Final Report for Period: 09/2008 - 08/2009
Submitted on: 03/12/2010
Principal Investigator: Katzenberger, John .
Award ID: 0850871
Organization: Aspen Global Change Inst
Submitted By:
Katzenberger, John - Principal Investigator
Title:
Aspen Global Change Institute (AGCI) Interdisciplinary Science Workshop: Decadal Climate Prediction; Aspen, CO; June 22-28, 2008

Project Participants

Senior Personnel

Name: Katzenberger, John
Worked for more than 160 Hours: Yes
Contribution to Project:

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Other Participant

Name: Masone, Michelle
Worked for more than 160 Hours: Yes
Contribution to Project:
Ms. Masone served as conference coordinator, assisting in the logistical preparation and execution of the meeting.

Name: Goddard, Lisa
Worked for more than 160 Hours: No
Contribution to Project:
Dr. Goddard was a co-chair who helped to organize the content of the meeting (without compensation).

Name: Meehl, Gerald
Worked for more than 160 Hours: No
Contribution to Project:
Dr. Meehl was a co-chair who helped to organize the content of the meeting (without compensation).

Name: Murphy, James
Worked for more than 160 Hours: No
Contribution to Project:
Dr. Murphy was a co-chair who helped to organize the content of the meeting (without compensation).

Name: Stouffer, Ronald
Worked for more than 160 Hours: No
Contribution to Project:
Dr. Stouffer was a co-chair who helped to organize the content of the

meeting (without compensation).

Name: Stevens, Tanya

Worked for more than 160 Hours: No

Contribution to Project:

Ms. Stevens assisted with logistics for the meeting.

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

The participants of the meeting other than AGCI staff and meeting co-chairs are listed
below along with their organizational identification:

Ronald Stouffer National Oceanic and Atmosphere Administration
Anthony Rosati Geophysical Fluid Dynamics Laboratory
Keith Dixon National Oceanic and Atmospheric Administration
Gerald Meehl National Center for Atmospheric Research (NCAR)
Joe Tribbia National Center for Atmospheric Research (NCAR)
Gokhan Danabasoglu National Center for Atmospheric Research (NCAR)
Peter Gent National Center for Atmospheric Research (NCAR)
James Murphy Met Office Hadley Centre
Timothy Stockdale European Centre for Medium-Range Weather Forecasts (ECMWF)
Lisa Goddard Columbia University
Art Greene International Research Institute for Climate & Society
George Boer Canadian Centre for Climate Modelling and Analysis
Masahide Kimoto University of Tokyo
Marco Giorgetta Max Planck Institute for Meteorology
Gabriele Hegerl Duke University
Ben Kirtman University of Miami
David Karoly University of Melbourne
Vikram Mehta Center for Research on the Changing Earth System
Richard Murnane Bermuda Institute of Ocean Science
Noel Keenlyside Institut fuer Meereswissenschaften-Fusion des Forschungszentrums f?r Marine Geowissenschaften (IFM-GEOMAR)
Detlef Stammer University of Hamburg
Doug Smith Met Office Hadley Centre
Jean-Francois Lamarque National Center for Atmospheric Research (NCAR)
Claudia Tebaldi Climate Central
Kathy Hibbard National Center for Atmospheric Research (NCAR)
Edwin Schneider George Mason University
Laurie Trenary University of Colorado
Aixue Hu National Center for Atmospheric Research (NCAR)
Weiqing Han University of Colorado
Ed Hawkins Walker Institute

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

[Please also refer to uploaded workshop agenda]

The major activities of this project was a weeklong meeting held in Aspen, Colorado entitled, Climate Prediction to 2030: Is it possible , what are the scientific issues, and how would those predictions be used? The meeting occurred June 22-28, 2008.

Participants in the meeting included 4 organizing co-chairs and 29 participants representing major climate modeling research institutions from around the world.

The work of this meeting picked up where a 2006 meeting also held by AGCI left off in addressing needs for short-term climate prediction. The work of this meeting summarized current state of knowledge on decadal prediction, discussed the degree of success one could expect from such experiments, proposed possible solutions to the scientific challenges involved with this problem, and an assessed how this type of climate change information could be used for decision support and impacts analyses in the context of natural climate variability and anthropogenic climate change.

At the conclusion of the meeting, organizers and participants worked to report on the meetings findings in the form of an article that was ultimately published in the Bulletin of the American Meteorological Society (reference provided under Products).

During the meeting, the public was invited to an evening lecture as part of AGCI?s ongoing Walter Orr Roberts Public Lecture Series. Lisa Goddard, one of the meeting?s co-chairs, delivered the lecture on the subject of decadal prediction. After the lecture a public reception was held in which the public was invited to engage with meeting participants about their work. Ultimately, a video of the lecture was posted on the AGCI website and has been viewed 259 times to date.

Findings:

Decadal prediction lies between seasonal/interannual forecasting and longer-term climate change projections, and focuses on time-evolving regional climate conditions over the next 10?30 yr. Numerous assessments of climate information user needs have identified this time scale as being important to infrastructure planners, water resource managers, and many others. It is central to the information portfolio required to adapt effectively to and through climatic changes.

