WGCM workshop on model tuning

6-8 October 2014
Garmisch-Partenkirchen, Germany

Monday

9:00-09:45 : Welcome and Introduction
From Pasadena to Garmisch-Partenkirchen (Frédéric Hourdin)
Expectations from WGCM and CMIP (Sandrine Bony)
Meeting : presentation and expectations (Thorsten Mauritsen)

Part I : Strategies of modeling groups

Chaired by : Larissa Nazarenko and Chris Golaz

In the first part we will have modeling groups present their tuning strategies. The emphasis here is on global coupled climate models and the particular issues related to tuning these. Presentations can include the specific tuning procedure, describing tuning targets and weighing, the processes that are tuned and how they influence results, and perhaps what you think about model tuning and what are the remaining outstanding problems. We are neither interested in details of your model or institute, nor advertising how good your model is.

09:45 (15+10) : A brief history of AOGCM tuning methods over the past 30 years or so
Ronald J Stouffer

10:10 (10+5) : Distress and dilemmas in developing and tuning models
Hideaki Kawai

10:25 (10+5) : Tuning and development of EC-Earth 3.1
Jost von Hardenberg

10:40 Coffee break

11:10 (15+10) : Tuning Strategy in the Community Earth System Model
Gokhan Danabasoglu, Jean-Francois Lamarque, Andrew Gettelman
11:35: (10+5) : Towards Credible and Transparent Model-Based Climate Science
John Scinocca

12:00: (10+5) : Tuning the GISS climate model to the past climate
Larissa Nazarenko

12:15 : (10+5) : CNRM-CM coupled model tuning protocol
David Salas

12:30 : Lunch Break
14:00 : Social event: Hike around Eibsee
15:30 : coffee break

16:00 (15+10) : On the development, tuning procedure, and parameter sensitivity of the climate model MIROC
Hiroaki Tatebe

16:25 (15+10) : Approaches for the tuning of the radiative balance in the IPSL climate model
Frédéric Hourdin, et al.

16:50 (10+5) : Tuning climate model INMCM
Evgeny Volodin

17:05 (10+5) : Tuning with expensive model physics: MPI-ESM-HAM, a progress report
Doris Folini

19:00 Dinner

20:30 : Why historians, sociologists and philosophers are interested in climate modelling.
Hélène Guillemot (Science and Technology Studies) and Johannes Lenhard (philosopher)
Tuesday

9:00 : Synthesis and discussions on tuning strategies
Chaired by : Andrew Gettelman, Larissa Nazarenko and Chris Golaz

10:30 : Coffee Break

Session 1, Tuning models to past climate change

Chaired by : Karl Taylor and David Salas

To some extent reliable climate models should be able to reproduce the climate changes and variations that have been observed in the recent and more distant past. Exact correspondence, however, between observed and simulated climate changes is not expected because of internal (unforced) climate variability. In this session discussion will focus on the potential for using past climate history to constrain climate models and the implications of such practices for simulation of future climate, including quantification and perception of projection uncertainty. Contributions are invited on methods of tuning to 20th century climate change (e.g., modifying cloud feedbacks, aerosol indirect effects, or ocean heat uptake efficiency), use of historical and paleoclimate information to constrain climate sensitivity, and ways to address the uncertainty in unforced climate variability and other factors that can hamper efforts to tune models precisely. The session should lead to an open discussion of this somewhat controversial practice and the difficulties associated in communicating it to those outside the field.

11:00 (15+5) : Tuning the climate sensitivity of MPI-ESM1.1
Thorsten Mauritsen

11:20 (5+5) : Why it could make sense to transparently tune the climate sensitivity range of ESMs
Florian Rauser

11:30 (10+5) : Tuning aerosol in-direct effect. Include new processes or tune old
Øyvind Seland

11:45 (10+5) : Cloud tuning and twentieth century warming
Chris Golaz

12:00 : General discussion

12:30 : Lunch Break
Session 2, Model development, tuning and evaluation

Chaired by: Masahiro Watanabe and Catherine Rio

Structural development of model physics and numerics, parametric tuning and evaluation against observations goes hand-in-hand at multiple levels during the model development cycles. The session will accommodate examples and perspectives on the model development process. For instance cases of implementing new or improved parameterizations where the re-tuning of the model was challenging, perhaps due to compensating errors, or possibly if model errors of disparate kinds had to be weighed against each other. But also perspectives on the model development process as a whole are welcomed, for instance how community-wide evaluation of CMIP influences the model development process.

