Welcome and Introduction

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WELCOME

- I welcome you to the 1st International Workshop of EULAG Users in Bad Tölz

- as you have all experienced by travelling via Munich, the Bavarian town Bad Tölz is located in the Alpine foreland: it is a rural environment and this remote location might be the perfect setting for a workshop:

- Bad Tölz is a beautiful and friendly town with it's old houses and the river Isar that flows through the town toward Munich

- the area in the vicinity of our meeting place belongs also to the Kurgarten, a place where people come for relaxation and enjoy the gifts of a spa; in contrast to big cities, Bad Tölz hasn't many attractive sights that keep one's busy and so I hope we are not too much distracted and we will find the necessary concentration for our workshop

- well, there are the Alps in the south and we will together make a little excursion to climb a hill of the Alpine foreland to have a view on the real big challenges to the south on Wednesday morning

- I hope, we enjoy the hospitable environment in Bavaria, in Bad Tölz, and in the Posthotel Kolberbräu to spend a couple of productive days during our workshop

INTRODUCTION

- the idea to held such a workshop of EULAG users was borne in Boulder, Colorado at NCAR in the spring 2007, when Joe, Andii, Wojtek, Piotr and myself were sitting together and when we were discussing recent changes of EULAG; similar events took place the years before when the primary developers of EULAG held small informal gatherings at NCAR; these true working events turned out to be fruitful for the further development of the numerical code.

- as far as I know, Piotr started to develop this numerical solver in the early nineties; it has been the numerical test bed to solve a wide variety of different geophysical problems

- we know: the applications span from solar convection to flows in the earth's atmosphere and ocean; there exist many clones for MHD turbulence, for propagating sand dunes, a viscoelastic fluid model for brain injuries and more

- these developments of a numerical solver as a kind of virtual laboratory required an intense communication and many visits of Piotr's collaborators to NCAR or many trips by Piotr around the world

- and most of the time I was in Boulder I was overwhelmed how Piotr got excited for solving an interesting physical problem

- the outcome of this productive work was not only a number of publications in peer-reviewed journals but also a gradually evolving numerical solver that became more advanced and also more complex from year to year

- it was natural that close collaborators made essential contributions to the code — a research model was created which allowed the family of people who know the code from their work with Piotr to solve a great variety of different geophysical problems

- at present, knowledge about the code is communicated personally or by intense reading of the respective papers, and each new user has to read and understand (at least essential parts of) the actual numerical code; as the number of users grows, a need for some form of documentation becomes apparent; there is already a Polish version of a documentation

- working with EULAG starts with a steep learning curve, but is also rewarded with an intellectual fun, and it is so much different from operating a community model: here, the effort to study the relevant papers which belong to essential parts of the code (a prominent example is MPDATA) lead to the fun of understanding and to the ability of applying the numerical model properly

- for many years, the numerical solver had no name; it was quite recent that EULAG was named after the great mathematicians Leonard Euler and Joseph Louis Lagrange, or after the ways we are solving the governing equations in the respective frameworks: I think, the first time the name EULAG appeared as the name of the numerical solver was 2002 (Grabowski and Smolarkiewicz, 2002, *Month. Weather Rev*., **130**, page 946) and the first time that the name EULAG appeared in a title of journal paper was just this year (Prusa et al., 2008, *Computers & Fluids*, **37**, 1193-1207)

GOAL OF THE WORKSHOP

- anyway: during our meeting in spring 2007, we realized that the family of EULAG users was gradually forming a growing community and that it might be a good idea to bring all the individuals together at one place for a common meeting

- What should be the purpose of this meeting?

- exchange of information and experiences among all the EULAG users

  - it appears that the EULAG clones of the different research groups tend to diverge rapidly due to customized developments

  - therefore, one of the primary purposes of the 1st Workshop of EULAG Users is to outline the current status of the various developments, to inform all users what is available, and thus to prevent unnecessary duplication of efforts

- for users and other colleagues interested to deepen their knowledge of the fundamental and possibilities of EULAG, five tutorials covering essential physical, mathematical and numerical aspects of EULAG will be given and I'm happy that the primary developers of the numerical code accepted to come

- collaborate/interact with other colleagues working in similar fields but using different numerical/theoretical tools

  - especially, we are happy that Rupert Klein as the coordinator of the German Priority Research Programme **Metstroem** which stands for "**Multiple Scales in Fluid Dynamics and Meteorology**" and other colleagues are participating in our workshop

  - this programme which was launched in 2006 comprises the expertise of Meteorology, Fluid Dynamics, and Applied Mathematics to develop model-adaptive as well as grid-adaptive numerical simulation concepts in multi-disciplinary projects: Thomas von Larcher will tell us more about the project this afternoon

  - on the other hand, we have a large group from Poland; there, EULAG has been developed, maintained and used for education at the University of Warszawa

- one last goal could be to develop ideas for further funding of our research and I hope that the discussions of the coming days will help to establish new partnerships