences (Aqua-Terra)
July 2002 to June 2003

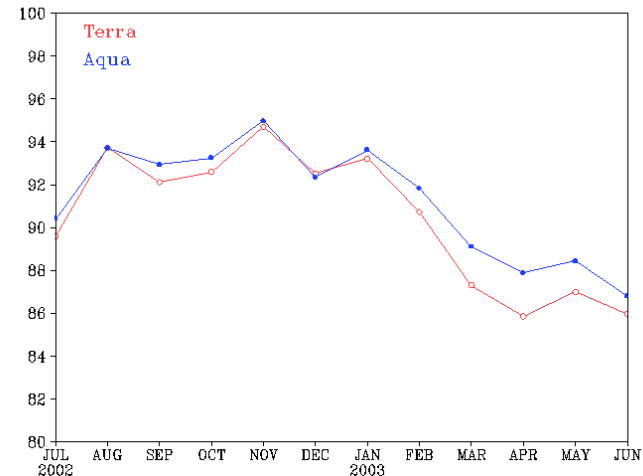


Time Series of Tropical Mean Fluxes

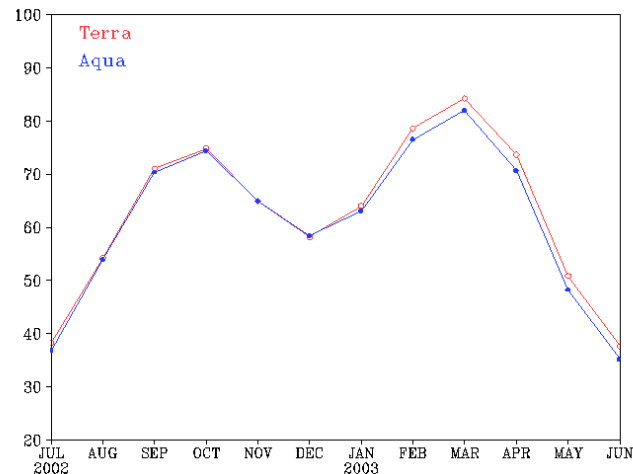
CERES Tropical Mean All-sky Outgoing Longwave
July 2002 to June 2003



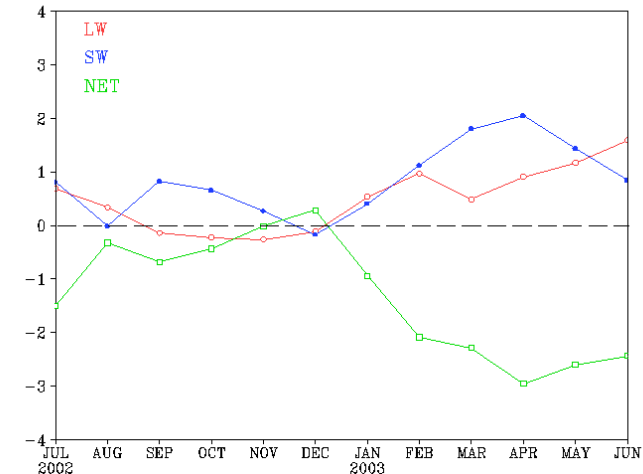
CERES Tropical Mean All-sky Reflected Solar
July 2002 to June 2003



CERES Tropical Mean All-sky Net
July 2002 to June 2003

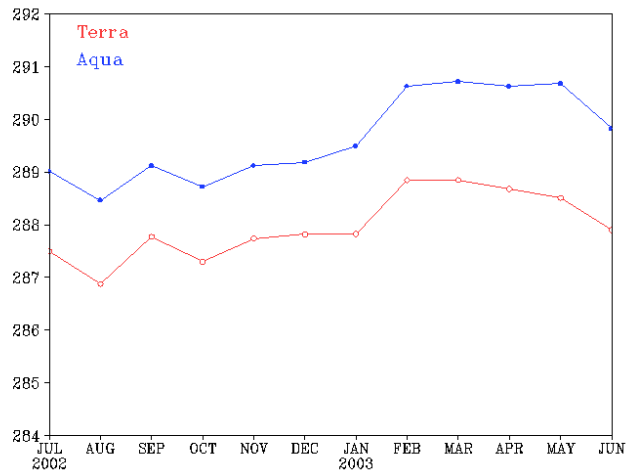


CERES Tropical Mean All-sky Flux Differences (Aqua-Terra)
July 2002 to June 2003

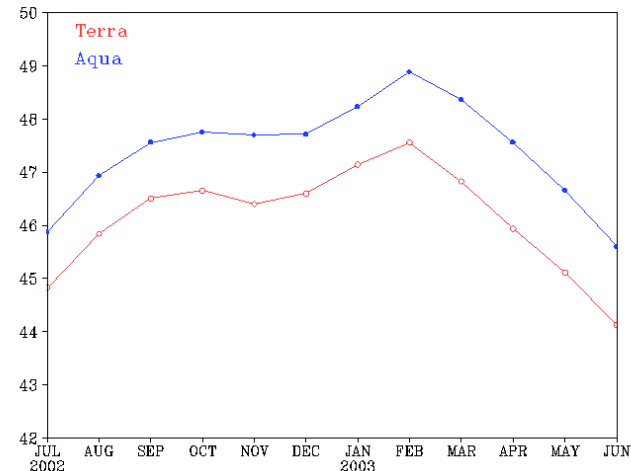


Time Series of Tropical Mean Clear Fluxes

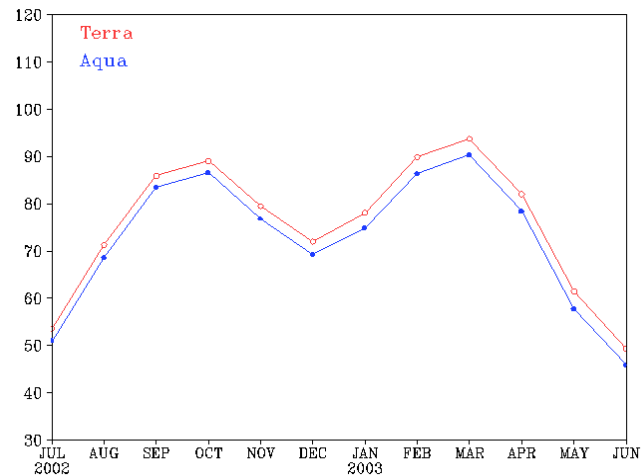
CERES Tropical Mean Clear-sky Outgoing Longwave
July 2002 to June 2003



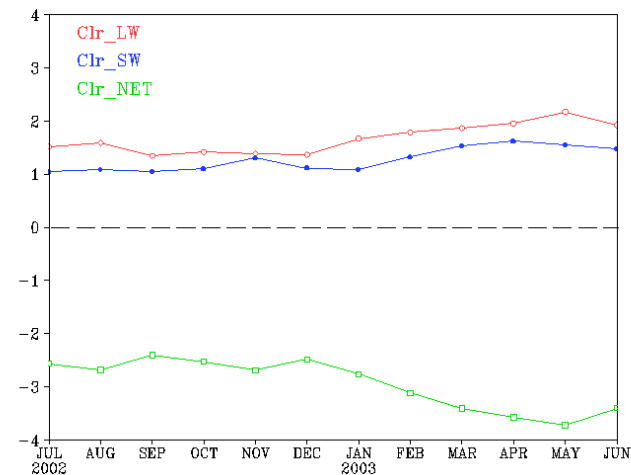
CERES Tropical Mean Clear-sky Reflected Solar
July 2002 to June 2003



