The Sociology of Community Modeling

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Christopherson (2000)

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Outline of Presentation

- Challenge of Community Modeling
- Organizational Issues
- Development Issues
- Resource Issues
- Travails and Rewards of Community Modeling

Challenge of Community Modeling

- *Given that:*
 - Ideas Originate from Creative Individuals
 - Scientists are Strongly Individualistic
 - People Have Unique Approaches to Problem Solving
 - People Seek Rewards for their Creativity
- *How Do We Create a Community Effort Which:*
 - Motivates Scientists to Work on a Common Goal
 - Allows All to Feel Involved and Appreciated
 - Allows All to Feel a Sense of Ownership
 - Allows All to Feel Rewarded

Organizational Issues

- Governance of Community Modeling
- Optimal Management Structure?
- Communication Issues

Governance System

- Who Steers the Scientific Direction?
- How Centralized vs Distributed?
 Need a Central Place for Modeling Effort
- How to Insure Inclusiveness?
 - Need to Strike a Balance Between Laboratories and Universities
- How to Motivate a Community of Volunteers?

Management Structure

- The Need for a Scientific Steering Group
 - Provides Oversight and Coordination
 - Provides Scientific Vision
 - Decisions of Resource Allocations
- The Importance of Working Groups
 - Where the Work Really Gets Done
- The Purpose of an Advisory Board
 - Composed of People of Breadth
 - Advises Program Managers on Project
 - Advises Steering Group of Project

Hierarchical Self Organization of a Community Effort



Organization of Community Climate System Model



CCSM Working Groups

Atmospheric Modeling W. Collins, NCAR D. Randall, CSU

Biogeochemistry S. Doney, NCAR I. Fung, U.C. Berkley

Climate Change and Assessment W. Washington, NCAR G. Meehl, NCAR K. Taylor, LLNL/PCMDI

> Climate Variability J. Hurrell, NCAR M. Alexander, NOAA

Land Modeling G. Bonan, NCAR P. Houser, GSFC

Ocean Modeling P. Gent, NCAR R. Smith, LANL

Paleoclimate B. Otto-Bliesner, NCAR L. Sloan, U.C. Santa Cruz

> Polar Climate R. Moritz, U.W. E. Hunke, LANL

Software Engineering C. Deluca, NCAR/SCD T. Craig, NCAR R. Rood, GSFC

Communication

- Working Groups:
 - Within the Groups
 - Among the Groups
- Hold an Annual Meeting
- Use the Web As Much As Possible
- How Does It All Work (Herding Cats)?
- How To Tell the World About Your Model?

Composition of 2001 CCSM Workshop





Community Climate System Model

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News & Events Highlights

• New! Employment Opportunity: Community Climate System Model Liaison - Job #1240 ° Responsible for the dayto-day oversight of the CCSM program.

• New! Employment Opportunity: Project Scientist II - Job #1250 ° Responsible for the dayto-day coordination and support of the CCSM atmospheric model development activities.

• CCSM Seventh Annual Workshop, 25 to 27 June 2002 The Community Climate System Model (CCSM) is a fully-coupled, global climate model that provides state-of-the-art computer simulations of the Earth's past, present, and future climate states.

www.ccsm.ucar.edu

NEWS & EVENTS

News items, a calendar of past and future events, CCSM Annual Workshop home pages.

PROJECT MANAGEMENT

The CCSM Project Plan, home pages for the Scientific Steering Committee (SSC) and the CCSM Advisory Board (CAB), funding opportunities, charges for computer usage.

WORKING GROUPS

A list of working group chairs, working group home pages, membership lists, mission statements, projects, meeting agendas & reports.

PUBLICATIONS

A list of CCSM related publications.

Sociology of Community Modeling

MODELS & DOCUMENTATION

Source code and documentation for component models and coupled systems, software development documents.

EXPERIMENTS & DATA

A database of CCSM experiments and related data, policies on data management, format, and processing.

CCSM SUPPORT NETWORK

Support for data file handling, graphics, and processing.

DISCUSSION FORUM

An online discussion forum.

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Development Issues

- Development Process
 - The Single Most Important Aspect of a Community Model Effort
- Software Management
 - Essential for Insuring the Model is Truly a Community Tool

The Development Process

- System Components:
 - Multiple Developers of Similar Processes
 - Agreement On Experimental Testing Strategy
 - Model Diagnosis and Agreement on Final Model
- Fully Integrated System:
 - Optimal Integration of Components
 - Consideration of Computational Burdens
 - Coupling Strategy for Components
- Release to Community
 - Freeze and Release Issues (Who Gets What First?)
 - Tension Between Developers and Users

Software Management

- Coding Standards
- Documentation (Internal & External)
- Reviews (Change Review Boards)
- Code Archival and Revision Systems



Resource Issues

- Human Resources
 - The Rate Limiting Step to Development
 - The Rate Limiting Step to Diagnosis
- Computational Resources
 - The Rate Limiting Step to Applications

Human Resources

- Who Does What?
- How Do You Reward People?
- How Do You Keep People Satisfied?
- How Do You Support the Greater Community?
 - Need Liaisons between Modeling Activity and Greater Community

Computational Issues

- How to Secure and Insure Resources?
- The Ever Changing Hardware Paradox
 - Portability (Interoperability)
 - Efficiency (e.g. Load Balance Issues)
 - Flexibility
- Data Transmission Issues
- Data Archive Issues

Travails of Community Modeling

- You Will Never Please Everyone in Your Community
- You Will Be Perceived as a Threat by Someone(s)
- You Will Live with the "Modeling is Not Science" Dictum
- You Will Never Finish Developing
- Success Can Be Your Greatest Enemy
 - Keeping Ahead of Malthus
 - You Will Never Have Enough Resources
- Beware What Others Commit You To!

CCSM Workshop Attendance



Year

Sociology of Community Modeling

Rewards of Community Modeling

- Tackling the Big Science Questions
- Building Something Bigger than the Sum of the Parts (Systems Science)
- Satisfaction of Working as a Community