

# KT Overview

## Year 4 Accomplishments and Renewal SI Plans

Wayne Schubert



Knowledge Transfer

CMMAP Team Meeting, January 12-14, 2010



# KT Goals

First SI Plan:

- A. Enable improved climate models
- B. Enable improved weather forecasts
- C. Capture and record the history of global modeling.
- D. Create an appropriate venue for the publication of scientific papers on global environmental modeling.
- E. Create an appropriate venue for the publication of review articles directed toward policy planners and the scientifically informed public.
- F. Create ... CMMAP website.

# KT Objectives

## First SI Plan:

1. Provide to climate modeling centers improved tools for the simulation of global cloudiness, as well as innovative tools for the analysis of such simulations. Relates to Goal A.
2. Provide improved cloud parameterizations to numerical weather prediction centers. Relates to Goal B.
3. Create an edited book on the history of global atmospheric modeling. Relates to Goal C. *Leo Donner\**
4. Create a new all-electronic open-access journal for the publication of research on global environmental modeling, including a section ... for review articles. Relates to Goals D and E.
5. Create and maintain ... CMMAP web site. Relates to Goal F.

*\* Presenter*

# KT Goals

## Renewal SI Plan:

- A. Enable improved climate and weather prediction models.
- B. Enlarge and enhance the global modeling workforce.
- C. Create publications that communicate climate science to a wide range of audiences.

# KT Objectives

## Renewal SI Plan:

1. Collaborate with CCSM on climate change simulations. Relates to Goal A. *Steve Krueger\**
2. Collaborate on global atmospheric model development. Relates to Goal A. *Steve Krueger\**
3. Create a national training resource for global modelers. Relates to Goal B. *Dave Randall\**
4. Foster JAMES, and wean it from CMMAP. Relates to Goal C. *Rodger Ames\**
5. Create an online magazine for public outreach. Relates to Goal C. *Rodger Ames\**

*\* Presenter*

# Book Project

## First SI Plan:

Objective 3. Create an edited book on the history of global atmospheric modeling.

*Leo Donner*

- Accomplishments (Book, Year 4 of the STC)



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# *The Development of Atmospheric General Circulation Models: Complexity, Synthesis, and Computation*

Leo Donner  
GFDL/NOAA, Princeton University

KT Book Project Update, San Diego, January 2010





# Status

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- All chapters and foreword submitted
- 6 revised chapters and foreword in
- 2 revised chapters not in
- Review not received for chapter on land model (Bob Dickinson)-Volunteer for review?





# Overall Impressions

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- Book will provide unique history and current status of climate models.
- Most authors have written at “specialist” level. Implications for marketing target.
- Wider group of physical and biological scientists may find book challenging, especially due to “jargon.” Glossary may be helpful.
- Re-ordering of chapters to improve overall coherence (Washington, Fleming chapters should be adjacent. Position of IPCC chapter...ultimate or penultimate?)





# Remaining Activity

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- Manuscript was due at Cambridge 31 Dec 2009
- Some chapter revisions still required
- Introduction to be written
- Format issues, e.g., consistent referencing among chapters, to be addressed
- Copyrights for figures
- Marketing analysis
- Cover art-Suggestions welcome
- Submission





## Cover Layout Suggested by Dave Randall

The Development of Atmospheric  
General Circulation Models:  
Complexity, Synthesis, and  
Computation



*Leo Donner, Wayne Schubert,  
and Richard Somerville, Eds.*





# Current Chapter Order

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- Foreword, Introduction (Held, Editors)
- 2. Richardson to Early NWP (Lynch)
- 3. Evolution of GCM Research Goals (Washington and Kasahara)
- 4. NWP/Climate Synergies (Senior)
- 5. Observations (Lau)
- 6. Societal Context (Fleming)
- 7. IPCC (Somerville)
- 8. Ocean Coupling (Bryan)
- 9. Land Coupling (Dickinson)
- 10. Complexity (Randall)



# Enable Improved Climate and NWP Models

## Renewal SI Plan:

Objective 1. Collaborate with CCSM on climate change simulations.

Objective 2. Collaborate on global atmospheric model development.

## *Steve Krueger*

- Accomplishments (KT to NWP and Climate Centers, Year 4 of the STC)
- Renewal plans

# ***Objectives***

1. Collaborate with CCSM on climate change simulations. *Relates to Goal A.*

2. Collaborate on global atmospheric model development. *Relates to Goal A.*

*Goal A: Enable improved climate and weather prediction models.*

# **Collaborate with CCSM on climate change simulations**

- Our main Knowledge-Transfer partnership in the climate modeling arena is with the Community Climate System Model (CCSM) project, which is led by the National Center for Atmospheric Research.