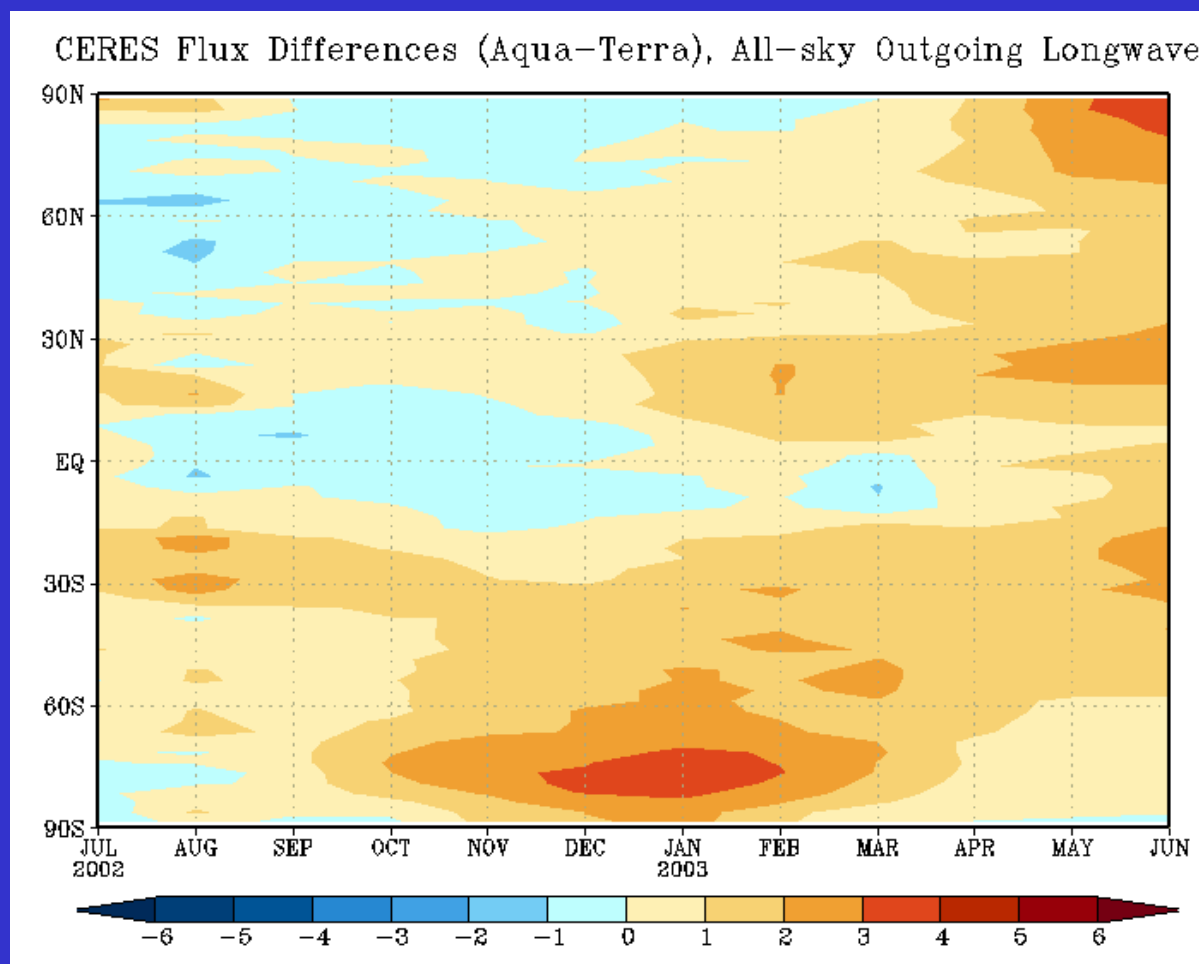
CERES Clear Mean Clear-sky Net
July 2002 to June 2003



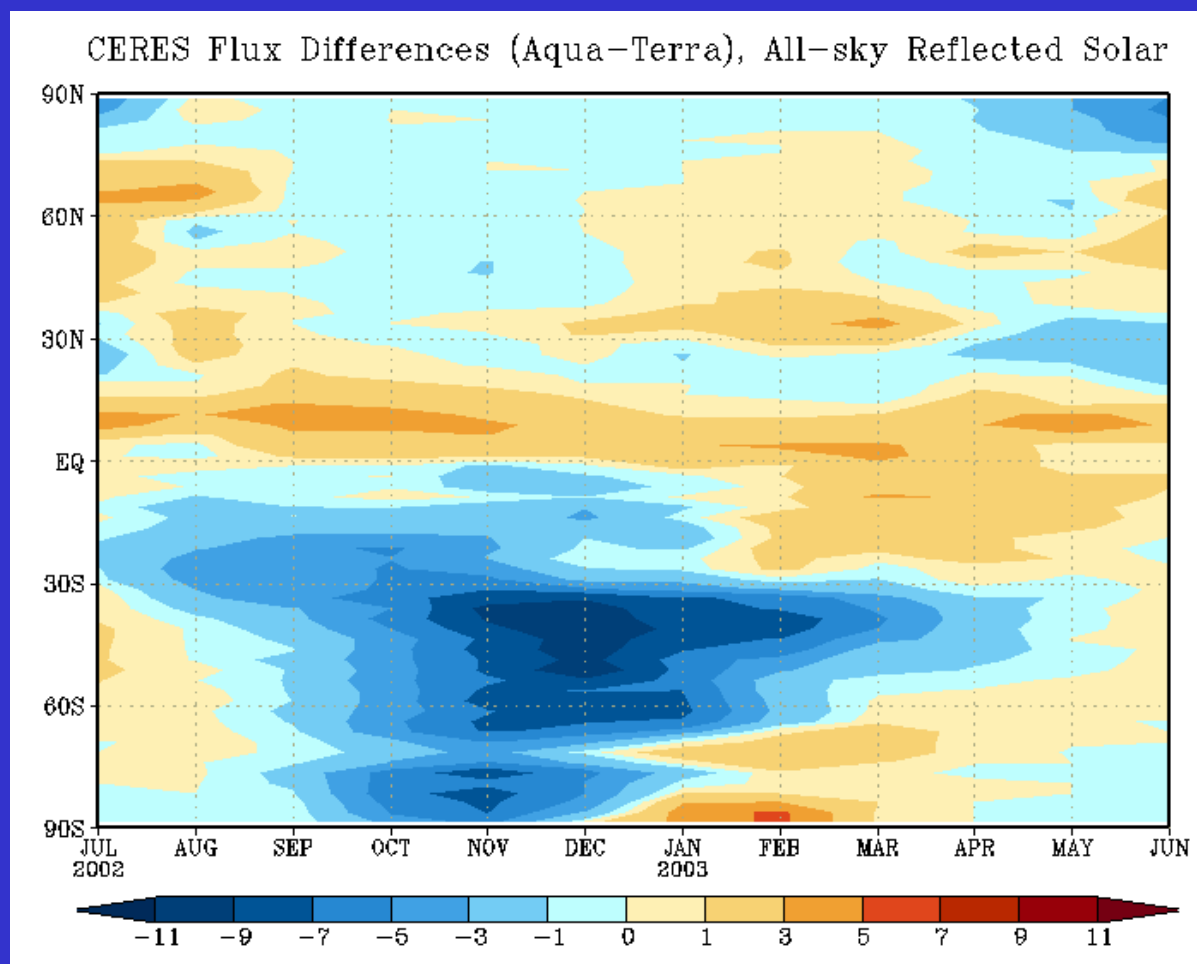
CERES Tropical Mean Clear-sky Flux Differences (Aqua-Terra)
July 2002 to June 2003



