GFDL's Role in CMIP:
A Look Back
A Look Ahead

Presented by

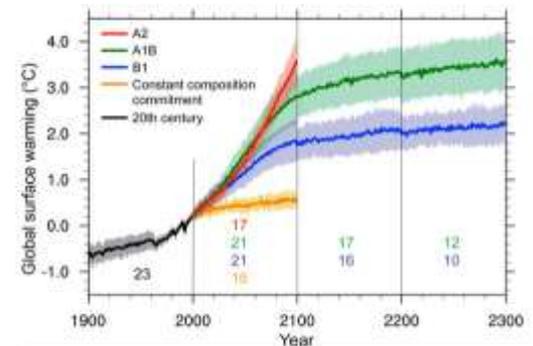## Ronald J Stouffer

- Coupled Model Intercomparison Project
- Started in 1995
- Overseen by the World Climate Research Programme's (WCRP) Working Group on Coupled Models (WGCM)
- Process managed by the CMIP Panel
  - I have been a member since it was created and am the past chair.

- CMIP5 is an international scientific activity
  - Consists of a set of coordinated experiments
  - Database supports IPCC and other assessments
  - Distributed data system
- CMIP5 goals and new activities
  - Provide data for new science
    - 300 or more peer-reviewed papers
  - Investigate decadal prediction
  - Study carbon response/feedbacks in climate change
  - Include atmospheric chemistry and stratosphere-troposphere interactions
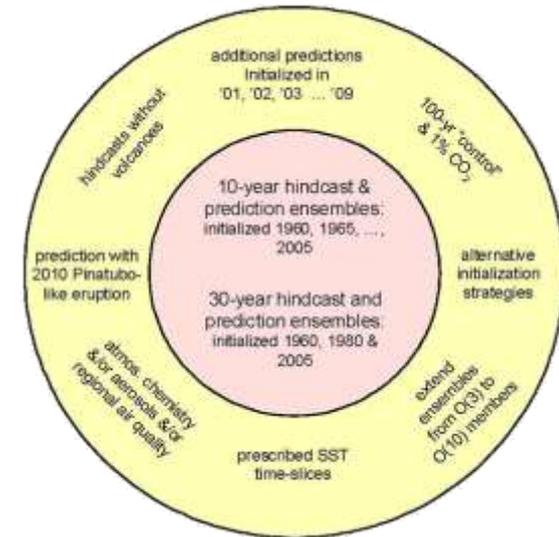
GFDL's High Level of Activity in CMIP5

- Involved most of the lab
- Process took several years
  - Several years to build models
  - About 1 year to run model integrations
  - Another year to post-process/error check/put data on server
- Currently analyzing results and performing "1-off" experiments to study important science questions

- 4 streams or activities with independent models
  - Investigate decadal prediction – (CM2.1)
  - Study carbon response/feedbacks in climate change – Earth System Models (ESM2M and ESM2G)
  - Include atmospheric chemistry and stratosphere-troposphere interactions – Atmosphere-Ocean-GCM (CM3)
  - Understanding changes in weather extremes – High resolution atmosphere-only model (HiRAM)
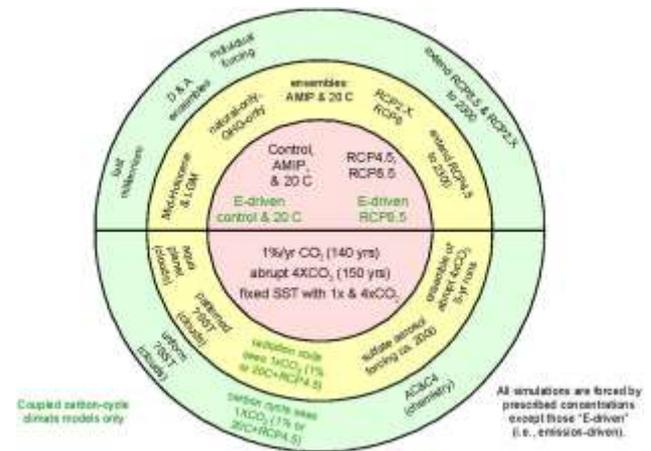
- GFDL data available
  - Decadal Prediction - 10TB
  - Earth System Models – 128TB
  - CM3 – 30TB
  - High Resolution atm-only (HiRAM) – 22TB

  - Total = 188TB (slightly less than 10% of CMIP5 archive)
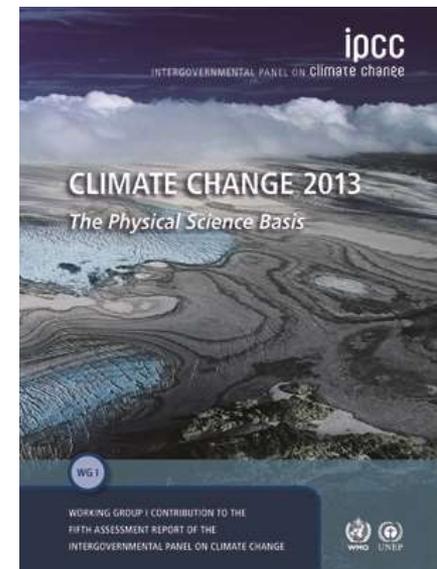
GFDL's CMIP5 data is being used!

