Earth System Modeling Welcome

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Climate and Environmental Sciences Division

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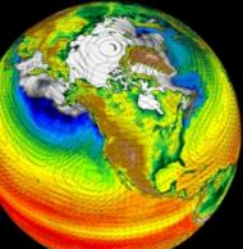
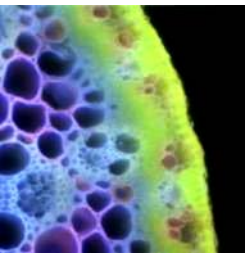
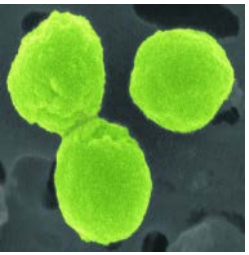
Office of Science

Department of Energy

September 19, 2011

Hyatt Grand, DC



DOE Climate Modeling News

- Meeting structure
- Break-out charge
- "Research Highlights"
- New website
- Logo contest

Earth System Modeling (ESM) News

- ESM Climate Modeling Priorities
- SciDAC Announcement
- ESM presentations

Climate and Environmental Sciences Division

Atmospheric Science

- Atmospheric System Research
- Atmospheric Radiation Measurement Climate Research Facility

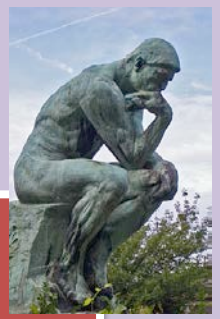
Climate and Earth System Modeling

- Earth System Modeling
  Dorothy Koch
- Regional & Global Climate Modeling
  Renu Joseph
- Integrated Assessment
  Bob Vallario

Environmental System Science

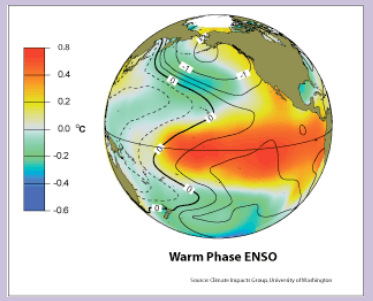
- Terrestrial Ecosystem Science
- Terrestrial Carbon Sequestration Research
- Subsurface Biogeochemical Research
- Environmental Molecular Sciences Laboratory

Climate Modeling Program



Integrated Assessment Modeling
Human dimension

Regional & Global Climate Modeling
Model Analysis, Downscaling



Earth System Modeling
Climate Model Development

Meeting Structure

Morning programmatic Plenaries

Sep 19: Earth System Modeling

Sep 20: Regional and Global Climate Modeling

Sep 21: Integrated Assessment Modeling

Sep 22: CESD Cross-cutting

Cross-cutting Topical Break-outs

- Posters (includes many new projects!)
- Oral

Land, Ocean, Atmosphere, Regional high resolution, Arctic, Variability, Energy-Water-Land, Interoperability, Data/visualization, Uncertainty Quantification, Extremes

Charge to Breakouts!

CESD and modeling programs are strategizing, setting goals and priorities. The breakout sessions are designed to inform this process.

The charge for each session is to:

1. Briefly summarize topical session results, INCLUDING POSTERS!, identify new potential collaborations

2. Highlight priority research

3. Identify gaps in understanding to be addressed by models and measurements.

4. Identify strategic potential advances given skills and resources of our team

Thursday afternoon discussion: Collect ideas, discuss potential role of long-term working groups.

"Research Highlights" Publications, Media Attention, Major Achievements

Format:
1. Paragraph summarizing importance of research, achievement and impact of study.
Write for a non-specialist scientist (***do not*** just send paper abstract…)
2. Also send a single summary ppt slide, and a pdf of the manuscript

When:
As soon as manuscript is accepted or published

Why:
1. Educate and inform your management!
2. Used for advertisement of program achievement within CESD, to Office of Science, to BER Advisory Committee (BERAC)
3. Impacts funding…

New DOE Climate Modeling Website!

http://www.climatemodeling.science.energy.gov/

Programmatic news
Upload your highlights
Links to large projects

DOE Climate Modeling LOGO Contest!