# **Collaborate with CCSM on climate change simulations**

- CMMAP will collaborate with CCSM in connection with the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), which will be completed in 2013. CMMAP and CCSM scientists will perform simulations of direct relevance to AR5, using CMMAP computing resources, and a unique model created by CMMAP using some components from the CCSM.

# **Collaborate with CCSM on climate change simulations**

- Analysis of the simulation results will provide a basis for evaluation of the cloud-related feedbacks on climate change, in comparison with results from a conventional version of the CCSM.
- Our results will be provided as input to the IPCC's Assessment.

# **Collaborate on global atmospheric model development**

- On the weather prediction side, CMMAP will continue its partnership with the National Centers for Environmental Prediction (NCEP).
- CMMAP will also begin a new partnership with the Earth System Research Laboratory (ESRL).
- CMMAP will organize an international intercomparison of very high-resolution global dynamical cores.

# **Collaborate on global atmospheric model development:**

## **NCEP**

- NCEP's EMC (Environmental Modeling Center) is considering using the assumed PDF method for representing subgrid-scale clouds and turbulent fluxes in the GFS and CFS.
- NCEP's EMC is particularly interested in using the giga-LES for improving the cumulus parameterization used in the GFS and CFS.

# **Collaborate on global atmospheric model development:**

## **New interactions with ESRL**

- ◆ ESRL is building models that have a lot in common with CMAP models.
- ◆ We have a history of working with ESRL.
- ◆ ESRL has a strong and growing connection with NCEP.
- ◆ ESRL is close to CSU, making collaboration easy

# Metrics for Knowledge Transfer

- Number of collaborative research papers on climate change.  
*Addresses Objective 1.*
- Number of collaborative research papers on numerical weather prediction.  
*Addresses Objective 2.*

# Summary

Objectives	Actions Required	Key Scientists	Timeline
1. Collaborate with CCSM on climate change simulations	Perform simulations	Randall, Collins, Moeng	Year 8
	Analyze results		
	Communicate results to AR5		
2. Collaborations on global atmospheric model development	Continue interactions with NCEP, NCAR, and GFDL	Randall, Krueger, Collins, Donner	Ongoing
	Create new interactions with ESRL		
	Organize intercomparison of GCRMs		

# Enhance the Global Modeling Workforce

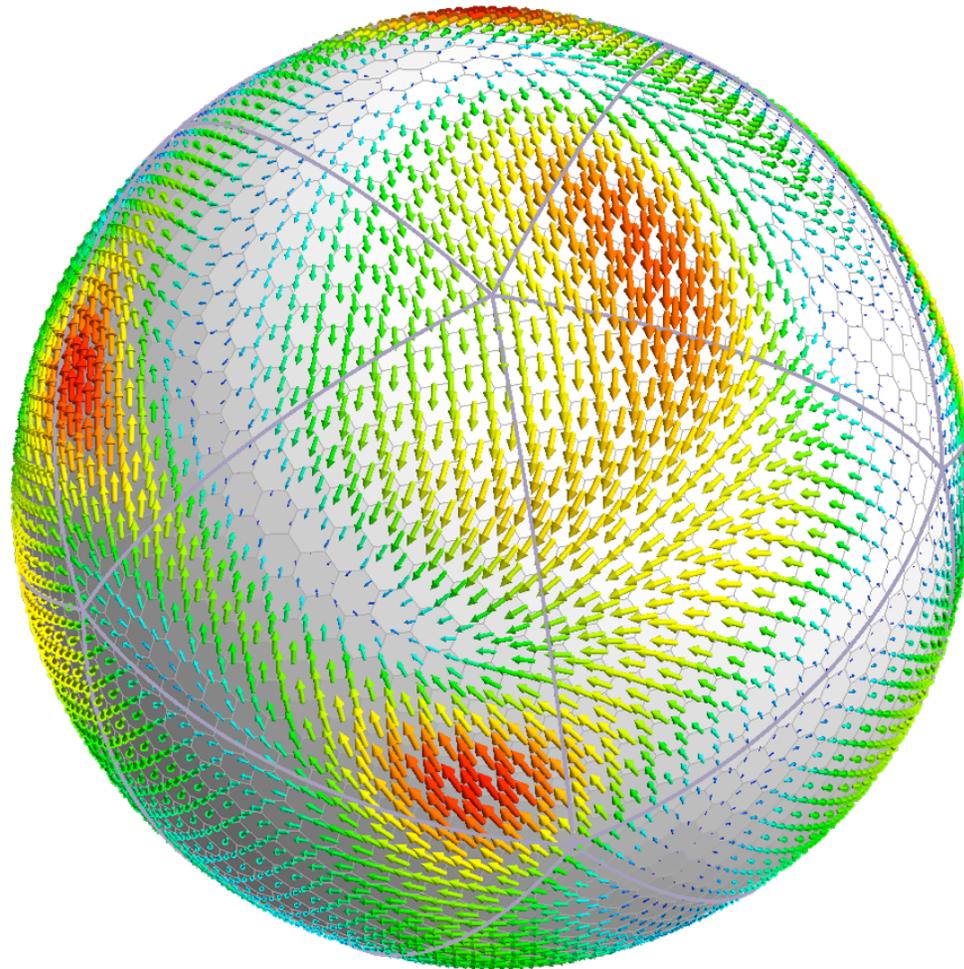
## Renewal SI Plan:

Objective 3. Create a national training resource for global modelers.

*Dave Randall*

- Renewal plans

# Training Global Modelers





**Teaching is  
the most important job  
in the world.**

# The Need



- ◆ **Global modeling is a rapidly growing, constantly changing, increasingly complicated subject.**
- ◆ **Not many people build models -- especially parameterizations.**
- ◆ **There is a need for more modeling expertise to support climate prediction.**

# What is the content?



- ◆ **Concepts**
  - ▲ **Numerics**
  - ▲ **Physics**
  - ▲ **Tests**
  - ▲ **Applications**
- ◆ **Infrastructure**
  - ▲ **Major modeling centers**
  - ▲ **Operational models**
  - ▲ **Datasets**
  - ▲ **Analysis tools**
  - ▲ **Supercomputing**
- ◆ **History**
  - ▲ **Stand alone**
  - ▲ **Blended with technical material**

# Who is the audience?

- ◆ **Graduate students at universities**
- ◆ **Professionals, for example at federal modeling centers**



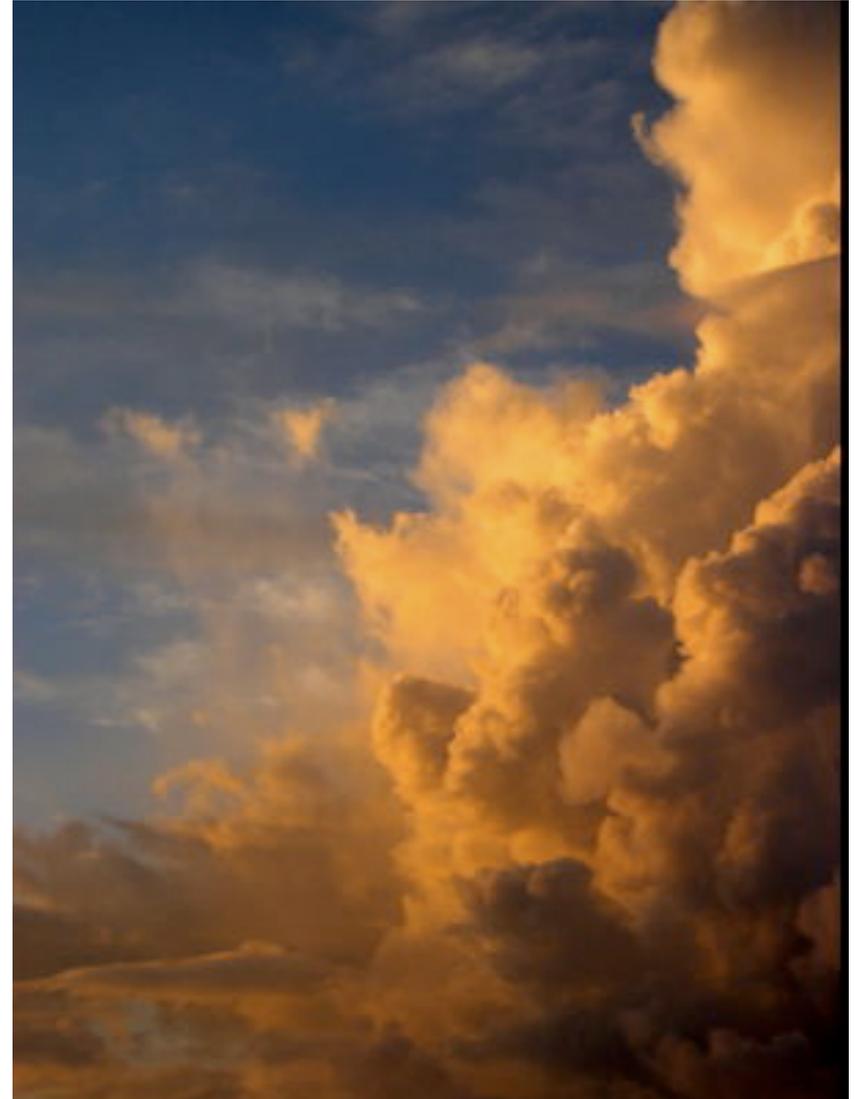
# How can we reach them?



