The differentially heated rotating annulus as a laboratory analogue of the atmospheric circulation

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The priority program “Metstrm [http://metstroem.mi.fu-berlin.de/]” is an initiative that brings together engineers, mathematicians, and meteorologists to unify (theoretical and numerical) concepts of technical and meteorological fluid dynamics. The MetStrm projects are absorbed in one of the following three topics: 1. Large-scale Dynamics, 2. Turbulence/LES, and 3. Multiphase flows. Each of these topics has at least one reference experiment that gathers benchmark data for numerical modelling. The reference experiment for the topic “large-scale dynamics” is the thermally driven rotating annulus.

The thermally driven rotating annulus can be seen as a simple laboratory experiment of atmospheric baroclinic instability. This instability generates a highly complex and nonlinear flow that shows many similarities with irregular atmospheric flows. Besides our aim of providing benchmark data for MetStrm, several not well understood wave phenomena can be investigated by conducting the experiment. For example wave instability, chaotic behaviour wave-vortex interactions, multiple-scale flows, to name a few.

In my talk I will give an overview of the project and I will address issues of data assessment and data post processing that is important for the present and future work.

Time: Thursday, 03/17/2011, 2:40-3:30pm
Location: MG 108
Refreshments: at 2:10pm in MG 226