

Séminaire ven 19 Nov 2010 11h / Seminar Fri Nov 19th 2010 11h

Conférencier/Lecturer: Janusz Pudykiewicz

Sujet/Subject: How do we test numerical models?

Présentation/Presentation: Anglais / English

Lieu/Room: Salle des vents (Dorval)

iweb: <http://web-mrb.cmc.ec.gc.ca/mrb/rpn/SEM/>

web: <http://collaboration.cmc.ec.gc.ca/science/rpn/SEM/index.php>

Abstract

The atmospheric phenomena exhibit complex nonlinear behaviour, which in most of cases can be only described with the help of the numerical methods applied to the underlying equations. In order to use the models based on the approximate solutions with a reasonable degree of confidence, it is essential to establish a certain hierarchy of the canonical tests. The foundation for such hierarchy consists of splitting the full system of atmospheric equations into simpler reduced sets. The review of the literature shows that it is most common to consider a sequence consisting of advection equation, Boussinesq system, shallow water equations and 3D hydrostatic dynamical core. Specific examples of the model testing based on the canonical tests from this group will be presented to illustrate their importance when constructing reliable weather and environmental prediction models. Although the discussion of the presented examples contains different types of models, the main focus will be on the extended and very systematic evaluation of the icosahedral finite volume model. In particular, the conservation properties for mass, energy and potential enstrophy, as well as the issues pertinent to the convergence of the model will be presented. The potential applications of the method for the simulation of atmospheric chemistry will be discussed as an integral part of the system.