Targeted Training Activity(TTA) on
"El Nino-Southern Oscillation Monsoon in the Current and Future Climate"

Climate Model Analysis Lab1: Data sets Description

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Overview

Model Experiments*:* *Coupled Model Intercomparison Project Phase 5*
CMIP 5 Experients Description
CMIP 5 Models and experiments we will use here

Observation : data

Methodology : Variables
Period of time,
resolution
etc

Summary/ Conclusion

CMIP5 : General Presentation of Model Experiments

WCRP World Climate Research Programme

Accomplishments

Climate Projections

CMIP5 - Unprecedented International Coordination

CMIP5 participating groups (20+ groups; ~40 models).

2.3Pbytes of model output expected - 100 times greater than CMIP3.

Model data will be accessed by the Earth System Grid - output will be served by federated centers around the world and will appear to be a single PCMDI archive.

The archive will become available to analysts from end 2010 to Spring 2011.

ICSU

CMIP5 : General Presentation of Model Experiments

CMIP5 is/will be :

-> Key part of the upcoming IPCC Fifth Assessment Report

-> "1).assessing the mechanisms responsible for model differences in poorly understood feedbacks associated with the carbon cycle and with clouds
2).examining climate "predictability" and exploring the ability of models to predict climate on decadal time scales, and, more generally
3).determining why similarly forced models produce a range of responses"
4). evaluate how realistic the models are in simulating the recent past
5).provide projections of future climate change on two time scales, near term (out to about 2035) and long term (out to 2100 and beyond)
6).understand some of the factors responsible for differences in model projections, including quantifying some key feedbacks such as those involving clouds and the carbon cycle"

(http://cmip-pcmdi.llnl.gov/cmip5/)

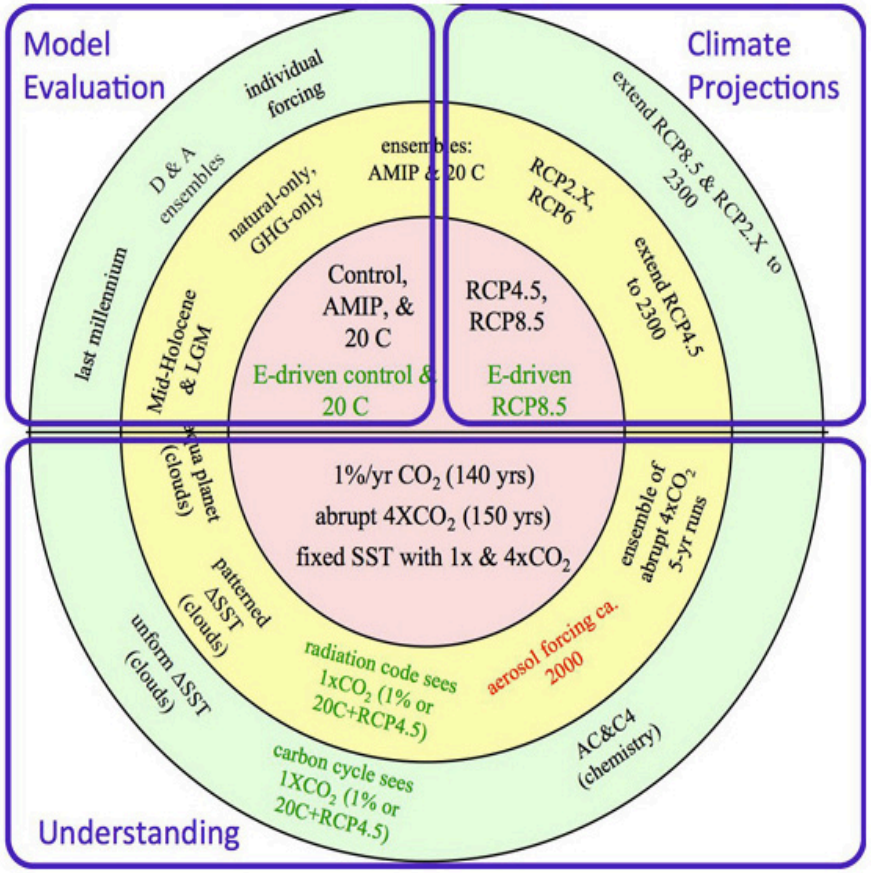
Taylor et al (2009), "A Summary of the *CMIP5* Experiment Design

CMIP5 : Experiments

Decadal Hindcasts and Predictions

Long term simulations

Atmosphere-only" (prescribed SST –for comp-demandingModels).