Submit your ideas, here at the meeting (to one of us) or before October 1

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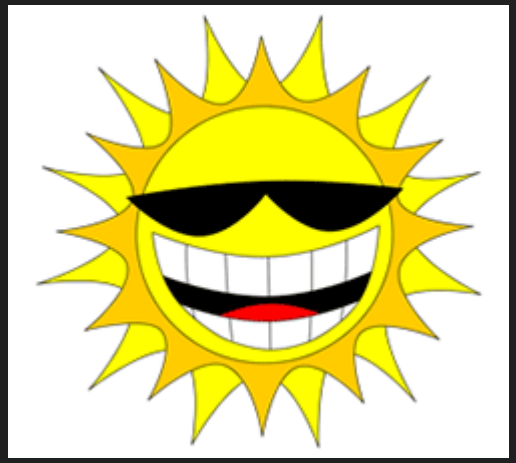

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SciDAC Laboratory Announcement: September 16, 2011
BER Climate modeling – ASCR partnership
Preproposals due Oct 17; Proposals due Dec 3

Topics:

- Develop physics and dynamics for atmosphere, ocean and ice-sheets to run efficiently and accurately using high resolution or *unstructured grids*
- Develop efficient and accurate schemes for simulating *atmospheric or oceanic chemical or biogeochemical tracers*

Should utilize:

- New SciDAC Institutes
- Uncertainty quantification, model validation methods
- Develop community model

SciDAC
Scientific Discovery through Advanced Computing

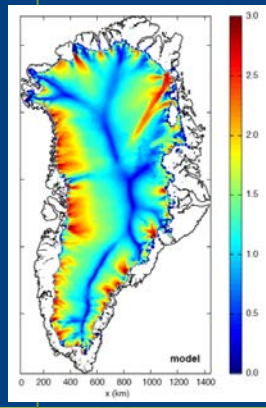
Earth System Modeling Program

DOE: Basic research to discern the implications of climate shifts for energy needs and potentials, and the impacts of energy production on the climate system

1. Improve representation of climate model physics and processes (in the Community Earth System Model). Leverage DOE HPC and numerical expertise to maximize numerical efficiency, develop adaptive mesh, quantify uncertainties, analyze/visualize data (with ASCR)

2. Develop sophisticated systems to test model processes with measurements ("Testbeds"). Focus on clouds/aerosols (with ASR/ARM) and terrestrial (with TES) systems.

3. Integrate human and natural systems (with IA; iESM)



4. Study and improve coupling and feedbacks (clouds, cryosphere, carbon cycle)

5. Project extreme or abrupt changes to climate system (drought, AMOC, ice-sheet stability, methane

Earth System Modeling Laboratory Projects

"IMPACTS" 5. Project abrupt changes to climate system

Investigation of the Magnitudes and Probabilities of Abrupt Climate TransitionS

Bill Collins, LBNL

"Polar" 4. Study and improve feedbacks (clouds, aerosol and cryosphere)

Coupling Global and Regional Model Predictions of the Interactions of Aged Aerosols and Mixed-Phased Clouds in the Arctic

Jerome Fast, PNNL

"High-Res" 1. Utilize HPC and numerical methods to upgrade CESM

Ultra High Resolution Global Climate Simulation to Explore and Quantify Predictive Skill for Climate Means, Variability and Extremes

Jim Hack, ORNL

"FASTER" 2. Constrain processes and feedbacks in cloud-aerosol (with ASR/ARM)

Relationship between cloud fraction and cloud albedo in observations and GCMs

Yangang Liu, BNL

"CSSEF" 1. Numerics, 2. Diagnostics, 4. Feedbacks

Climate Science for a Sustainable Energy Future

Dave Bader, LLNL