Climate monitoring with Earth Radiation Budget measurements

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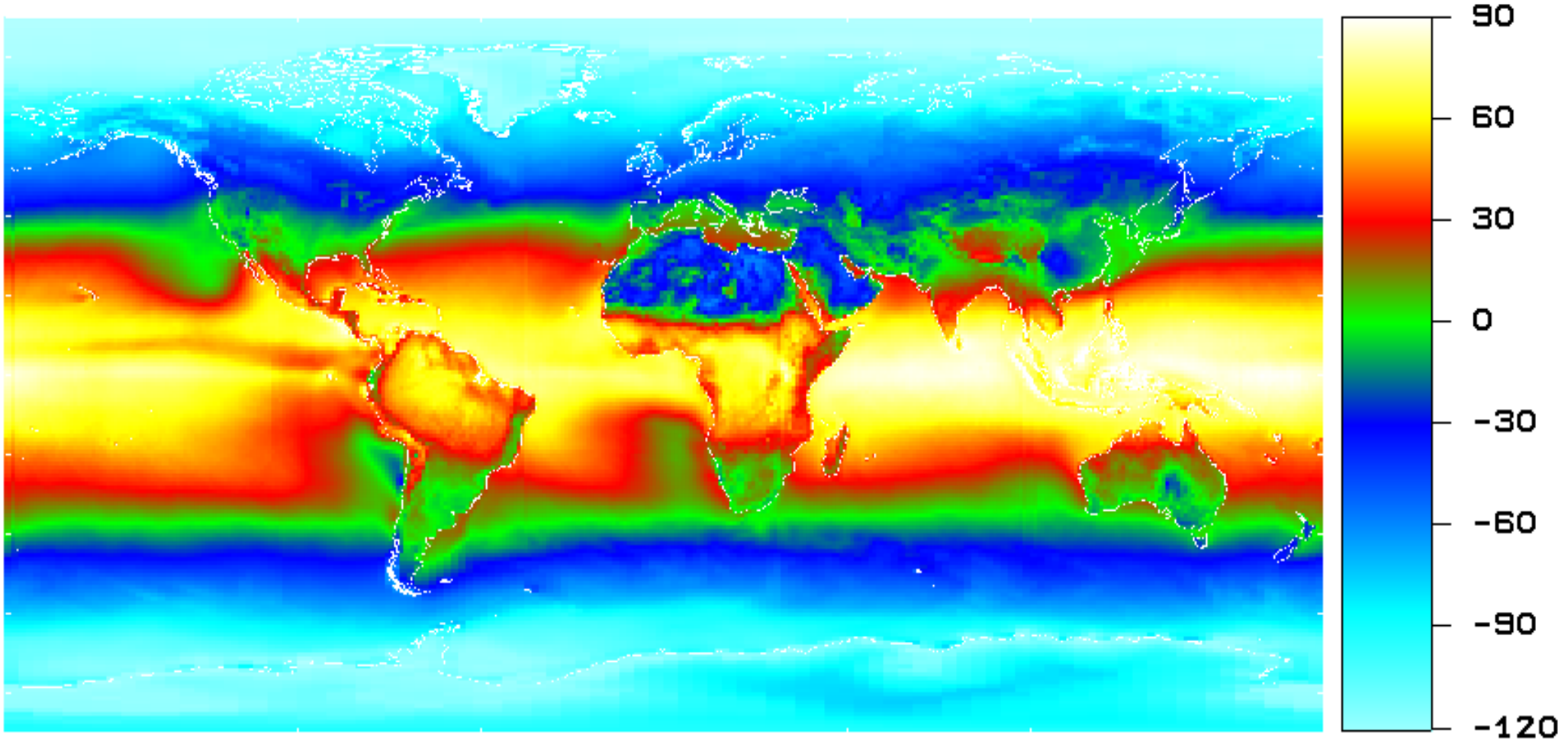
RMIB