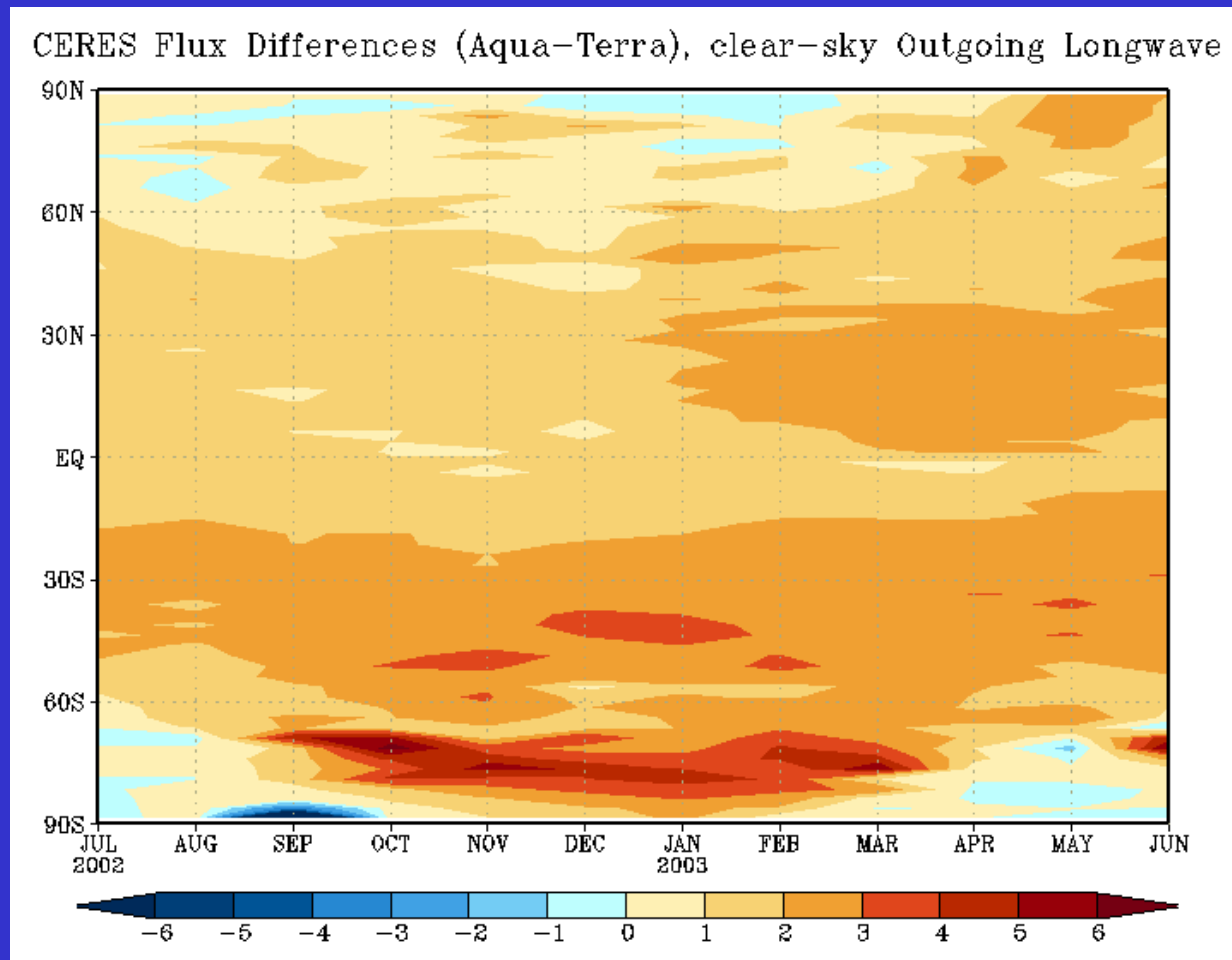
Aqua - Terra Zonal Mean LW Differences



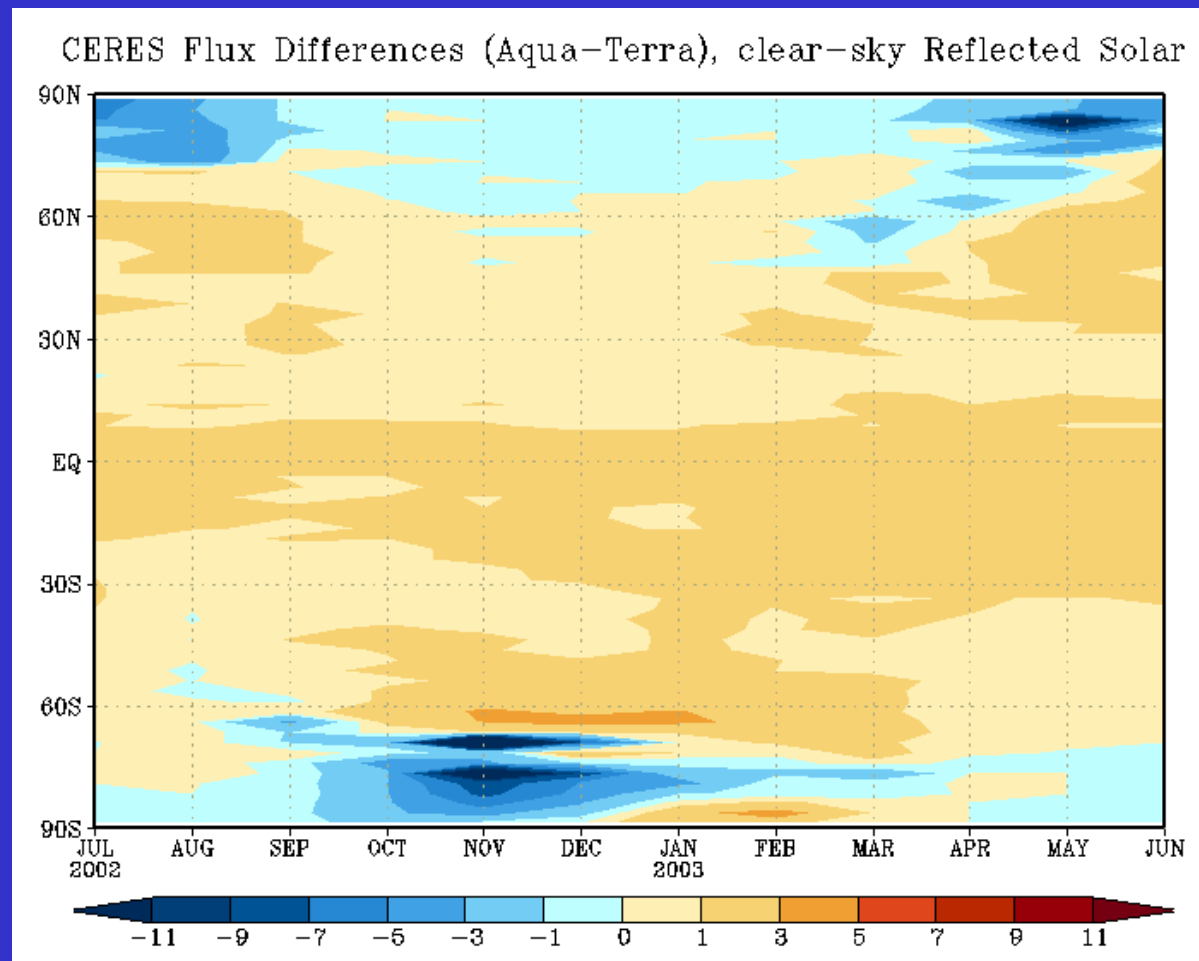
Aqua - Terra Zonal Mean SW Differences



Aqua - Terra Zonal Mean Clr LW Differences



Aqua - Terra Zonal Mean Clr SW Differences



Annual Mean Comparisons



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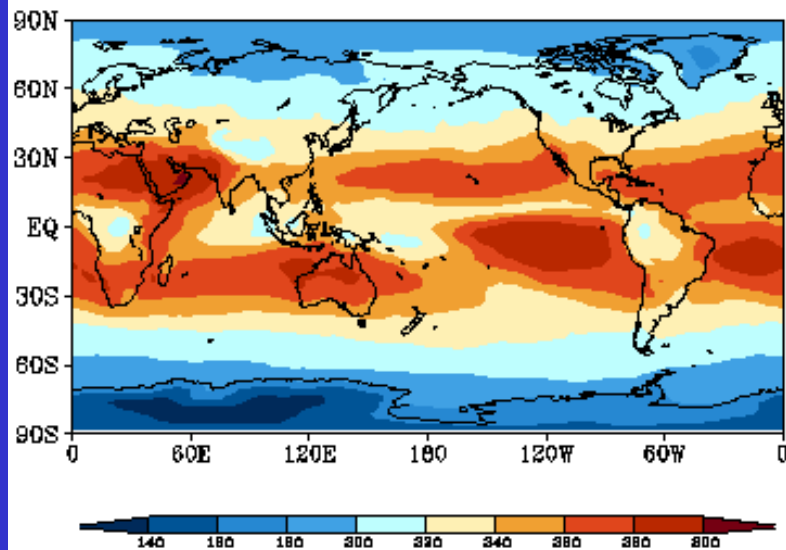


