Coupling moist convection and large scale dynamics in numerical weather prediction models

Monday 21st-Tuesday 22nd March 2016

Venues: Lecture Theatre A (LTA) on 21st, LTB on 22nd

Sponsored by: "Maths Foresees" EPSRC Network and University of Surrey

Organizers: Ian Roulstone (Surrey), Alison Stirling (Met Office), Peter Clark (Reading), Matt Turner (Surrey), Bin Cheng (Surrey)

Day 1

- 12:00-12:55 Arrival & Lunch
- 12:55-13:00 *Ian Roulstone* - Welcome
- **Talks**. Chair: Matt Turner
  - 13:00-13:45 *Pete Clark* (Reading)
    (Title TBA)
  - 13:45-14:30 *Mike Cullen* (Met Office)
    "Dynamics convection interaction on various scales"
  - 14:30-15:15 *John Thuburn* (Exeter)
    "Proposal for a multi-fluid representation of convection"
- 15:15-15:45 Tea & Coffee
- **Talks**. Chair: Ian Roulstone
  - 15:45-16:15 *Michael Whitall* (Met Office)
    "An idealised test problem for the dynamical response to moist convection"

  - 16:15-16:30 *Martin Willett* (Met Office)
    "Time smoothing increments: A pragmatic approach to improving convection-dynamics coupling"

- 16:30-17:45 **Discussions**. Led by Mike Cullen. Note-taken by Matt Turner.

Day 2

- 9:00-10:30 **Discussions**. Led by Alison Stirling. Note-taken by Bin Cheng.

- 10:30-11:00 Tea & Coffee

- **Talks**. Chair: Bin Cheng
  - 11:00-11:30 *Steef Boeing* (Leeds)
    "Virtual laboratory experiments for moist convection, and its interaction with the environment"
  - 11:30-12:00 *Sylvie Malardel* (ECMWF)
    "To permit or not to permit convection?"
  - 12:00-12:30 *Ben Shipway* (Met Office)
    (Title TBA)
  - 12:30-13:00 *Bob Kerr* (Warwick)
    (Title TBA)

- 13:00-14:00 Lunch

- 14:00-15:00 **Discussions**. Led by Peter Clark. Note-taken by Matt Turner.

- 15:00-15:30 Tea & Coffee

- 15:30-17:00 **Discussions & Formalising PhD/Post Doc questions**. Led by Ian Roulstone. Note-taken by Bin Cheng.

- 17:00 - 17:30 *Ian Roulstone* - Round up and Goodbyes

Synopsis

With the introduction of new more powerful computers, the Met Office is able to run its atmospheric weather code on finer grids, in order to make more accurate weather predictions. Precipitation and cloud predictions are on the very bottleneck of the next-generation weather code, which critically hinges on the modelling and understanding of the moist convection process. However, resolving moist convection dynamically via numerical PDEs on such finer grid sizes will still be infeasible in the next two decades, and therefore convection parametrization schemes will still be used. The major issue that this Workshop tries to address is that the currently used moist convection schemes do not accurately couple to large scale dynamics resolved by PDE solvers ("dynamical core"). The nature of this issue is multi-scale, multi-physical and cross-disciplinary, which demands that modern mathematical approaches play a critical role in the picture.