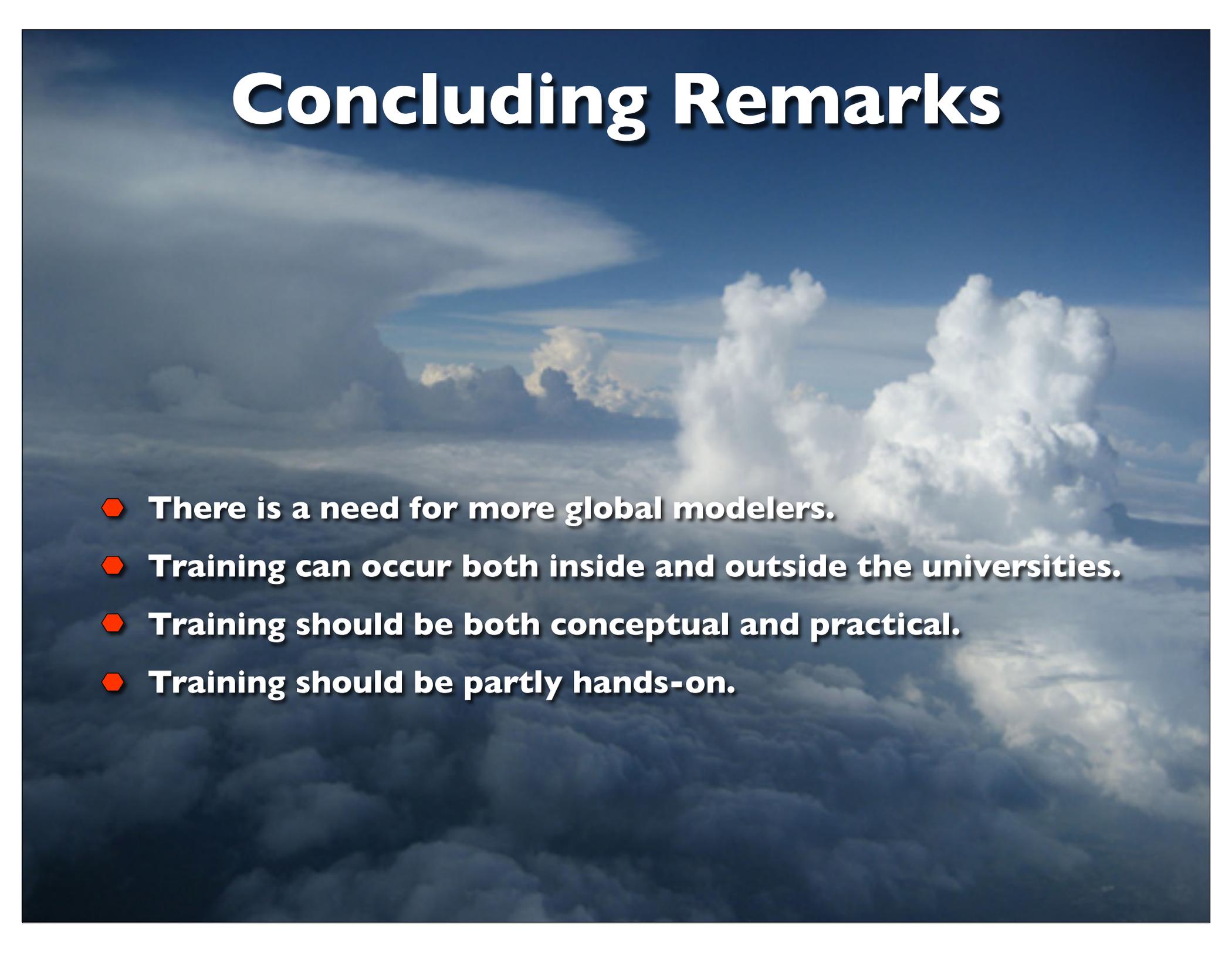
- ◆ **University classes**
  - ▲ **Lecture materials**
  - ▲ **Textbook(s)**
- ◆ **Summer schools**
  - ▲ **2 weeks**
  - ▲ **Rotating venues**
- ◆ **Web sites**

# How it will work

- ◆ **University classes**
  - ▲ **Access to federal models**
  - ▲ **Support for hands-on instruction**
    - **Computer time**
    - **Technical assistance**
  - ▲ **Documentation**
- ◆ **Summer schools**
  - ▲ **Venues**
  - ▲ **Instructors**
  - ▲ **Recruiting/selection processs**
  - ▲ **Student expenses**
  - ▲ **And the same three requirements listed for university classes**