Terra and Aqua Longwave Flux

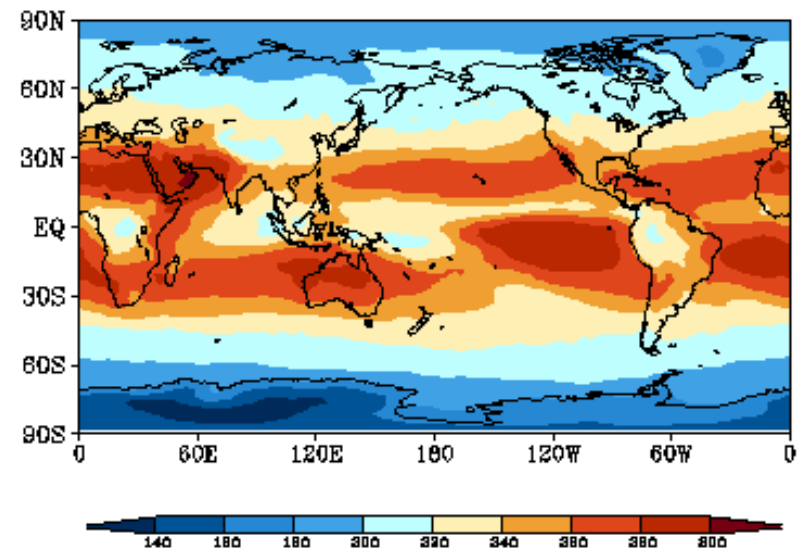
CERES All-sky Outgoing Longwave Radiation, Annual Mean

July 2002 to June 2003

Terra



Aqua

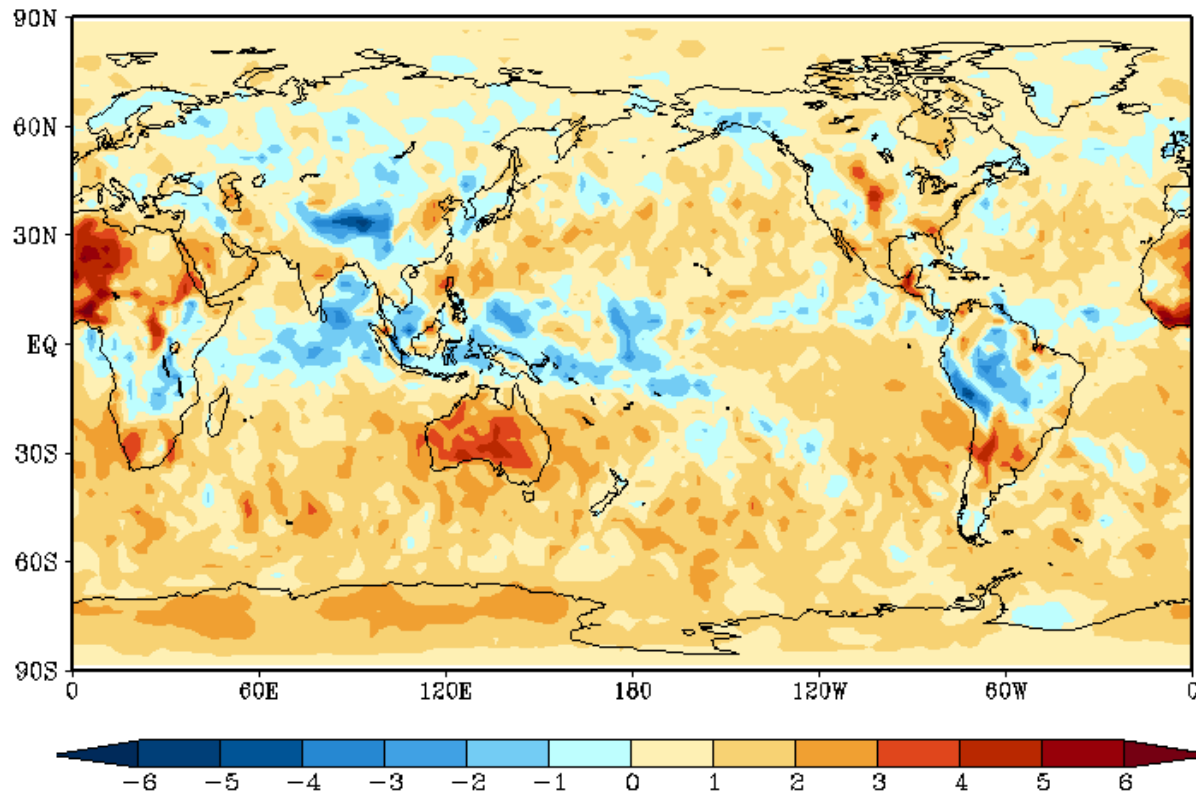


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Aqua - Terra LW Differences

CERES Annual Mean Differences (Aqua-Terra), All-sky Outgoing Longwave
July 2002 to June 2003