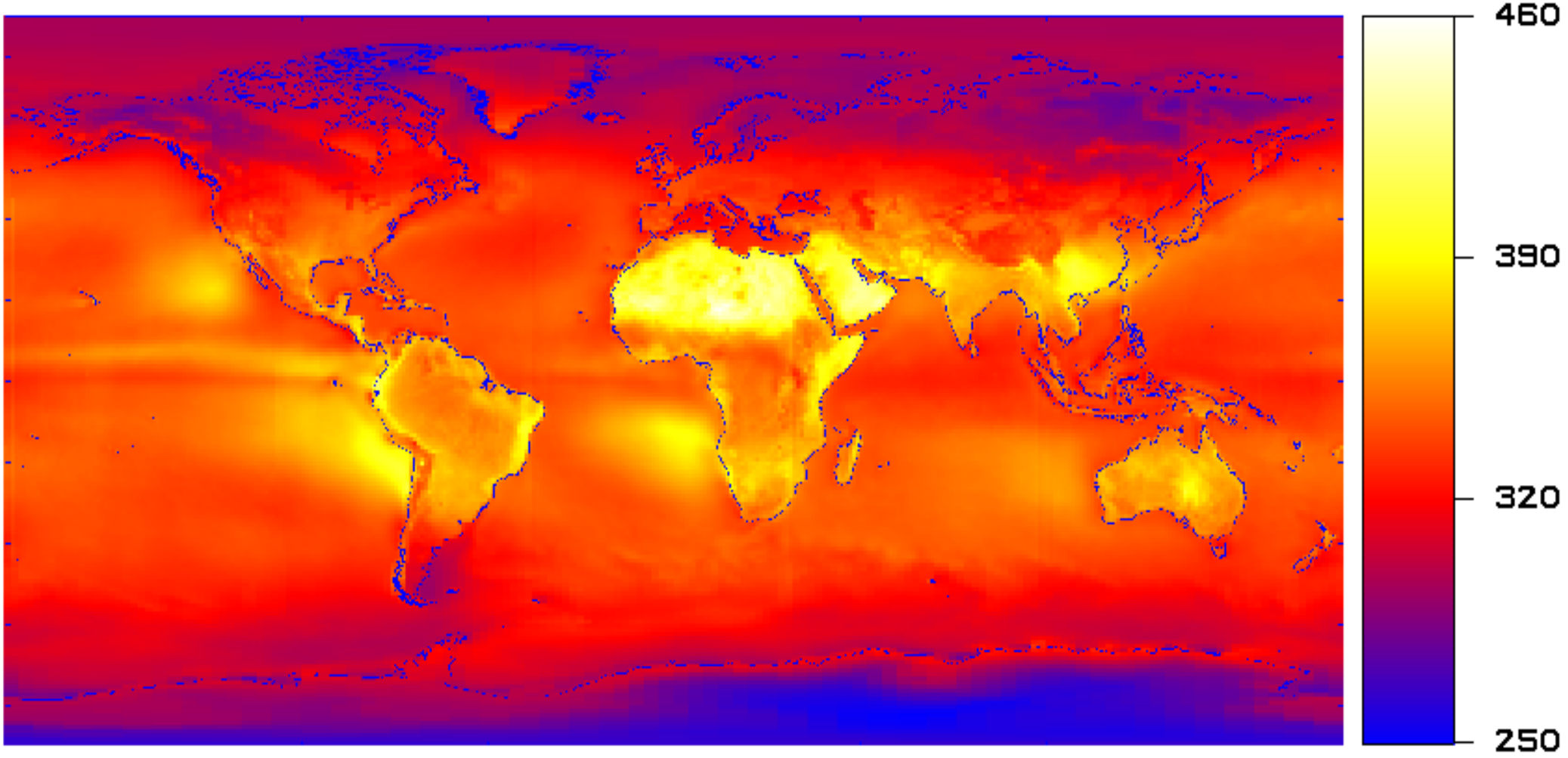
10 year annual mean Ceres EBAF net incoming radiation