# Concluding Remarks



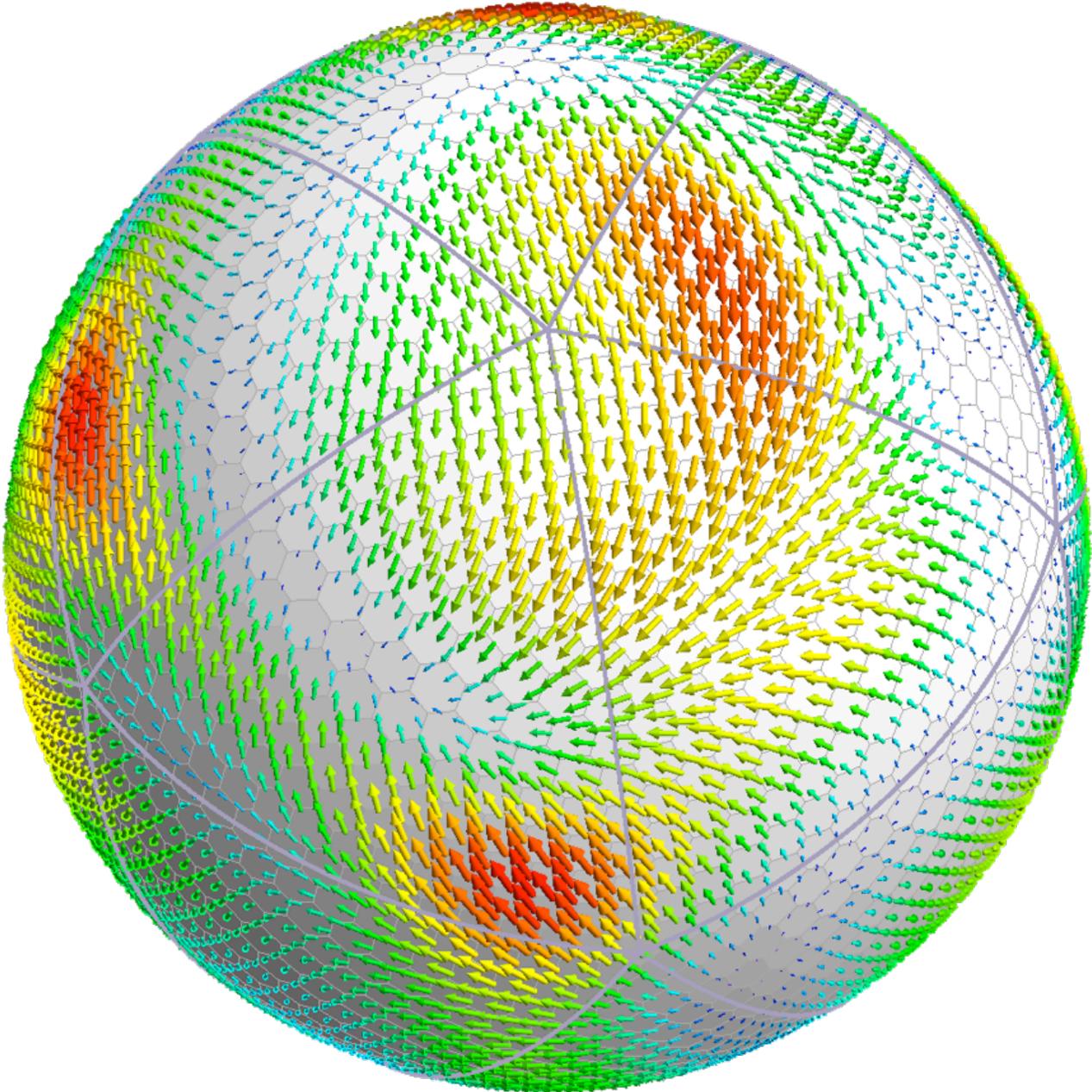
- ◆ **There is a need for more global modelers.**
- ◆ **Training can occur both inside and outside the universities.**
- ◆ **Training should be both conceptual and practical.**
- ◆ **Training should be partly hands-on.**



**Alison Gopnik  
UC Berkeley**

**...Babies and kids are really the R&D department of the human species.  
They're the ones that get to do the blue-sky learning, imagining, thinking.**

**And the adults are production and marketing.**



# Publication Projects

## Renewal SI Plan:

Objective 4. Foster JAMES, and wean it from CMMAP.

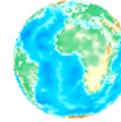
Objective 5. Create an online magazine for public outreach.

