EUROPEAN MECHANICS SOCIETY

Colloquium Final Report Form

Title: Modelling Atmospheric and Oceanic Flows: insights from laboratory experiments and numerical simulations

Colloquium No: 552

Dates and location: Sept. 26-28, 2013, Berlin, Germany

Chairperson: Dr Thomas von Larcher, Freie Universitaet Berlin, Germany

Co-Chairpersons: Dr Paul Willians, University of Reading, UK
Dr Wolf-Gerrit Frueh, Heriot-Watt University, Edinburgh, UK

Is there need of another Colloquium on the same or a related subject? Which year?
Yes, 2015

Full registration fee	EARLY BIRD	224 EURO
	EARLY BIRD, PhD students	184 EURO
	REGULAR	274 EURO
	REGULAR PhD students	234 EURO
	ON-SITE	324 EURO
	ON-SITE PhD students	284 EURO

What other funding was obtained?
German Science Foundation (DFG)

What were the participants offered?
Book of Abstracts, 6x Coffee Breaks, 3x Lunch, 1x Dinner

Number of members of Euromech (reduced registration fee):
10

Number of non-members of Euromech (full registration fee):
35

EUROPEAN MECHANICS SOCIETY

Number of participants from each country:

Austria		United Kingdom	6	Slovakia	
Belgium		Greece		Slovenia	
Bosnia		Hungary		Spain	1
Byelorussia		Ireland		Sweden	1
Bulgaria		Italy		Switzerland	
Croatia		Latvia		Ukraine	
Czech Republic		Lithuania		Serbia	
Denmark		Netherlands	1	Montenegro	
Estonia		Norway		Turkey	
Finland		Poland		Others	15
France	7	Portugal			
Georgia		Romania			
Germany	13	Russia	1	**Total**	45

List names of Applicants to EUROMECH: see attached list of participants

www.euromech.org

PRESIDENT
Patrick Huerre
huerre@ladhyx.polytechnique.fr

VICE PRESIDENT
Hans-Hermann Fernholz
fernholz@pi.tu-berlin.de

SECRETARY GENERAL
Bernhard A. Schrefler
CISM International Centre for
Mechanical Sciences
Palazzo del Torso
Piazza Garibaldi 18
33100 Udine, Italy
bas@dic.unipd.it

TREASURER
Wolfgang Schröder
office@aia.rwth-aachen.de

EUROPEAN MECHANICS SOCIETY

Colloquium No 552 “Modelling Atmospheric and Oceanic flows: insights from laboratory experiments and numerical simulations”

Sept. 26-28, 2013, Berlin, Germany

Organization:

- Thomas von Larcher, Freie Universitaet Berlin, Germany
- Paul Williams, University of Reading,UK
- Wolf-Gerrit Früh, Heriot-Watt University, Edinburgh, UK

http://euromech552.mi.fu-berlin.de

Scientific Report

This colloquium has brought together approaches and recent results from laboratory experiments and corresponding numerical simulations, performed to improve our understanding of atmospheric and oceanic fluid motion.

As sufficient computer resources and numerical codes become available, the interplay of numerical simulations and experimental research is gaining increasing interest in the scientific community. Therefore, the main focus of the colloquium was the comparison of results of laboratory experiments with adequate numerical simulations, with the particular aim of accurately simulating laboratory flows using numerical models, and on combined laboratory and numerical investigations of a system.

On the experimental side, new designs of experiments on the laboratory scale, developments in instrumentation and data acquisition techniques, and the computer-based analysis of experimental results have been addressed.

On the numerical side, developments in simulation techniques, from model formulation to the assimilation of experimental data into the model configuration, initialisation or forcing were addressed. The presentation of results from corresponding experiments and numerical models has brought the two sides together with a discussion of methodologies of reliable laboratory-model comparisons.

Contributions from the following topics were presented: Rotating flows, Balanced and unbalanced flows, Atmospheric flows (Earth and other planets), Oceanic flows, Jets, waves and vortices, Turbulent flows, Advances in numerical methods, Validation of numerical methods using laboratory experiments, and Technical and methodological advances in laboratory experiments.

The programme was devised with the idea of supporting intense and iterated discussions between all participants throughout the Colloquium. Moreover, a permanent poster exhibition was provided instead of a particular display time, with a specific "Authors in Attendance Time" at the first day of the Colloquium.

Keynote speakers has set the scene at the beginning of each day as well as in the afternoon with a state-of-the-art review on particular topics:

- Jan-Bert Flør, LEGI, Grenoble, France: SMALL AND LARGE SCALE FRONTAL INSTABILITIES IN A DIFFERENTIALLY ROTATING STRATIFIED FLUID
- Uwe Harlander, BTU Cottbus-Senftenberg, Germany: DECOMPOSITION METHODS TO ANALYZE DATA FROM A THERMALLY DRIVEN ROTATING ANNULUS LABORATORY EXPERIMENT
- Leo R.M. Maas, Utrecht University, The Netherlands: THEORY AND EXPERIMENTS ON INERTIAL WAVES AND GEOSTROPHIC FLOWS
- Peter L. Read, University of Oxford, UK: BAROCLINIC CIRCULATION REGIMES AND HEAT AND TRACER TRANSPORT - COMPARING LABORATORY AND ATMOSPHERE-OCEAN MODELS?
- Laurette S. Tuckerman , PMMH-ESPCI, Paris, France: BIFURCATION ANALYSIS FOR TIMESTEPPERS

www.euromech.org

PRESIDENT
Patrick Huerre
huerre@ladhyx.polytechnique.fr

VICE PRESIDENT
Hans-Hermann Fernholz
fernholz@pi.tu-berlin.de

SECRETARY GENERAL
Bernhard A. Schrefler
CISM International Centre for Mechanical Sciences
Palazzo del Torso
Piazza Garibaldi 18
33100 Udine, Italy
bas@dic.unipd.it

TREASURER
Wolfgang Schröder
office@aia.rwth-aachen.de

There were 45 participants in total, thereof 12 junior scientists, presenting 33 inspiring oral talks and 11 poster contributions (plus the 5 keynote lectures mentioned above).

The Colloquium has shown the substantial progress in combining laboratory experiments and numerical simulations for research on atmospheric and oceanic flows achieved over the last couple of years, and highlighted also the benefits from recent advances in methodology. Some issues that were discussed in depth were, e.g., spontaneuos emission of inertia-gravity waves, the role of local mechanisms of wave emission, and the role of non-linearities; the route to chaos specifically in the thermally driven, rotating annulus; extension of path-following techniques, the development and the benefits of decomposition methods, and the development of numerical techniques. Many issues remained open, of course, and another meeting in two or three years would seem reasonable.

The organizers gratefully acknowledge funding from the German Science Foundation (DFG, LA2286/2-1) and thank the EUROMECH society very much for making the Colloquium possible.