W/m^2



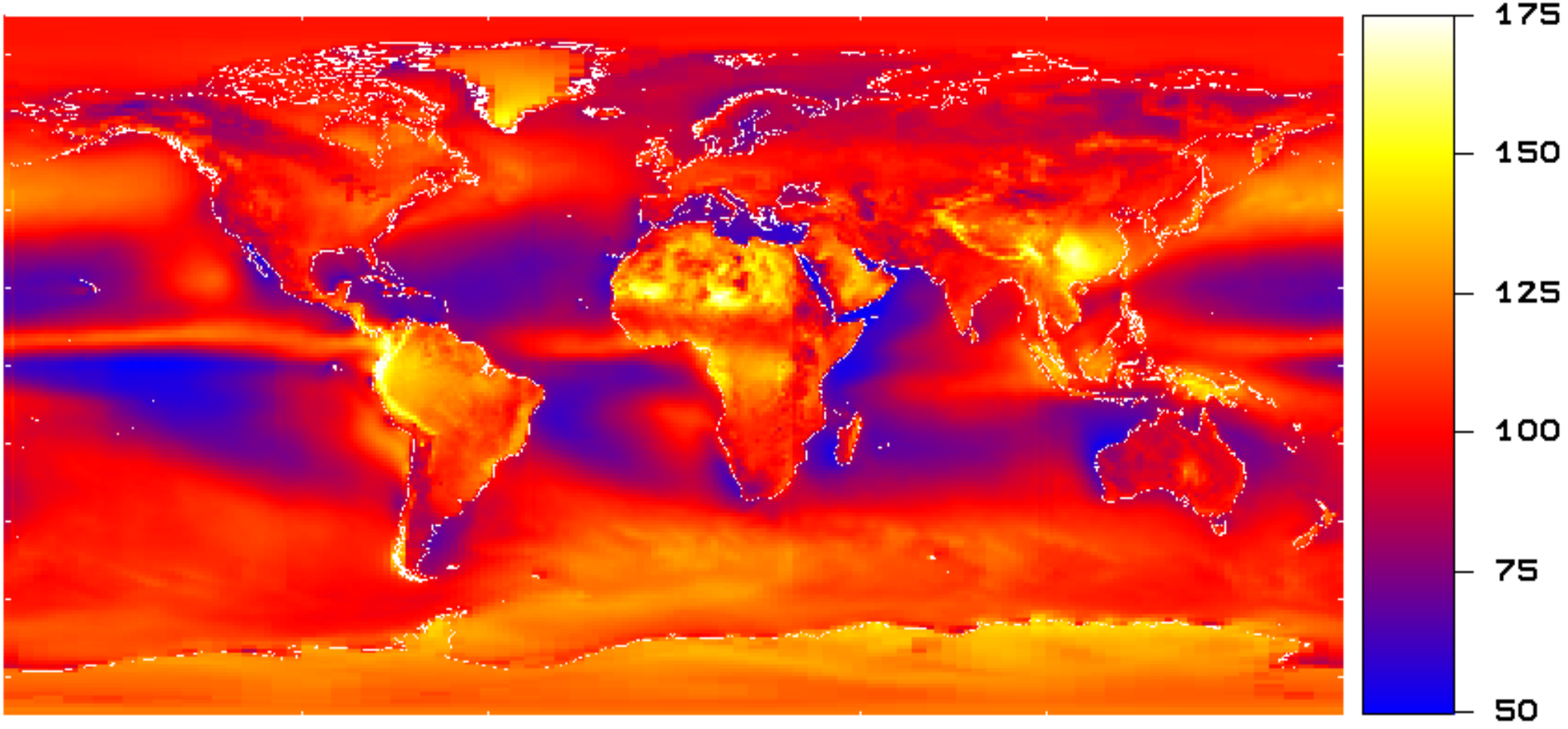
Total outgoing

W/m²



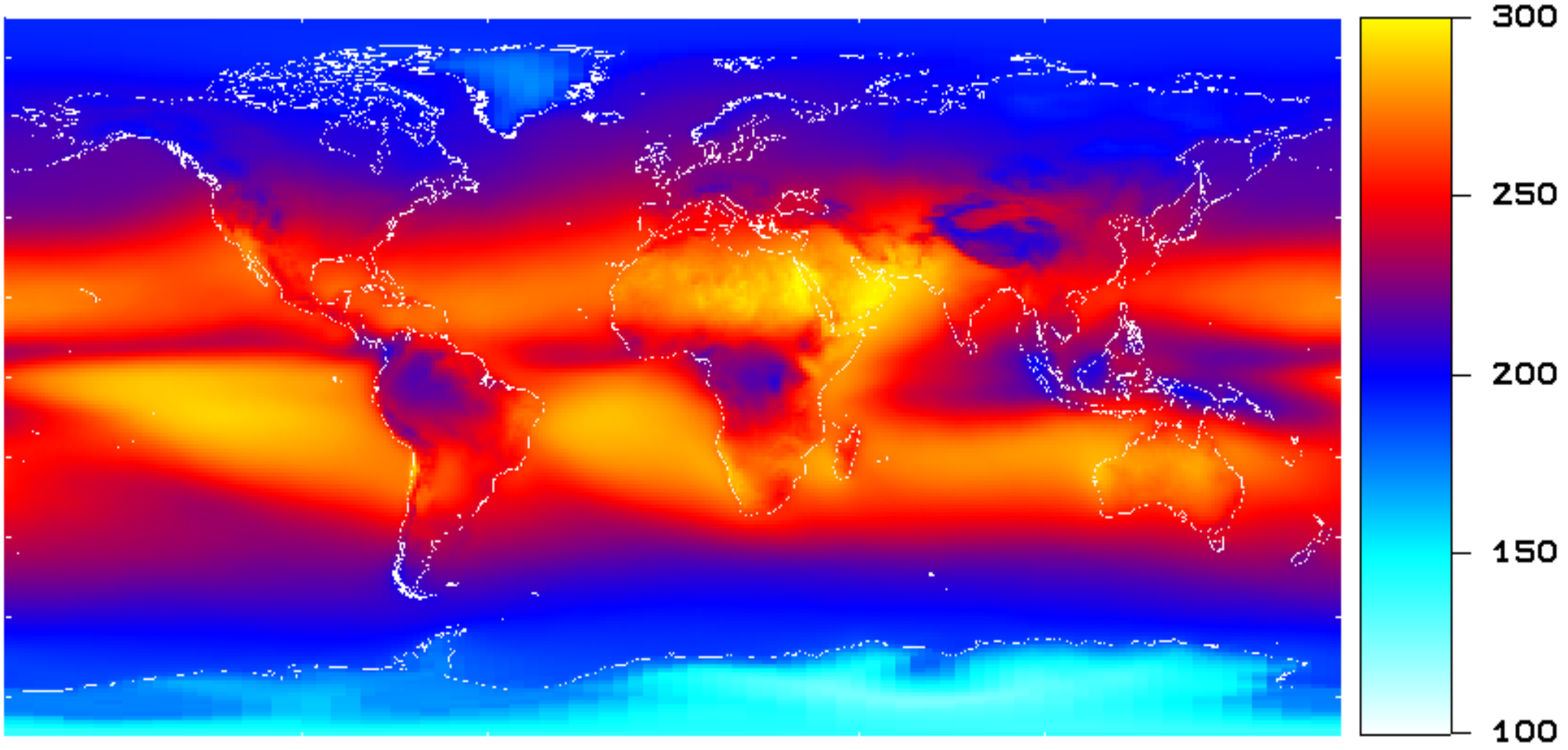