At least three factors influence time-evolving regional climate at the decadal time scale:
1) climate change commitment (further warming as the coupled climate system comes into adjustment with increases of greenhouse gases that have already occurred),
2) external forcing, particularly from future increases of greenhouse gases, aerosols, and recovery of the ozone hole, and
3) internally generated variability.

Some decadal prediction skill has been demonstrated to arise from

the first two of these factors, and there is evidence that initialized coupled climate models can capture mechanisms of internally generated decadal climate variations, thus increasing predictive skill globally and particularly regionally. Several methods have been proposed for initializing global coupled climate models for decadal predictions, all of which involve global time-evolving three-dimensional ocean data, including temperature and salinity.

An experimental framework to address decadal predictability/prediction developed during this meeting and has been incorporated into the coordinated Coupled Model Intercomparison Model, phase 5 (CMIP5) experiments, some of which will be assessed for the IPCC Fifth Assessment Report (AR5). These experiments will likely guide work in this emerging field over the next 5 yr.

Training and Development:

Four participants of the meeting classify either as post-docs or young scientists.

Outreach Activities:

During the meeting, the public was invited to an evening lecture as part
of AGCI?s ongoing Walter Orr Roberts Public Lecture Series. Lisa Goddard, one of the meeting?s co-chairs, delivered the lecture on the subject of decadal prediction. After the lecture a public reception was held in which the public was invited to engage with meeting participants
about their work. Ultimately, a video of the lecture was posted on the AGCI website and has been viewed 259 times to date.

Additional education and public outreach resulting from this project is currently being incorporated through the 'Classroom' section of our website utilizing videos and powerpoint presentation material (explained in lay terms).

Journal Publications

Meehl, GA; Goddard, L; Murphy, J; Stouffer, RJ; Boer, G; Danabasoglu, G; Dixon, K; Giorgetta, MA; Greene, AM; Hawkins, E; Hegerl, G; Karoly, D; Keenlyside, N; Kimoto, M; Kirtman, B; Navarra, A; Pulwarty, R; Smith, D; Stammer, D; Stockdale, T, "DECADAL PREDICTION Can It Be Skillful?", BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY, p. 1467, vol. 90, (2009). Published, 10.1175/2009BAMS2778.

Books or Other One-time Publications

Web/Internet Site

URL(s):

http://www.agci.org/programs/past_scientist_workshops/about_the_workshop/sciSess_details.php?recordID=241

Description:

This site offers the public a searchable archive of the meeting's proceedings including: roster, agenda, pdf versions of slideshow presentations, pre and post workshop documents and publications, and a complete video record of the proceedings (in progress).

Other Specific Products

Contributions

Contributions within Discipline:

The experimental design developed at the decadal prediction meeting is an integral part to the overall climate change modeling strategy of the Coupled Model Intercomparison Project Phase 5 (CMIP5). Modeling groups are now running these experiments with the hope that many of them will be completed by the end of this year so they can be analyzed and have papers written to be assessed in the upcoming Intergovernmental Panel on Climate Change Fifth Assessment Report (IPPCC AR5). IPCC AR5 will have an entire chapter devoted to decadal prediction and shorter term climate change. This is the first time such a chapter has appeared in an IPCC assessment, and the AGCI session was a major contributor to developing this area of study to the point that it can be assessed in its own IPCC chapter.

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

The work of this meeting has significant implications for the public welfare because the users of decadal climate prediction information are those engaged in climate change mitigation, adaptation, and risk assessment activities, such as resource management and protection, infrastructure planning and investment, and private enterprise. As evidence by the recently created NOAA Climate Services Office, there is a high demand for accurate and accessible climate prediction on the 10-30 year scale. This meeting was key in bringing together many of the international climate modeling groups in assessing scientific and technical issues associated with moving the state of the art forward in experimental designing for that purpose.

Conference Proceedings

Categories for which nothing is reported:

Organizational Partners

Any Book

Any Product

Contributions: To Any Other Disciplines

Contributions: To Any Human Resource Development

Contributions: To Any Resources for Research and Education

Any Conference

CLIMATE PREDICTION TO 2030:
Is it possible, what are the scientific issues, and how would those predictions be used?
June 22-28, 2008
Aspen, Colorado

Workshop Chairs: Lisa Goddard and Ronald Stouffer
Organizing Committee: Gerald Meehl, Ronald Stouffer, Lisa Goddard, and James Murphy

Agenda

1 July 2008 Version (v5)

Note: The Aspen Global Change Institute is located on the property of the Given Institute, 100 E. Francis. All sessions are at this location unless otherwise indicated.