-> outputs can be accessed via *the Earth System Grid*

-> The Metafor project has built a controlled vocabulary for describing models and experiments

-> Curator project has developed web-based tools for ingesting this metatdata.

-> There's a BAMS paper coming out soon describing CMIP5

-> for more info see http://cmip-pcmdi.llnl.gov/cmip5/

CMIP5: Models and experiments used for the TTA Project

Models

CNRM-CERFACS.CNRM-CM5,
INM.inmcm4,
IPSL.IPSL-CM5A-LR,
IPSL.IPSL-CM5A-LR,
IPSL.IPSL-CM5A-MR,
IPSL.IPSL-CM5B-LR,
MIROC.MIROC-ESM-CHEM
MIROC.MIROC-ESM
MIROC.MIROC5
MOHC.HadGEM2-CC
MOHC.HadGEM2-ES
MPI-M.MPI-ESM-LR
MPI-M.MPI-ESM-MR
MRI.MRI-CGCM3
NASA-GISS.GISS-E2-R,
NCC.NorESM1-M
NOAA-GFDL.GFDL-CM3,
NOAA-GFDL.GFDL-ESM2G,
NOAA-GFDL.GFDL-ESM2M

Experiments

CONTROL: *run with preindustrial external forcing*

HISTORICAL: *model run similar with CONTROL but that includes time varying external forcings*

RCP8.5 :

Representative Concentration Pathways (RCP) 8.5 represents the more pessimistic of the non-mitigation futures. For example, by 2070, we would still be getting about 80% of the world's energy needs from fossil fuels, without CCS, while the remaining 20% come from renewables and/or nuclear

Time period : 1850-2005,monthly means
Variables : precipitation,u and v wind components and temperature
Grid : depends on the model

OBSERVATION DATA used for the TTA Project

Observations/Reanalysis data

NCEP Reanalysis (ts,u,v,prec)

Hadley Center SST (sea surface temperature)

CMAP (precipitation only)

University of Delawere (precipitation over land only)

Time period :depends on obs.; monthly means
Variables : precipitation,u and v wind components and temperature/sea surface temperature
Grid : depends on the observation set

Summary and Conclusion

What data do we have ?

2 datasets

Models

Obs

Different variables

Different "experiments"

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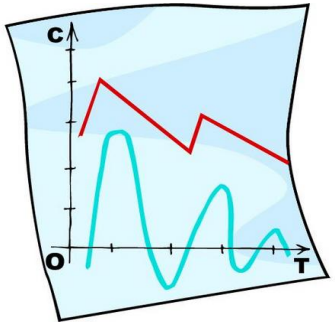
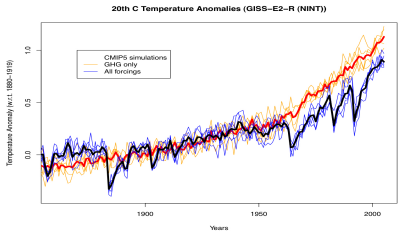
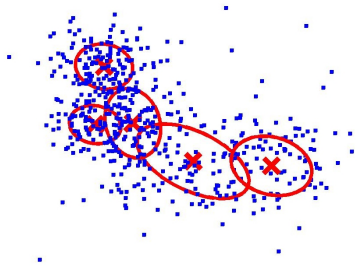
What do with this data sets ?



Compare
Model with Obs.



Compare Models
Among themselves



Calculate statistics

Etc …