Reflected solar

W/m^2

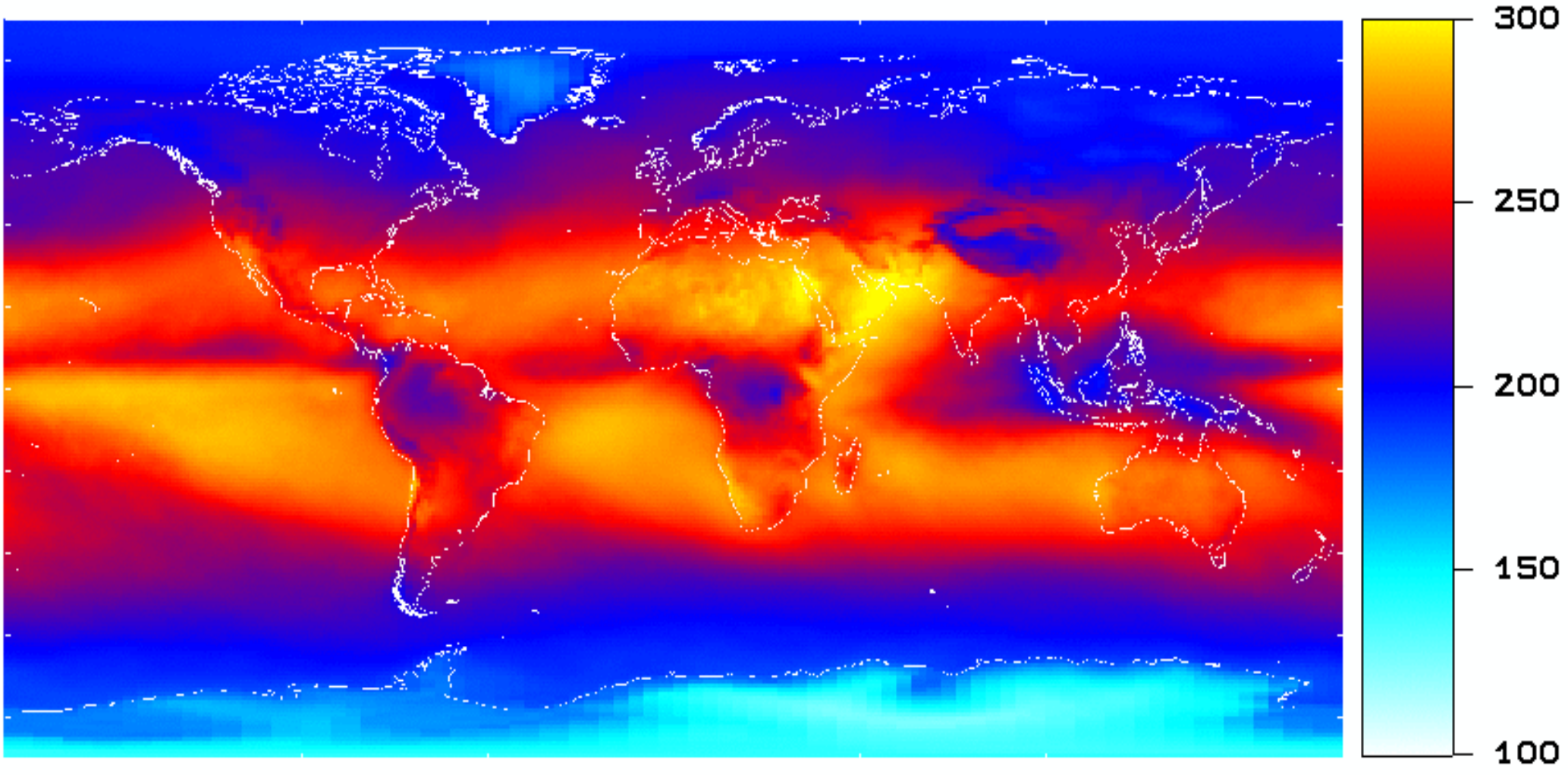


Emitted thermal

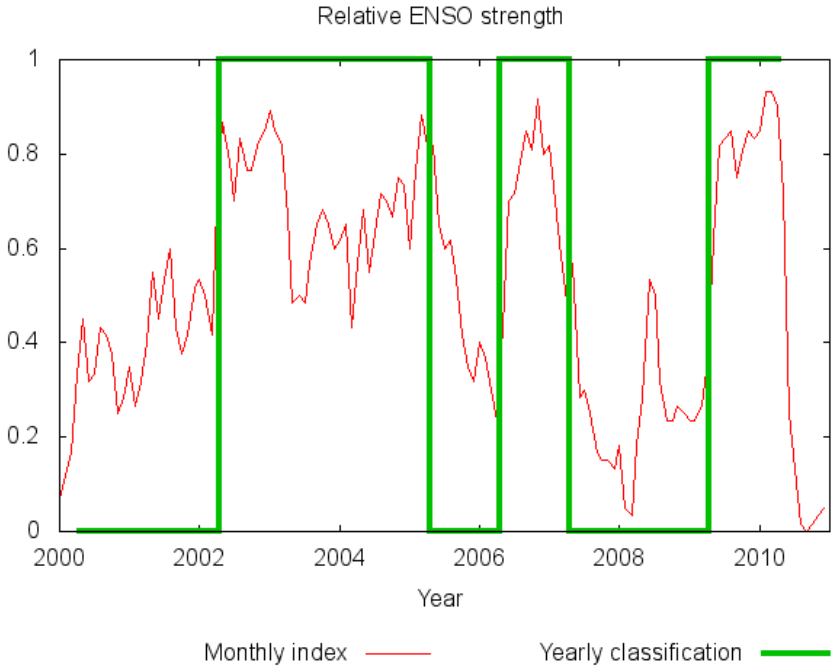
W/m^2



Interannual variation



El Nino / La Nina characterisation



Mulitvariate El nino index [Wolters,2011]