## *Rodger Ames*

- Accomplishments (JAMES, Year 4 of the STC)
- Renewal plans

# JAMES Accomplishments

- First articles published in June of 2009
- 16 articles published to Vol. 1, 2009
  - ▶ 4 Review papers; 11 Research; 1 “Short Topic”
- Submitted manuscripts
  - ▶ 3 in press; 4 in review; 4 rejected
- A new editor: Christiane Jablonowski, University of Michigan
- Added to DOAJ & MGA
- Under evaluation for coverage in Web of Science



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The Journal of Advances in Modeling Earth Systems (JAMES) is an international, open-access, scientific journal for the publication of original and updated research. JAMES is the only journal devoted to modeling Earth systems. JAMES maintains high standards of formal peer review, and provides authors the opportunity to participate in an interactive discussion forum. JAMES is committed to removing publication barriers and offers high quality publication services at minimal cost.

**Sections**

- Review
- Research
- Short Topics

**Article Spotlight**

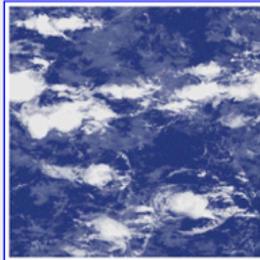


Figure 4. Visualization of simulated cloud scene over the area of 205x205 km<sup>2</sup> corresponding to hour 13 of the BASE run. The image represents visible albedo estimated from the liquid and ice water paths. The cloud arcs around some of the deep clouds are the shallow clouds lifted up by the gust fronts at the edges of spreading cold pools. The semi-transparent gray-blue areas indicate the presence of cirrus clouds, while dark-blue areas are cloud-free.

Khairoutdinov, Krueger, Moeng, Bogenschutz, Randall; Large-eddy simulation of maritime deep tropical convection [Abstract](#)

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- 11 Dec. '09 **December 2009 JAMES Update!** [More...](#)
- 6 Mar. '09 **March 2009 JAMES Update!** [More...](#)
- 19 Feb. '09 **Letter from the Chief Editor** [More...](#)

**Recently Published - Vol. 1, 2009** [Full TOC](#)

**Research**

- The tropical marine boundary layer under a deep convection system: a large-eddy simulation study**, Moeng, LeMone, Khairoutdinov, Krueger, Bogenschutz, Randall, Art. #16, 13 pp. *Published 30 Dec. '09* [Abstract](#) [PDF](#)
- Large-eddy simulation of maritime deep tropical convection**, Khairoutdinov, Krueger, Moeng, Bogenschutz, Randall, Art. #15, 13 pp. *Published 31 Dec. '09* [Abstract](#) [PDF](#) [Supp. Files \(1\)](#)
- Sensitivity of land-atmosphere exchanges to overshooting PBL thermals in an idealized coupled model**, McGrath-Spangler, Denning, Corbin, Baker, Art. #14, 13 pp. *Published 29 Nov. '09* [Abstract](#) [PDF](#) [HTML](#)

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**Research**

- Tropical Cyclone Activity Downscaled from NOAA-CIRES Reanalysis, 1908-1958**, Emanuel *Accepted 5 Jan. '10* [Abstract](#) [Rev. PDF](#)
- Rotated versions of the Jablonowski steady-state and baroclinic wave test cases: A dynamical core intercomparison**, Lauritzen, Jablonowski, Taylor, Nair *Accepted 9 Dec. '09* [Abstract](#) [Rev. PDF](#)

**Manuscripts Recently Posted to the Discussion Forum** [See All](#)

**Review**

- Progress in understanding land-surface-atmosphere coupling over the Amazon: a review**, Betts, Silva Dias *Submitted 12 Nov. '09* [Abstract](#) [PDF](#) [Comments \(0\)](#)
- Intraseasonal Variability in an Aquaplanet General Circulation Model**, Maloney, Sobel, Hannah *Submitted 30 Sep. '09* [Abstract](#) [PDF](#) [Comments \(0\)](#)

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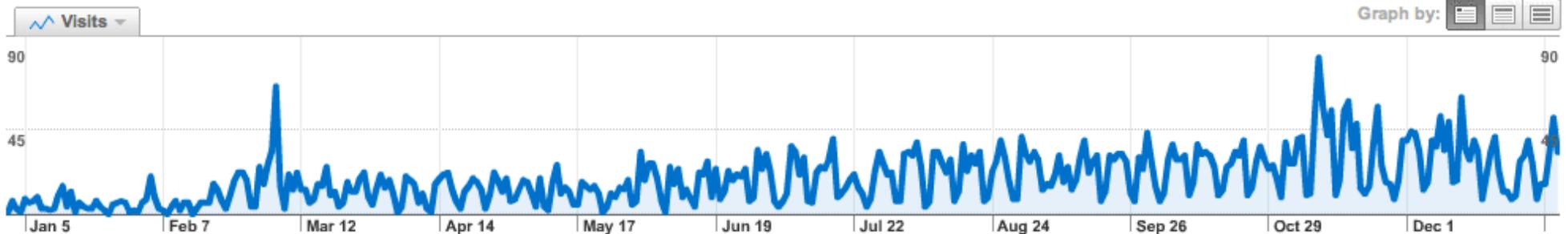