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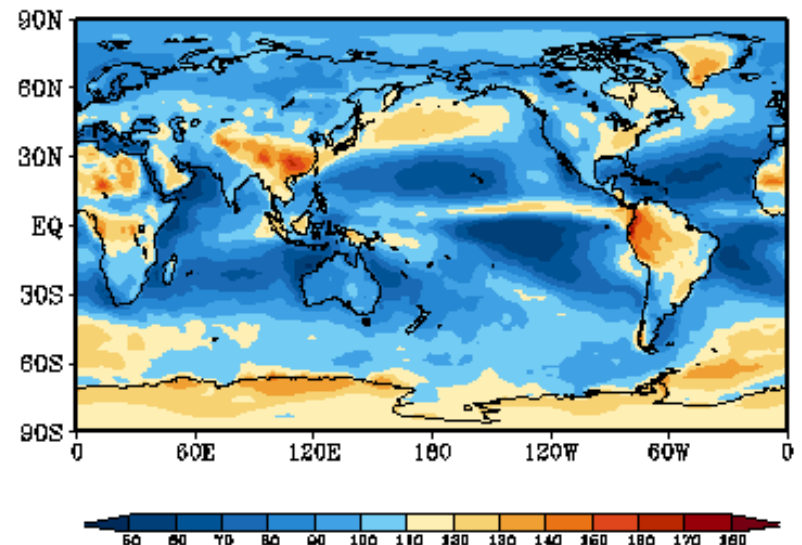
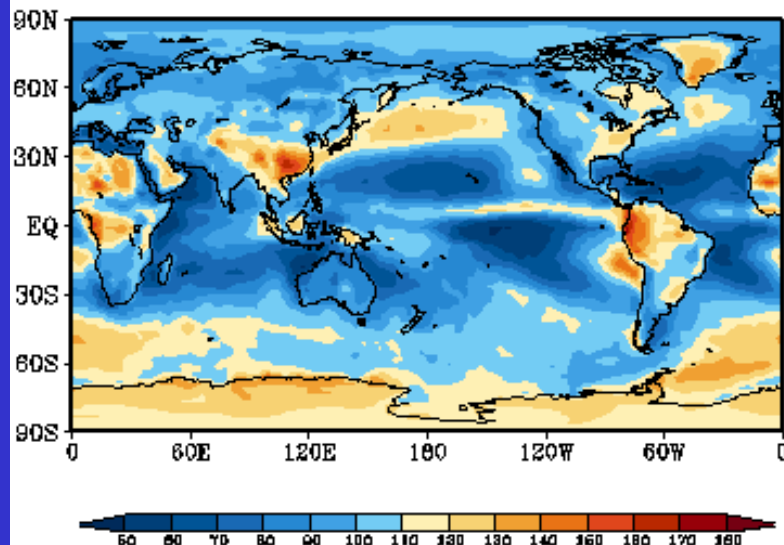
Terra and Aqua Shortwave Flux

CERES All-sky Reflected Solar Radiation, Annual Mean

July 2002 to June 2003

Terra

Aqua

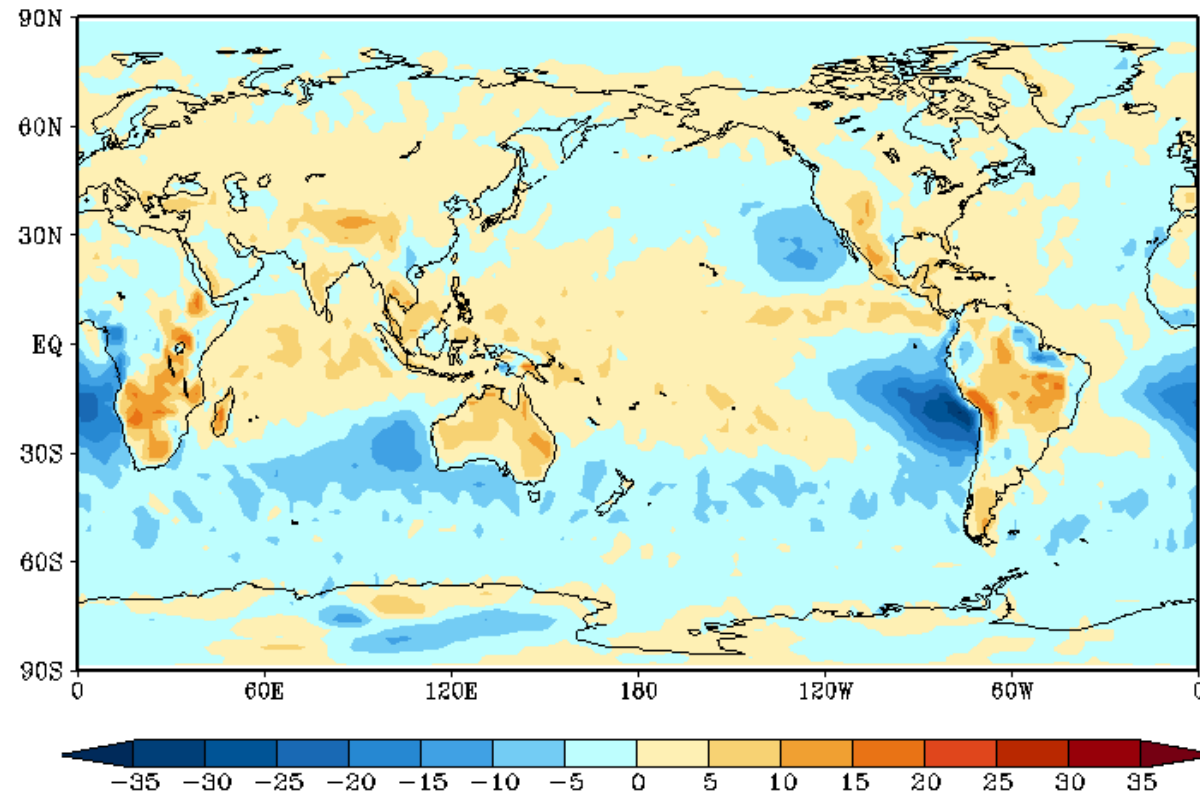


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Aqua - Terra SW Differences

CERES Annual Mean Differences (Aqua-Terra), All-sky Reflected Solar
July 2002 to June 2003



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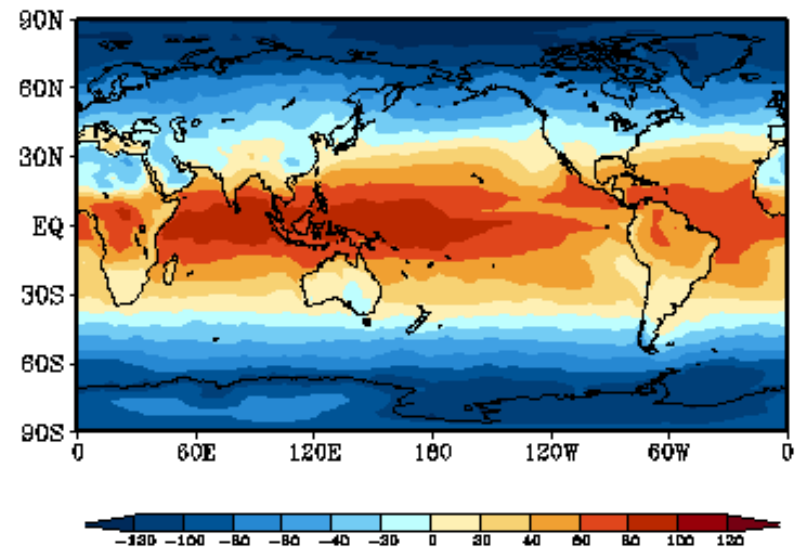
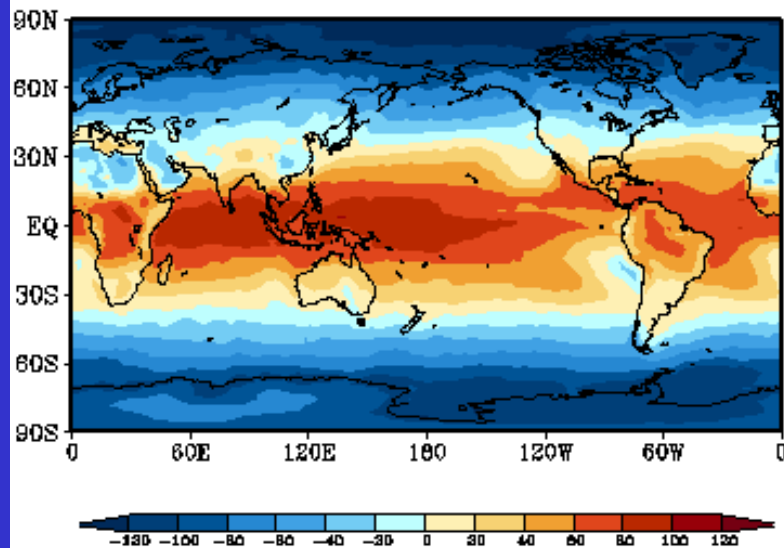
Terra and Aqua Net Flux