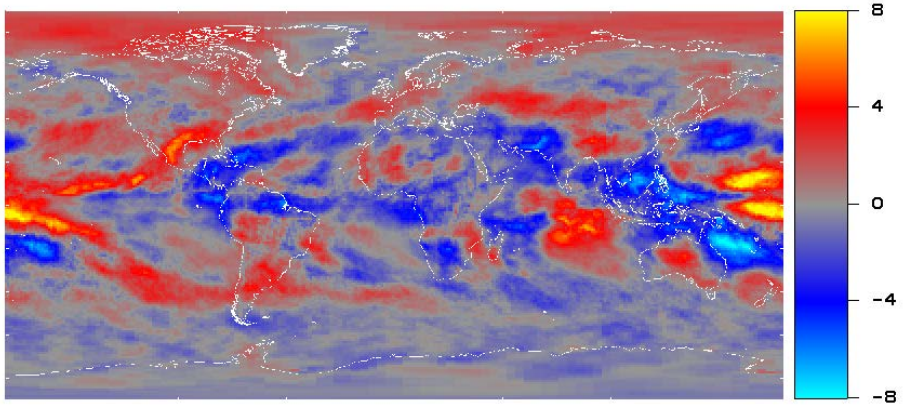
La Nina – El Nino change = average over 5 strongest La Nina years - average over 5 strongest El Nino years

Long term change = average over last 5 years - average over first 5 years

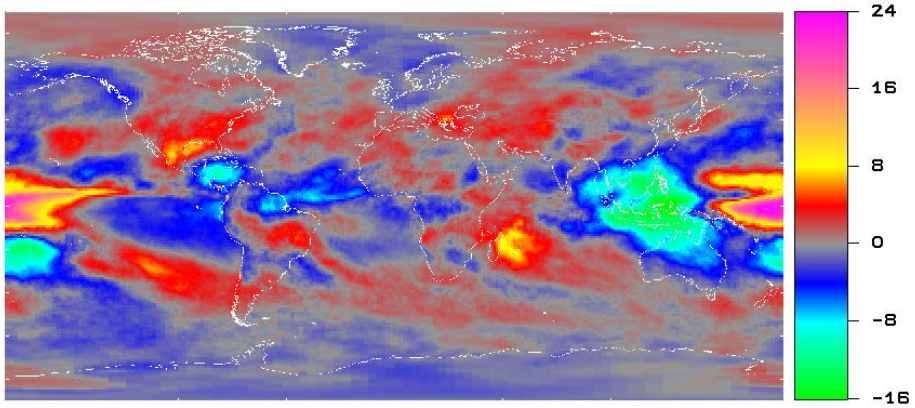
Long term change compared to La Nina – El Nino