From 2012 to 2014, GFDL is averaging about:

- 400,000 downloads per year
  - Much more in 2014

- 360,000 files transferred per year
  - 600,000+ in 2014

- 80 TB of data transferred per year
  - 125 TB in 2014

    * 2014 data as of April 25, 2014

GFDL has many contributions to IPCC AR5

- Science papers (WG 1 and 2)

    - ~200 GFDL peer-reviewed in AR5 WG1

    - Many papers are integral parts of the IPCC reports

- Model data (WG 1, 2, 3)

- Chapter Lead Authors (LAs WG 1)

    - Gabriel Vecchi, Gabriel Lau

- Review editors (WG 1)

    - Ramaswamy, Held

- Contributors and reviewers (WG 1, 2)

- Other important assessments: e.g. US National Assessment
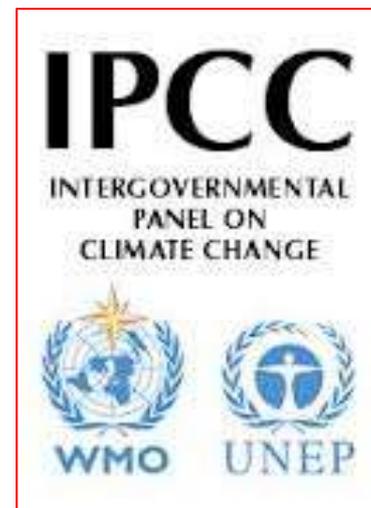
- Several teams working on building components of next generation GFDL climate model.

- Goal is to merge best of 4 stream models into 1 model plus advance state of art in all components

  - Have models write standardized output directly

  - Take advantage of common analysis packages and contribute to those

  - Prototype atmosphere, ocean and sea ice components developed
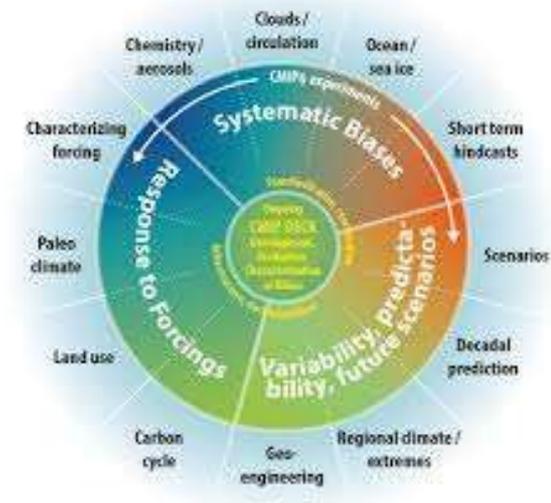
GFDLers are active in helping:

- Design CMIP6

- Working on inputs needed for various experiments

- Test inputs in running models (land use, aerosols, etc.)

- Participants in newly formed WGCM Infrastructure Panel (WIP) which provides input to the distributed software efforts.
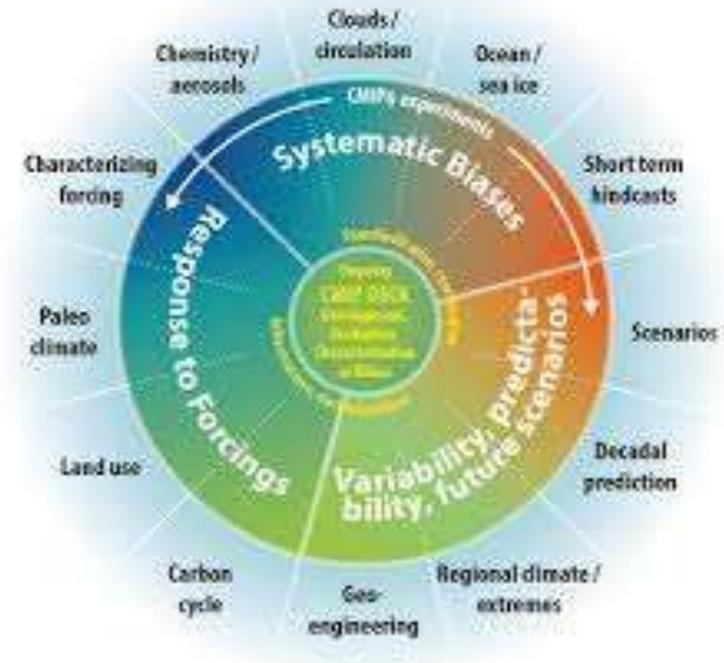
- GFDL has always been a major player in CMIP
  - Helping design experiments
  - Helping to manage process
    - Modeling side
    - Data serving side
  - Contributing model data
- GFDL has always had important role in IPCC
  - Authors – CLAs, LAs, Contributors, Review editors, etc.
  - Scientific results – papers, understanding
- We look forward to participating in these processes in the future.