14:00 (10+5) : Simulation of East Asian-Western Pacific Summer Monsoon: From CMIP3 to CMIP5
Tianjun Zhou

14:15 (10+5) : On the effectiveness and limitation of parameter tuning
Tomoo Ogura

14:30 (15+5) : How Bright is a Cloud? Parametric Tuning in the Model Development and Evaluation Process
Andrew Gettelman

14:50 (10+5) : The “process-oriented” tuning strategy of the LMDZ model
Catherine Rio, Frédéric Hourdin, Arnaud Jam and Fleur Couvreux

15:05 (10+5) : Designing a Sensitivity Model Intercomparison Project (SensMIP)
Peter Gleckler and David Neelin

15:20 : Discussion

15:50 : Coffee break
Session 3, Challenges and prospects in high resolution climate modeling

Chaired by: Peter Caldwell and Jie Zhang

Climate modeling has always been pushing the boundaries of our computational power requiring both large and long calculations that increases exponentially with resolution. The tuning and spin-up of high resolution models is particularly challenging – relative to mainstream resolutions – because of the high cost of running these models to equilibrium. The session aims at sharing experience, methods and strategies to achieve high resolution modeling, both success stories as well as failures are welcome. Further, possibly prospects of what can be achieved with higher resolutions and what problems persists at higher resolutions are welcome.

16:20 (15+5) : High-Resolution Tuning Overview and ACME Tuning Plans
Peter Caldwell

16:40 (15+5) : Results and Tuning Lessons from High and Variable Resolution Climate Simulations using the Community Earth System Model
Andrew Gettelman

17:00 (10+5) : Tuning a high resolution AGCM to improve its performances in simulating East Asia Summer monsoon
Jie Zhang and Tongwen Wu

17:15 : Discussion

Wednesday

Session 4, From short timescales to climate

Chairman: Daniel Klocke and Alistair Sellar

Most atmospheric processes relevant to a models climate occur on relatively short timescales from nanoseconds (radiation) to hours to months (convection). Such processes can be studied and improved leveraging weather forecasts, DNS/LES/CRM and field campaigns. The session welcomes contributions describing seamless approaches using nearly the same model for both weather and seasonal prediction to climate modeling, tuning experience from weather forecasting models, as well as innovative observational studies with a linkage to modelled global climate.

09:00 (15+5) : Using numerical weather prediction methods to improve climate projections
Daniel Klocke

09:20 (15+5) : How the Met Office develops a global model for timescales from NWP to climate
Alistair Sellar

09:40 (10+5) : Is tuning based on hourly forecast range valid at annual range?
Martin Köhler
Session 5, Automatic or alternative tuning methods

Chairman: Florian Rauser and Danny Williamson

Climate model tuning at most centres tends to be artisanal, a time-consuming and slow process, carried out by skilled persons or groups frequently making subjective choices based on their preference and experience. Therefore several different approaches have been devised recently to tune models automatically using objective tuning targets and weighing. The session welcomes contributions describing such automatic methods, as well as other possible alternatives to the normal manual tuning process or examples of applications e.g. to perturbed physics ensembles.

11:00 (5) Introduction remarks
Florian Rauser

11:05 (12+3) Statistical tuning for GCMs with history matching and emulation
Danny Williamson

11:20 (7+3) Statistical model validation
Jean-Francois Lamarque

11:30 (12+3) Parametric sensitivity and auto-tuning of precipitation in the CAM5
Yun Qian

11:45 (7+3) The Parametric Sensitivity of CAM5’s MJO
Hsi-Yen Ma

11:55 Discussion

12:30 Lunch break

14:00 Discussion

15:30 Coffee break

16:00 summary and planning

17:00 end of meeting