June 22, Sunday

Afternoon arrivals

6:00 PM Informal reception in the backyard of the Given Institute
6:30 PM Backyard dinner (evenings can be cool, bring a jacket or sweater)

June 23, Monday

8:00 AM *Refreshments*
8:30 AM Introduction to session and intended products (John Katzenberger & session co-chairs)

OVERVIEW TALKS

9:00 AM Decadal prediction **(James Murphy)**
9:45 AM Decadal predictability and signal to noise **(David Karoly)**

10:30 AM *Break*

11:00 AM Preview of OceanObs '09 **(Detleff Stammer)**
11:05 AM Decadal information for applications **(Lisa Goddard)**
11:45 AM Decadal prediction experimental design **(Gabi Hegerl/Tim Stockdale)**

12:30 PM *Lunch (on your own)*

CURRENT ACTIVITIES RELATED TO DECADAL PREDICTION FROM RESEARCH GROUPS

2:00 PM **Marco Giorgetta** (Germany)
2:20 PM **Masa Kimoto** (Japan)
2:40 PM **James Murphy** (U.K.)

3:00 PM *Break*

3:30 PM **Joe Tribbia** (NCAR)
4:00 PM **Ed Schneider** (COLA)
4:30 PM **Ed Hawkins** (Reading)

4:50 PM *Adjourn*

6:30 PM Group dinner in the backyard of the Given Institute

June 24, Tuesday

8:40 AM: FIELD TRIP *(optional)* – GROUP HIKE TO THE MAROON BELLS
Guests welcome. Meet in the Molly Gibson lobby. Bus leaves from northeast corner of Main and Garmisch at about 8:47 AM

12:30 PM *Lunch (on your own)*

DECADAL PREDICTION TOPICS

1:30 PM Understanding Ocean-Atmosphere Interaction in the Tropical Pacific **(Tony Rosati)**

2:00 PM Coupled initialization at Hadley Centre **(Doug Smith)**
2:30 PM Advancing Decadal-Scale Climate Prediction in the N. Atlantic **(Noel Keenlyside)**

3:00 PM *Break*

3:30 PM Chemistry for decadal predictions **(Jean-Francois Lamarque)**
4:00 PM Statistical characterization and prediction(?) of decadal variability **(Art Green)**
4:30 PM Decadal Prediction Information **(Claudia Tebaldi)**

5:00 PM *Adjourn*

June 25, Wednesday

8:00 AM *Refreshments*

8:30 AM BREAKOUT GROUPS

1. Decadal prediction experimental design **(Ron Stouffer/Gabi Hegerl)**
2. Decadal prediction applications **(Rick Murnane/Lisa Goddard)**

12:30 PM *Lunch served at AGCI*

2:00 PM WORKING GROUP 1: status report and discussion

3:00 PM *Break*

3:30 PM WORKING GROUP 2: status report and discussion

4:30 PM *Adjourn*

6:00 PM WALTER ORR ROBERTS MEMORIAL PUBLIC LECTURE
At the Given Institute Lecture Hall
Speaker: **Lisa Goddard**
Followed by a public wine and cheese reception in the backyard of the Given

June 26, Thursday

8:00 AM *Refreshments*

PREDICTABILITY TOPICS

8:30 AM Atlantic THC **(Gokhan Danabasoglu)**
9:00 AM Pacific PDO/IPO **(Jerry Meehl)**
9:30 AM ENSO **(Ben Kirtman)**

10:00 AM *Break*

10:30 AM Results from Recent ENSO Experiments **(Peter Gent)**
11:00 AM North Atlantic MOC in GFDL CM2.1 Modeling **(Keith Dixon)**
11:15 AM Decadal Multi-Modal Potential Predictability **(George Boer)**
11:30 AM Decadal Subsurface Cooling in the Tropical Indian Ocean **(Laurie Trenary)**

12:00 PM *Group lunch at the Sundeck Restaurant on top Aspen Mountain*

3:30 PM Group Review and Discussion of Decadal Prediction Research Proposal Outline **(Tony Rosati and Peter Gent)**
5:00 PM GFDL Hi Resolution SST Animations **(Tony Rosati and Keith Dixon)**

June 27, Friday

8:30 AM *Refreshments*

9:00 AM Prospects for decadal predictions **(Detlef Stammer)**
9:30 AM Prospects for decadal predictions **(George Boer)**

10:00 AM *Break*

10:30 AM future of decadal predictions **(Vikram Mehta)**
11:00 AM future of decadal predictions **(Keith Dixon)**
11:30 AM Influence of decadal variability on extremes **(Gabi Hegerl)**

12:00 PM *Lunch served at AGCI*

1:30 PM Group Review of AR5 Experimental Design Project Outline **(Jerry Meehl and Ron Stouffer)**
2:00 PM Group Review of BAMS Article Outline **(Jerry Meehl and Ron Stouffer)**

3:00 PM *Adjourn*

6:30 PM *Group Farewell Dinner at the Sky Hotel, 709 E. Durant St.*

June 28, Saturday

8:30AM *Refreshments*

9:00 AM Final Group Review of BAMS Article Outline **(Jerry Meehl and Ron Stouffer)**

10:30AM *Break*

11:00AM Final Group Review of BAMS Article Outline **(Jerry Meehl and Ron Stouffer)**

12:00 pm *Adjourn*

Afternoon departures