CERES All-sky Net Radiation, Annual Mean

July 2002 to June 2003

Terra

Aqua

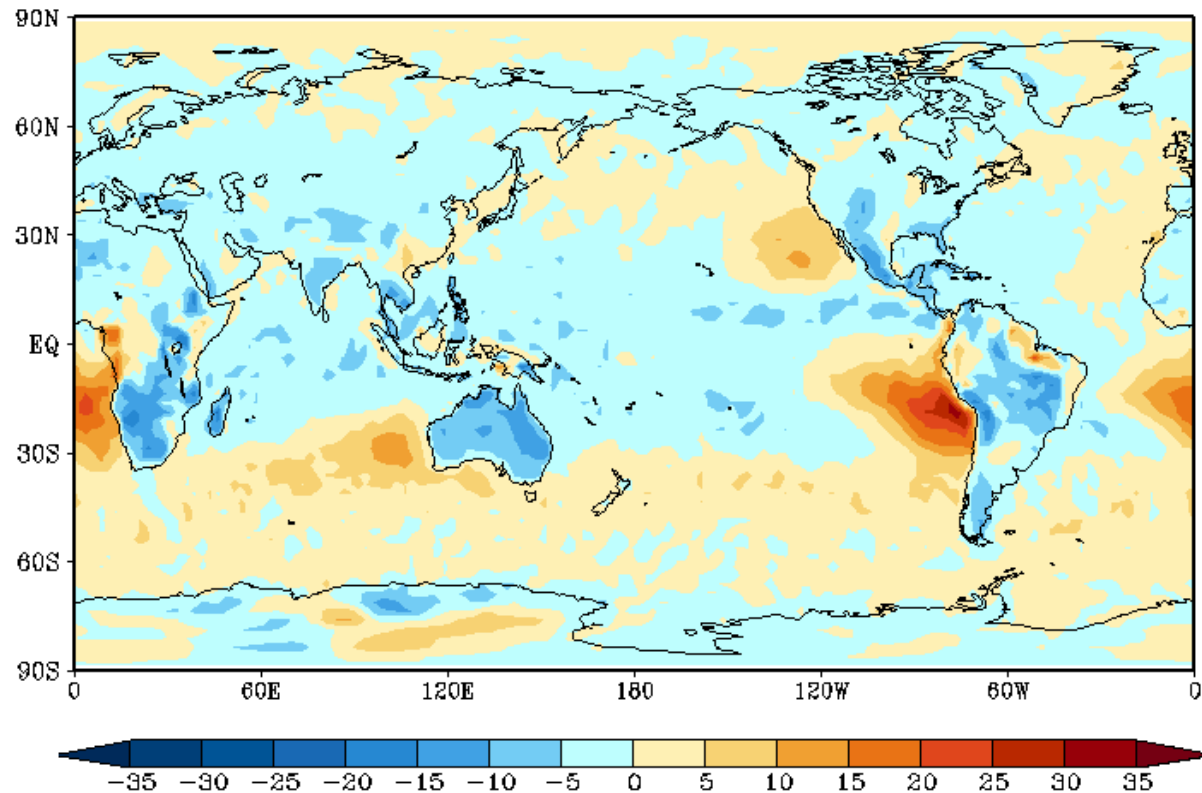


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Aqua - Terra Net Differences

CERES Annual Mean Differences (Aqua-Terra), All-sky Net
July 2002 to June 2003

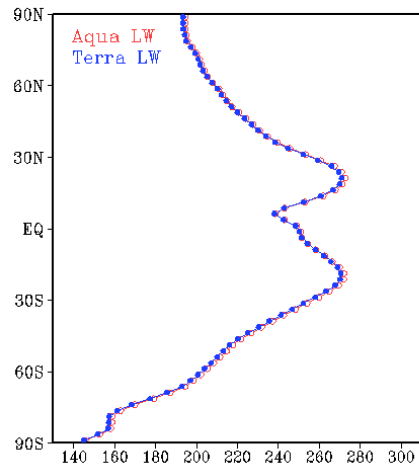


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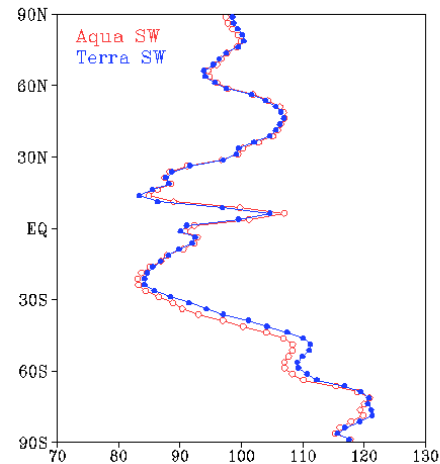


Terra and Aqua Zonal Mean Fluxes

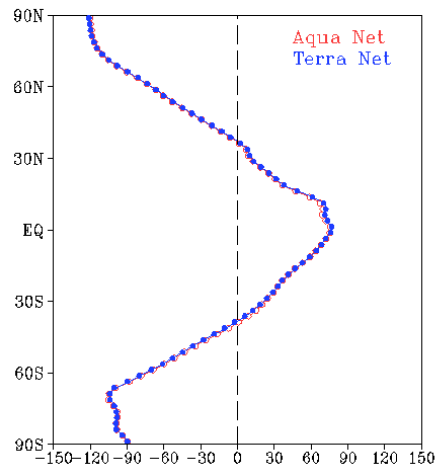
CERES Annual Mean All-sky Flux
July 2002 to June 2003



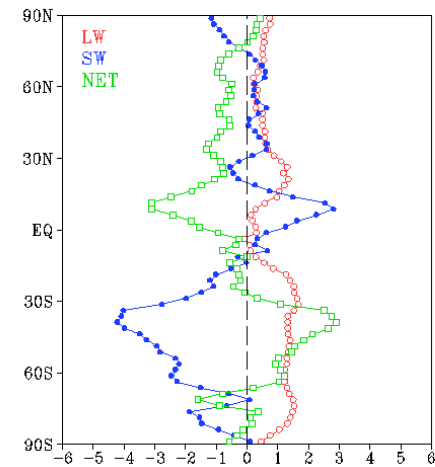
CERES Annual Mean All-sky Flux
July 2002 to June 2003