# JAMES - fun stats.

## Site visits and page views in 2009

### Dashboard

Jan 1, 2009 - Jan 6, 2010



### Site Usage

 **6,999 Visits**

 **48.66% Bounce Rate**

 **41,777 Pageviews**

 **00:05:28 Avg. Time on Site**

 **5.97 Pages/Visit**

 **55.24% % New Visits**

# JAMES - fun stats

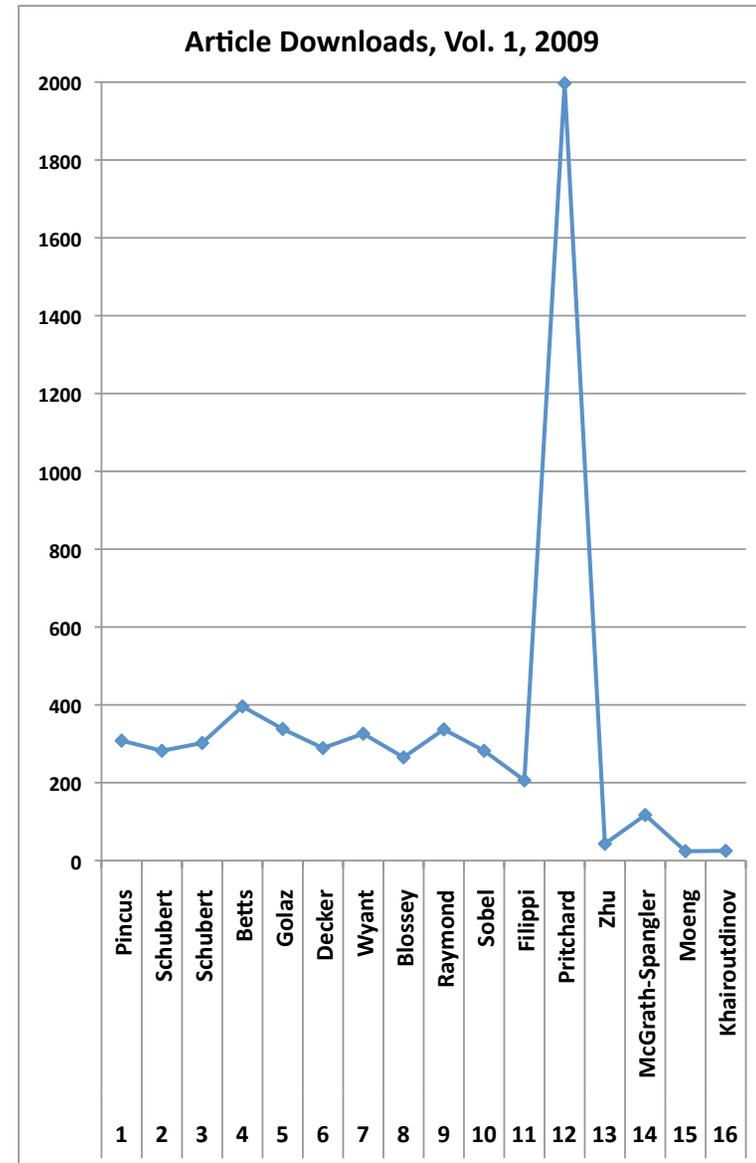
## Visits from around the world in 2009



**6,999 visits came from 1,219 cities**

# JAMES - fun stats

Number of PDF  
downloads by published  
article, Volume I, 2009



# JAMES - Renewal SI Plan

- Objective 4: **Foster JAMES**, and wean it from CMMAP
- Attract submissions
- Continue and expand marketing activities
- Increase visibility through A&I services, library coverage
- Publish articles
- Form new partnerships

# JAMES - Renewal SI Plan

- Objective 4: Foster JAMES, **and wean it from CMMAP**
- Current plan is to “hand-off” JAMES to IGES by Year 8 (2014)
- AGU approached us with an idea for a new journal
  - New title would cover the physical science of climate models and impacts of climate change (e.g. adaptation and mitigation research).
  - JAMES is a candidate to become “Part I” of such a journal.
  - AGU will develop a model for the proposed journal.
- Potential for a partnership with AGU in the near-term.

