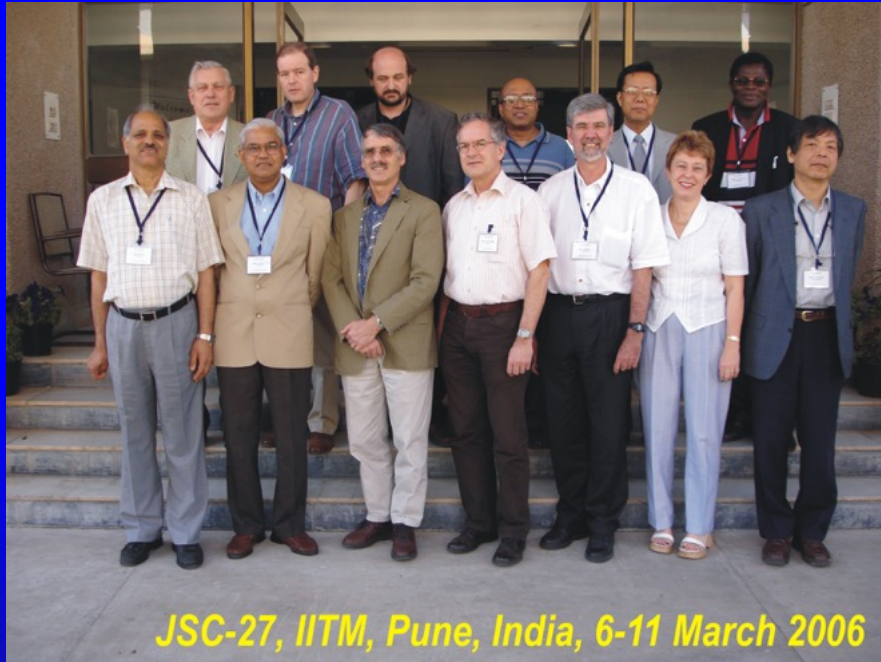


# WCRP-AGU

## Kevin E Trenberth



TOGA. 89-94  
CLIVAR-chair. 95-2004  
GEWEX-chair. 2004-14  
WOAP-chair. 2004-10  
JSC-officer. 99-2006  
WMP. 2004-09

TOGA: Tropical Oceans Global Atmosphere  
CLIVAR: Climate Variability and Predictability  
GEWEX: Global Energy and Water Exchanges  
WOAP: WCRP Observations and Assimilation Panel  
WMP: WCRP Modeling Panel

# WCRP-AGU

Kevin E Trenberth  
Pitch

I also wish to put in a pitch for AGU to  
have a coupled climate journal

And for WCRP to adopt a coupled  
approach to the science

Journal of Geophysical Research

Atmospheres

Biogeosciences

Earth Surface

Oceans

Planets

Solid Earth

Space Physics

# Energy on Earth

The climate is changing from increased GHGs.