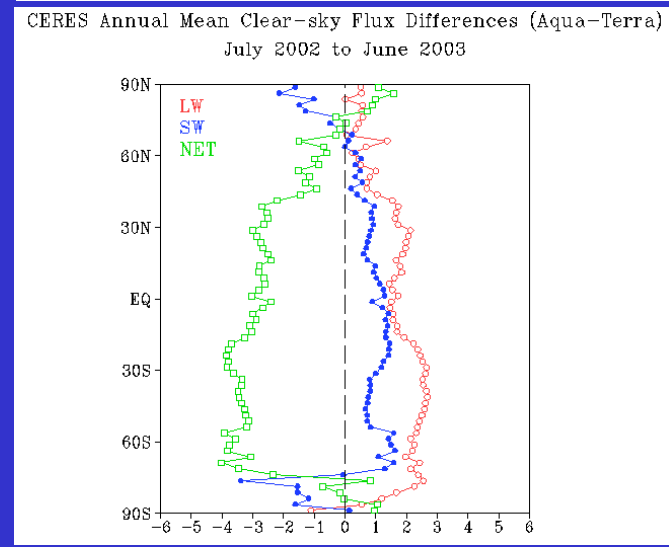
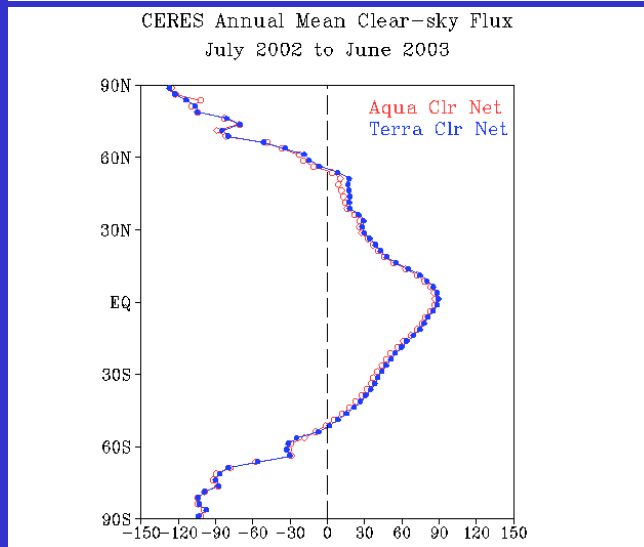
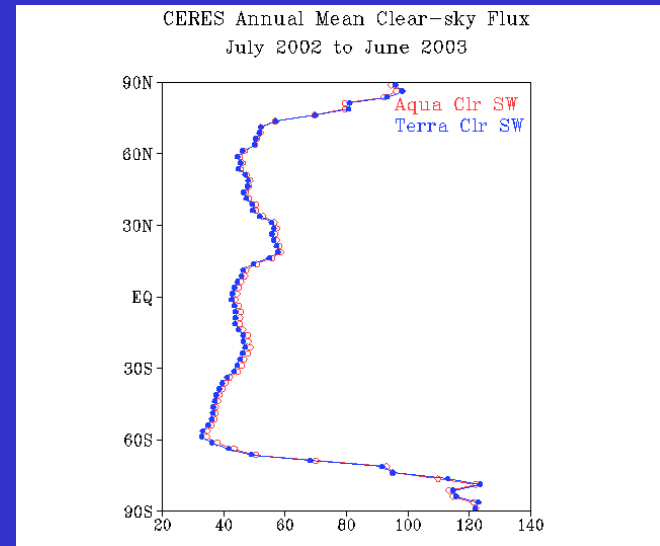
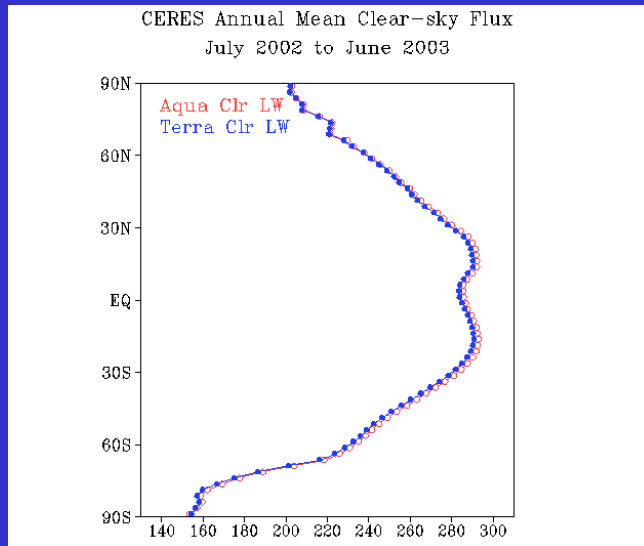
CERES Annual Mean All-sky Flux
July 2002 to June 2003



CERES Annual Mean All-sky Flux Differences (Aqua-Terra)
July 2002 to June 2003



Terra and Aqua Zonal Mean Clear Fluxes



Terra and Aqua Global Mean Fluxes

	Terra	Aqua	Aqua-Terra
LW	238.9	238.8	0.9
SW	97.2	96.7	-0.5
Net	5.3	4.9	-0.4
Albedo	28.46%	28.32%	-0.14%
Clear LW	266.6	268.4	1.8
Clear SW	48.6	49.5	0.9
Clear Net	29.5	26.8	-2.7
Clr Albedo	14.25%	14.50%	0.25%



Terra and Aqua Tropical Mean Fluxes

	Terra	Aqua	Aqua-Terra
LW	256.4	256.9	0.5
SW	90.4	91.3	0.9
Net	62.5	61.2	-1.3
Albedo	22.09%	22.29%	0.20%
Clear LW	287.9	289.6	1.7
Clear SW	46.3	47.5	1.2
Clear Net	74.6	72.1	-2.5
Clr Albedo	11.31%	11.59%	0.28%



Main Summary

- CERES/Aqua and Terra ERBE-like Fluxes Show Regional Differences (both monthly and annual Mean) Consistent With Diurnal Sampling Differences of the Two EOS Satellites
- Time Series of Global/Tropical Mean Flux Differences (Aqua-Terra) Show a Small Positive Slope in the All-sky Longwave Fluxes After 12/2002 → Need Longer Time Series to See if this Slope Continues
- However, Time Series of Global/Tropical Mean Clear Flux Differences (Aqua-Terra) Are Very Small → No Changes ??
- Annual Mean Zonal Mean SW Differences (Aqua-Terra) Show Largest Differences In the S.H.; Consistent with the Larger Differences in Daytime Sampling Time between the Two Satellites.
- Annual Mean Global Mean Differences (Aqua-Terra) Are Less Than 1 Wm^{-2} For LW, SW, and Net. Clear-sky Fluxes Differences Are Less Than 2.7 Wm^{-2}
- Annual Mean Tropical Mean Differences (Aqua-Terra) Are Less Than 1 Wm^{-2} For LW and SW and Less Than 1.5 Wm^{-2} For Net. Clear-sky Fluxes Differences Are Less Than 2.6 Wm^{-2}



Extra Materials



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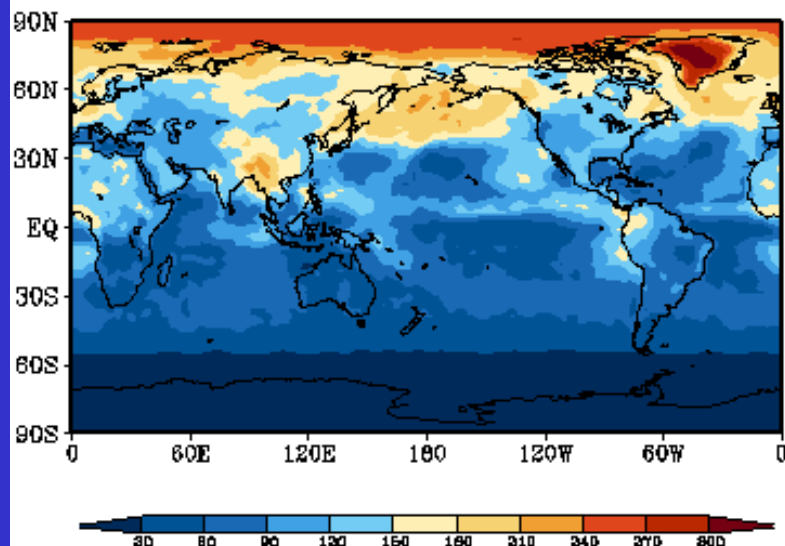


