Climate monitoring with Earth Radiation Budget measurements

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RMIB
10 year annual mean Ceres EBAF net incoming radiation \( \text{W/m}^2 \)
Total outgoing

W/m²
Reflected solar W/m²
Emitted thermal

$W/m^2$
Interannual variation

$W/m^2$
El Nino / La Nina characterisation

Mulitivariate 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

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
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 the 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.