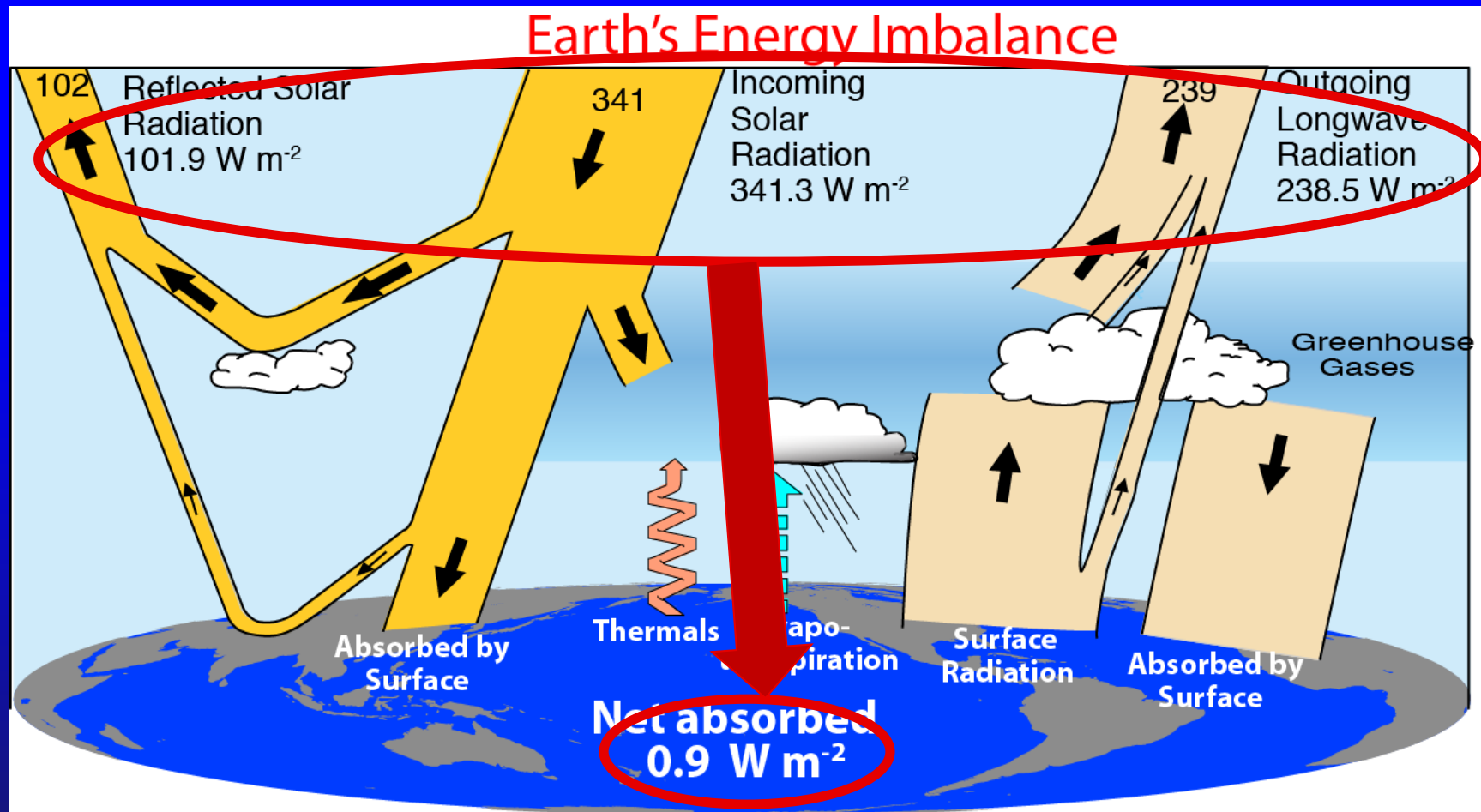
GHG: Greenhouse Gases

The most fundamental measure  
that the climate is changing is  
Earth's Energy Imbalance.

Major advantage: it is the net result of all  
complicated feedbacks.

Come to Moscone West 3012 L3:  
16:00 to 16:30 Earth's changing energy budget

# Implications of Regional Energy Budgets

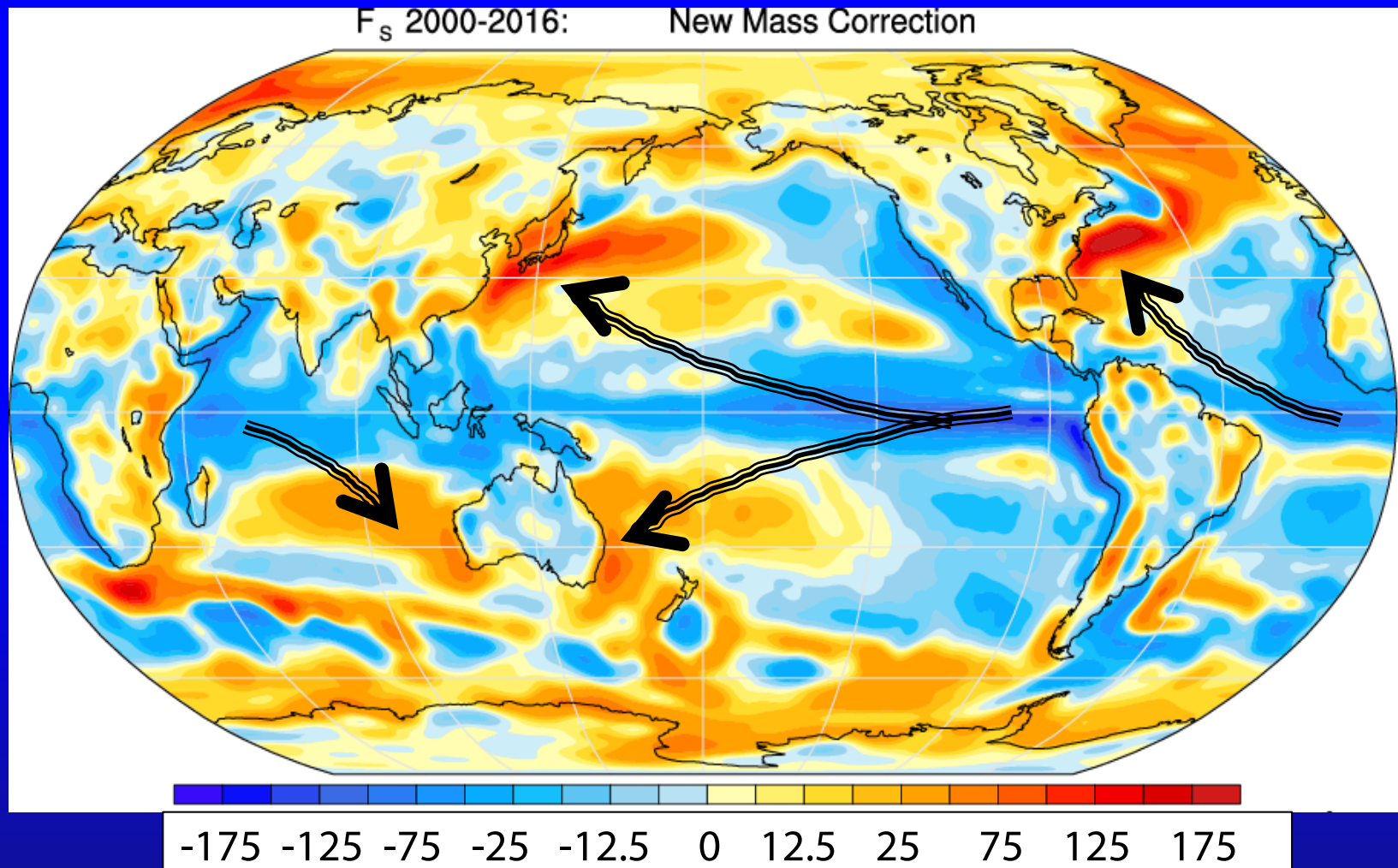


# Ways forward

## Requirements

- TOA radiation
- All atmospheric fields, including liquid and solid water
- Ocean heat content, sea level
- Land, and hydrology: runoff, stream flow, lakes
- Ice and snow
- Surface fluxes

# Annual mean surface flux





# EEI has implications for the future

- These methods bring in new information
- Indeed, there is a lot of information in the **coupled** system not being utilized in many analyses.
- Constrain many datasets
  - and models
- Recommended by EEI Workshop  
Toulouse, 2018