# JAMES - Renewal SI Plan

Our proposed terms for a publishing partnership with AGU:

- The JAMES model does not change
  - ▶ Focus on Earth systems modeling; open access; Creative Commons Attribution Licensing
- JAMES listed as an AGU journal
- AGU helps with marketing
- Benefits to each party
  - ▶ JAMES gains exposure and credibility via AGU's status; marketing expertise; membership
  - ▶ AGU gains an open access title focused on Earth systems modeling

# New publication

- Objective 5: Create an online magazine for public outreach
- Working title: *Climate Sense*
- Mission: provide a venue for a multidisciplinary conversation surrounding the Earth's climate and climate change, and to promote Earth-Science literacy.
- Content: non-technical articles on a range of topics related to climate science and climate policy.
- Target audience: students and members of the public who are educated at the university level, educators, and policy makers.
- Business plan: under development.



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ClimateSense is a source of interesting and informative articles focused on helping students, educators, policy makers, and members of the public interested in climate issues make "sense" of climate science and climate policy. In ClimateSense we provide a "watering hole" for the multidisciplinary conversation surrounding the Earth's climate and climate change.

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<b>Advisory Board</b>	Articles	<a href="#">Progress on desertification?</a>	<a href="#">PDF</a>
<b>Focus and Scope</b>	Essential facts	<i>Niall Hanan</i>	
<b>Submission Guidelines</b>	Notes from the field	<a href="#">The Road to Copenhagen: How did we get here?</a>	<a href="#">PDF</a>
	Audio and Visuals	<i>Michele Betsill</i>	
	I wonder box	<a href="#">Climate, Energy and Community: Vermont 2008</a>	<a href="#">PDF</a>
	How to...	<i>Alan K Betts</i>	



**Spotlight**

"The history of every Nation is eventually written in the way in which it cares for its soil." (Franklin D. Roosevelt, 1936). The United Nations Convention to Combat Desertification recently held its 9th Conference of Parties (COP-9) in Buenos Aires, Argentina to discuss global agreements aimed at reducing land degradation in Africa and other dryland regions. Although ratified by 193 UN member states, the UNCCD has had nothing like the impact of the UN Framework Convention on Climate Change, but progress on prevention and restoration of degraded lands could contribute not only to poverty alleviation and food security in poor rural communities, but also to carbon sequestration and protection of biological diversity.

Photo credit: [Ségué. \(2009\).](#) In Encyclopædia Britannica Online. Retrieved November 02, 2009.

*Hanan*; Progress on desertification? [Read more...](#) [Comment on this article!](#)

**Spotlight**

Delegates from more than 180 countries will meet in Copenhagen, Denmark 7-18 December to negotiate a new global climate change treaty. The current negotiations attempt to address two major issues: 1) the role of developing countries in a global response to climate change, and 2) additional commitments by industrialized countries for reducing greenhouse gas emissions. While these issues are being treated separately in the negotiations, countries are using their connections in a big game of

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**Format:**

- Organize content by categories of interest to the intended audience (students/educators/interested public).
- Contributing Editors write short introductions to submitted pieces, or to linked content from other sources (information broker).
- Review function (to evaluate the degree to which articles are well written and interesting).

Editors

	<b>Meena Balgopal</b>  Colorado State University, Department of Education United States Interests: Education	Phone: phone Fax: fax <a href="#">Web Site</a>
	<b>Dave Randall</b>  Colorado State University, Department of Atmospheric Science	
	<b>Diana Wall</b>  Colorado State University, School of Global Environment and Society	
	<b>Howard Drossman</b>  Colorado College, Department of Chemistry and Biochemistry	
	<b>Michele Betsill</b>  Colorado State University, Department of Political Science	
	<b>Brian Jones</b>  Colorado State University, Little Shop of Physics	
	<b>Sue Ellen Campbell</b>  Colorado State University, Department of English	
	<b>John Calderazzo</b>  Colorado State University, Department of English	
	<b>Scott Denning</b>  Colorado State University, Department of Atmospheric Science	
	<b>Wayne Schubert</b>  Colorado State University, Department of Atmospheric Science	
	<b>Julia Klein</b>  Colorado State University, Department of Forestry, Rangeland, and Watershed Stewardship	
	<b>Niall Hanan</b>  Colorado State University, Natural Resources Ecology Lab United States Interests: dryland ecology, climate change, development, Africa	Phone: 970-491-0240 Fax: 970-491-1965

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## Connections:

- Participation by faculty from a broad spectrum of academic programs; Education; English; Political Science; Natural Resources; Earth Sciences.
- Plan is to involve Schools of the Environment at CSU (SOGES) and other universities.
- Synergies with ED activities.