Long term

W/m²

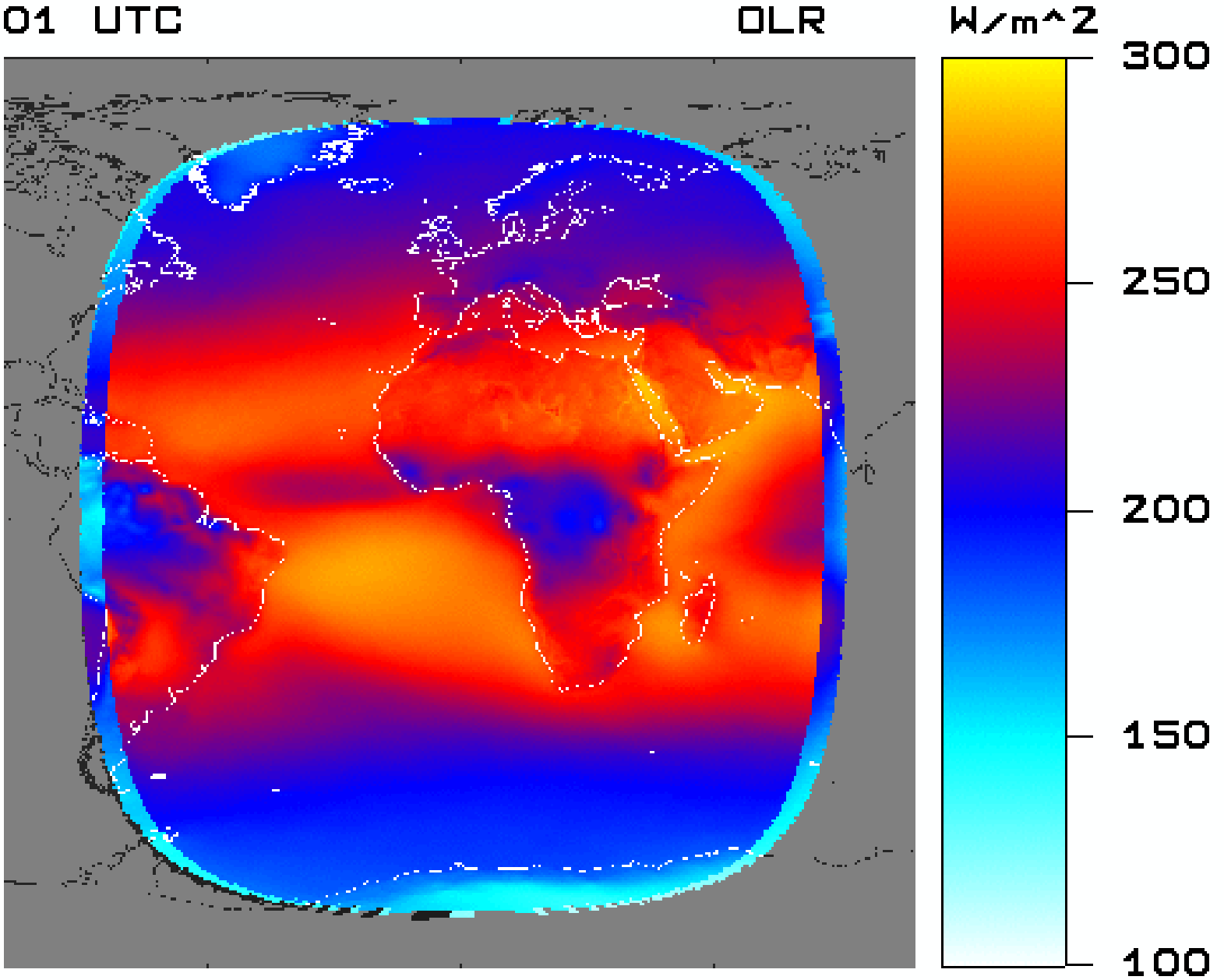


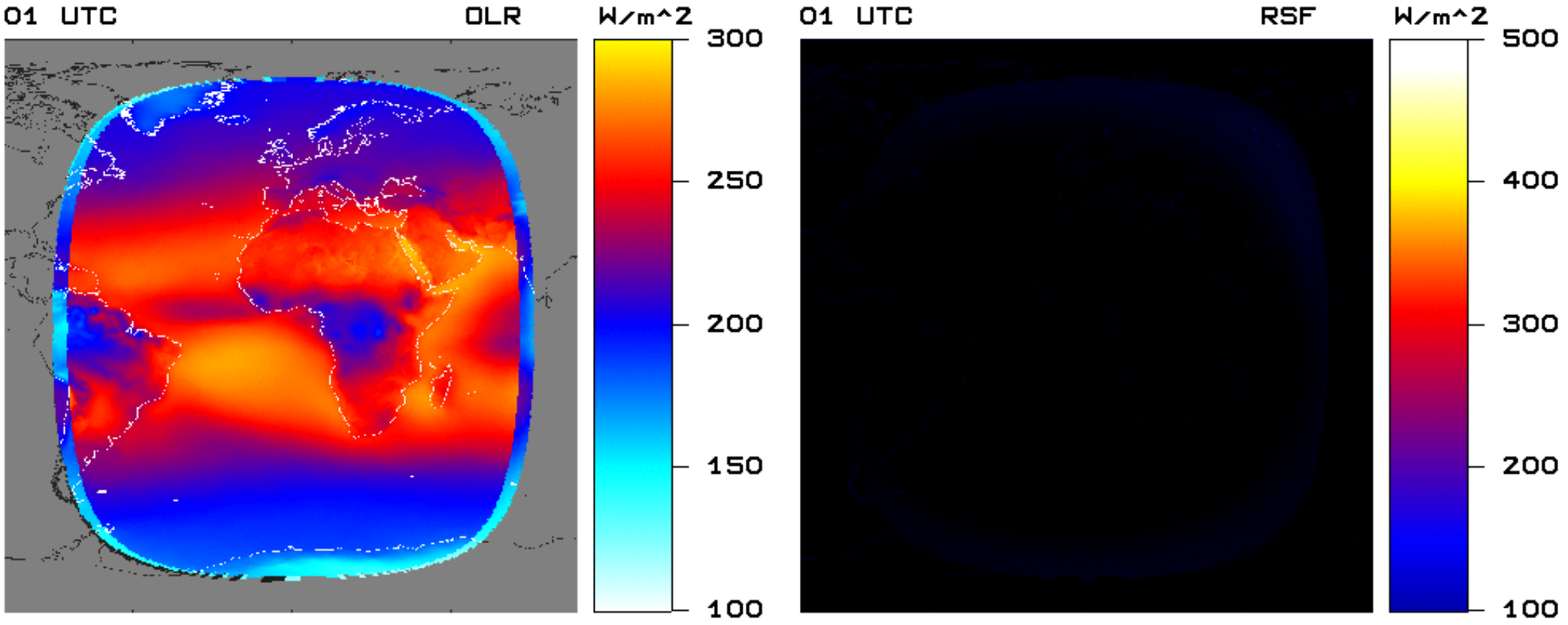
La Nina –El Nino



- Main change: strengthening of La Nina
  - Consistent with 'break' in global warming.
- Faint warming in the Arctic, related to ice melting ?

7 year GERB mean diurnal cycle




01 UTC
OLR
W/m^2
300
250
200
150
100
01 UTC
RSF
W/m^2
500
400
300
200
100

To be investigated

Diurnal cycle important for understanding/parametrisation of tropical convection = thé key element of climate variability

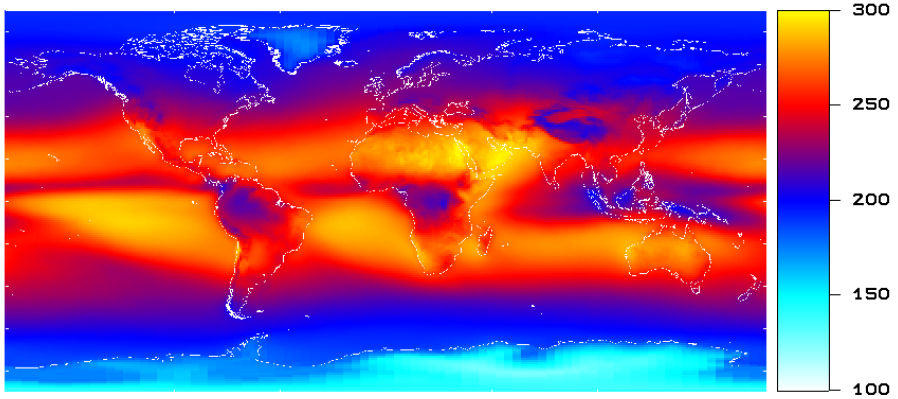
Southern Atlantic = known problem area in coupled climate models

Africa = major source of aerosols (desert dust + biomass burning): will influence stratocumulus life time