Terra and Aqua Shortwave Flux, July 2002

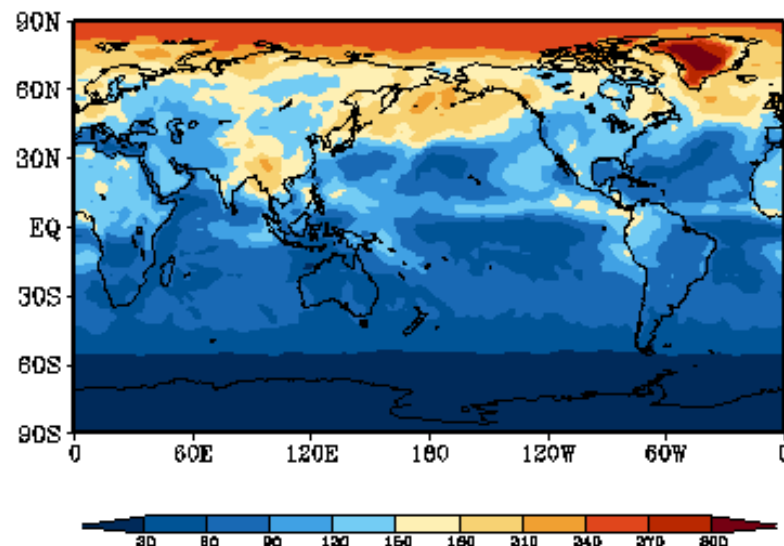
CERES All-sky Reflected Solar Radiation

July 2002

Terra



Aqua



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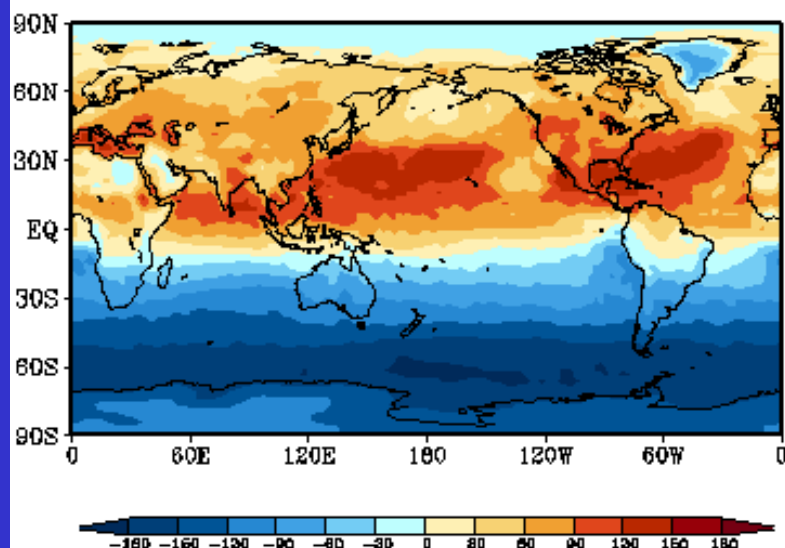


Terra and Aqua Net Flux, July 2002

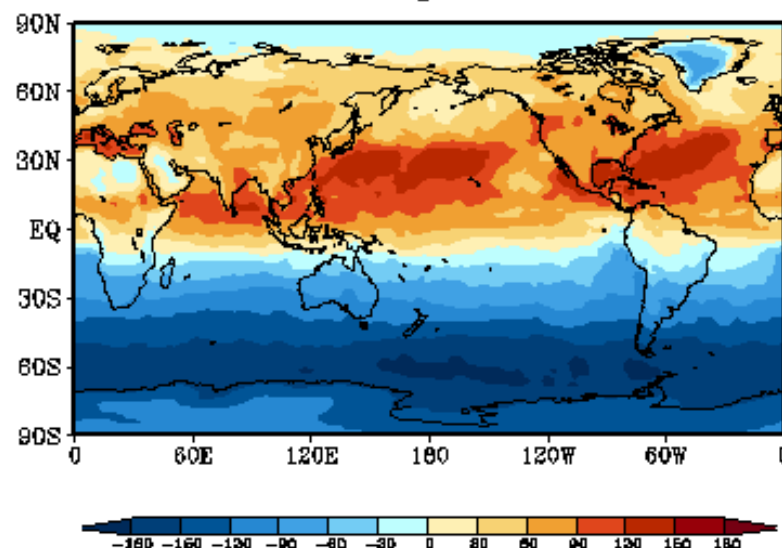
CERES All-sky Net Radiation

July 2002

Terra



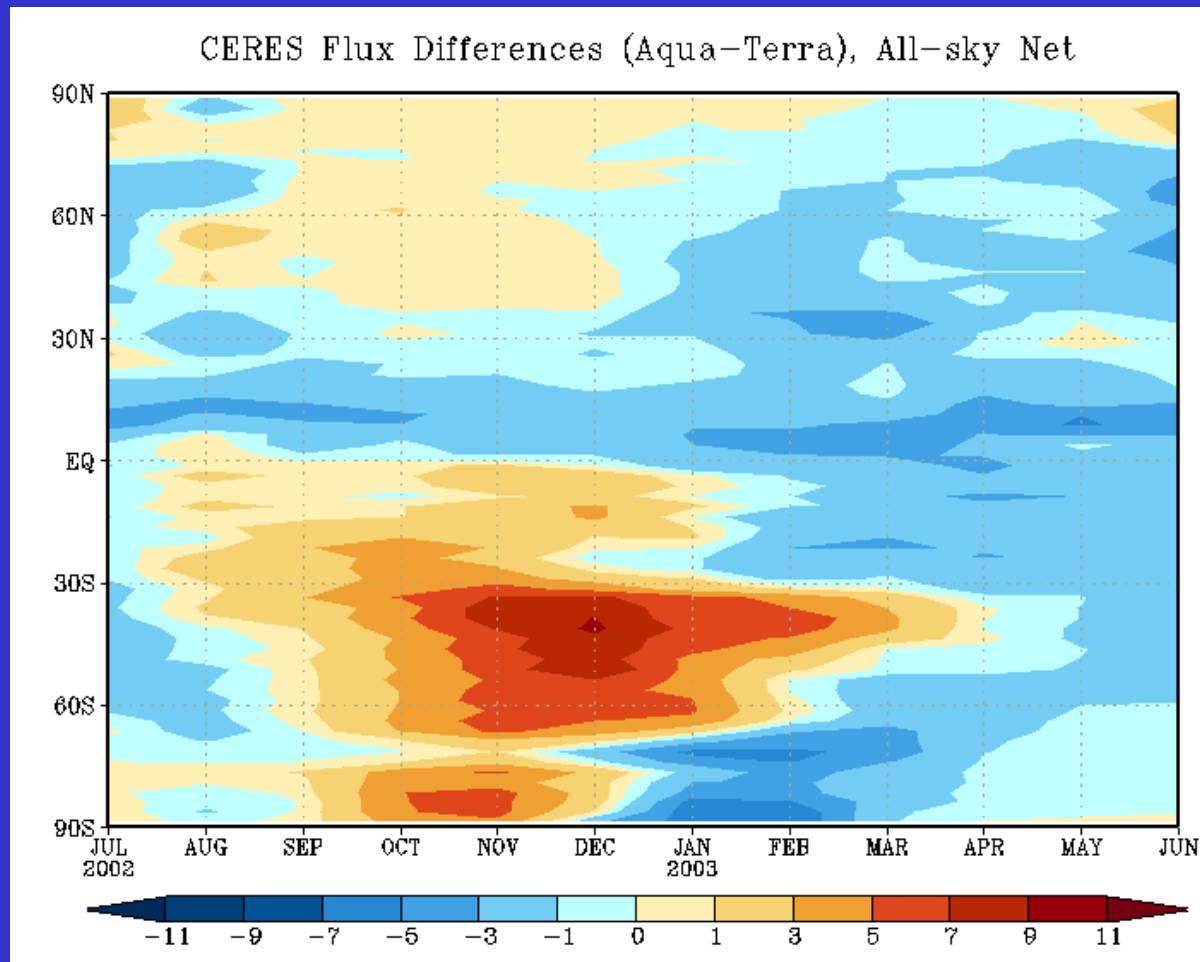
Aqua



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Aqua - Terra Zonal Mean Net Differences



Aqua - Terra Zonal Mean Clr Net Differences

