

LACE Working Group for Dynamics & Coupling: Preliminary research plan for the year 2010

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Introduction

This paper aims to give an impression about areas on the fields of dynamics and coupling which seem to be of interest and possibility to be studied during 2010 under the framework of the organized RC LACE research.

Indeed the main research concern for the 2010 will be the continuation of the LACE priority project: "Toward an operational implementation of the NH dynamics" (hereafter NH project).

Among the previous, a continuous interest is expected for the areas of LBC coupling, 3D turbulence scheme and increased numerical efficiency of the code.

1 NH project

• WP2: Additional development and validation

Description and objectives: With the aim of the operational usage of the NH dynamics for the 4.5 km, it is clear that the operational hydrostatic dynamics has to be outperformed. This is going to be only possible when all the available operational code features are also fully promoted to the NH code. This is for the moment still not the case. The most striking example of such discrepancy is the vertical finite element (VFE) discretization which is for the moment still not fully available for the NH dynamics.

Additionally, the NH approximation allows to use additional model complexity like fully elastic coupling of physics to dynamics, physical tendencies provided also to vertical velocity,... Logically it is desirable to gradually introduce such options to the model. This at least as a longer term target should further pay off the change from hydrostatic to NH dynamics.

Recognized workforce: J. Vivoda (Sk) - 4 months for VFE development
R. Brozkova (Cz) - 2 months for physics coupling to elastic dynamics
J. Masek (Sk) - 4 months for physics-dynamics coupling and pressure gradient term
F. Vana (Cz) - 2 months for physics tendency to w

• WP3 Comparison of the NH and hydrostatic dynamics

Description and objectives: Continuous evaluation of NH dynamics with respect to hydrostatic dynamics at the targeted resolution of $\Delta x \approx 4.5$ km and over 60 model levels.

Recognized workforce: C. Wittmann (At) - ? months
CHMI team (FV+...) - 2 months

• WP4 Code optimization of the NH dynamics + WP5 Operational implementation

Description and objectives: Except like one year delay caused mainly problems with HPC upgrade at CHMI no change with respect to the original NH project proposal.

2 Other topics

- **3D turbulence scheme**

Description and objectives: It seems to be a common consensus now that the horizontal smoothing plays important role for the areas where convection starts to be explicitly resolved. Logically there is the raising interest for physically sound horizontal diffusion scheme allowing smooth transition between scales with parametrized convection and those where convection is fully resolved. The skeleton of the 3D turbulence scheme in Aladin model is nearly ready. Massive evaluation of this scheme is still to be done.

Recognized workforce: F. Vana (Cz) - 2 months