Opportunity for the future

- MSG 3 to be launched 19 June 2012

➢ Opportunity to move MSG 1 with Gerb and Seviri over Indian ocean



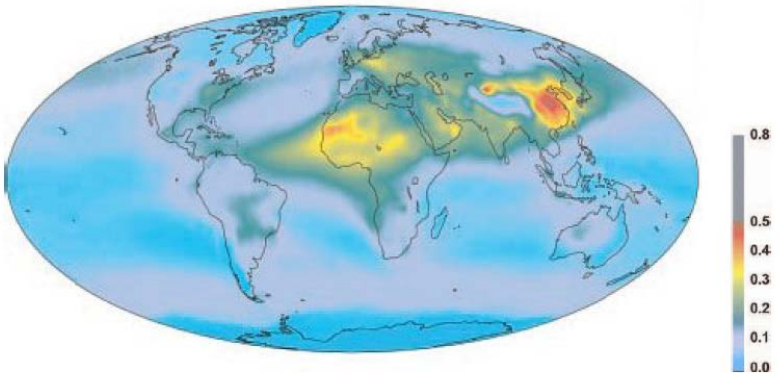


Figure 1.1: adopted from Ramanathan et al. (2001). Global distribution of natural and anthropogenic annual mean Aerosol Optical Depth (AOD).

Conclusions

Tropical convection is thé key element in climate variability.

Ceres provides unique possibility to study the interaction between the 3 deep convective centers of action.

Gerb provides unique possibility to study the diurnal cycle, particularly in the climate model problem zone of the Southern Atlantic.

MSG 1 move to Indian Ocean will extend Gerb/Seviri coverage of tropical convection and aerosol.