

# **COST ES0905 European Project**

**“Basic Concepts for Convection  
Parameterization in Weather Forecast  
and Climate Models”**

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# Outline



- COST Action ES0905: some dry facts
- Jean-François Geleyn, the working group leader
- Proponent of intellectual diversity
- The last of the Mohicans
- Manager and good friend



# COST Action ES0905

“Basic Concepts for Convection Parameterization in Weather Forecast and Climate Models” (Action Chair: Jun-Ichi Yano)

- Action provides clear theoretical guidance on convection parameterizations for atmospheric models
- Modellers and theoreticians form a “core group”
- Clear pathway for more coherent and effective parameterizations by integrating existing operational schemes and new theoretical ideas
- Increasing resolution of forecast models is one key issue
- Traditional approximations break down, description of physical processes become increasingly complex



# Prior to ES0905...

- 9-10 October 2006, Zürich, Switzerland. 28th EWGLAM and 13th SRNWP Meetings. **JFG** was accompanied by a number of young researches whom he guided to the exciting world of atmospheric modelling.
- 2-6 June 2008, Toulouse, France. 4th PAN-GCSS Meeting on Advances in Modeling and Observing Clouds and Convection. **JFG** encouraged several people to joint the “convection core group” and help launch a COST Action.
- 25-27 March 2009, Prag, Czech Republic. Workshop “Entrainment and Detrainment in Convective Plumes”. Interesting talks, COST proposal was drafted.

# WG3 “High-Resolution Limit”

Lead by **Jean-François Geleyn** (DM was co-leader)

- WG3 concerned with the issues arising with the convection parameterization when the model resolution increases.
- More specifically, WG3 addressed the following questions:
  - ✓ Which scales of motion should be parameterized and under which circumstances?
  - ✓ How can convection parameterizations be made resolution-(in)dependent in order to avoid double-counting of energy-containing scales of motion or their loss?
  - ✓ What is the degree of complexity of physics required at a given horizontal resolution?

# WG3 "High-Resolution Limit" (cont'd)

Ghent, September 2013

## WG3 Meetings:

- March 2013
- November 2012
- November 2012
- November 2012
- September 2013

Reports, presented at  
ES0905 web page  
documents.21



# PropONENT of ... University

JFG is discussing various alternatives with colleagues (Cambridge, UK, March 2011)

**Should deep precipitating convection scheme be switched off at cen**

- **JFG** viewpoint kept no matter gradually be and, important physical part microphysic
- **Alternative** switched off turbulence-s closure)

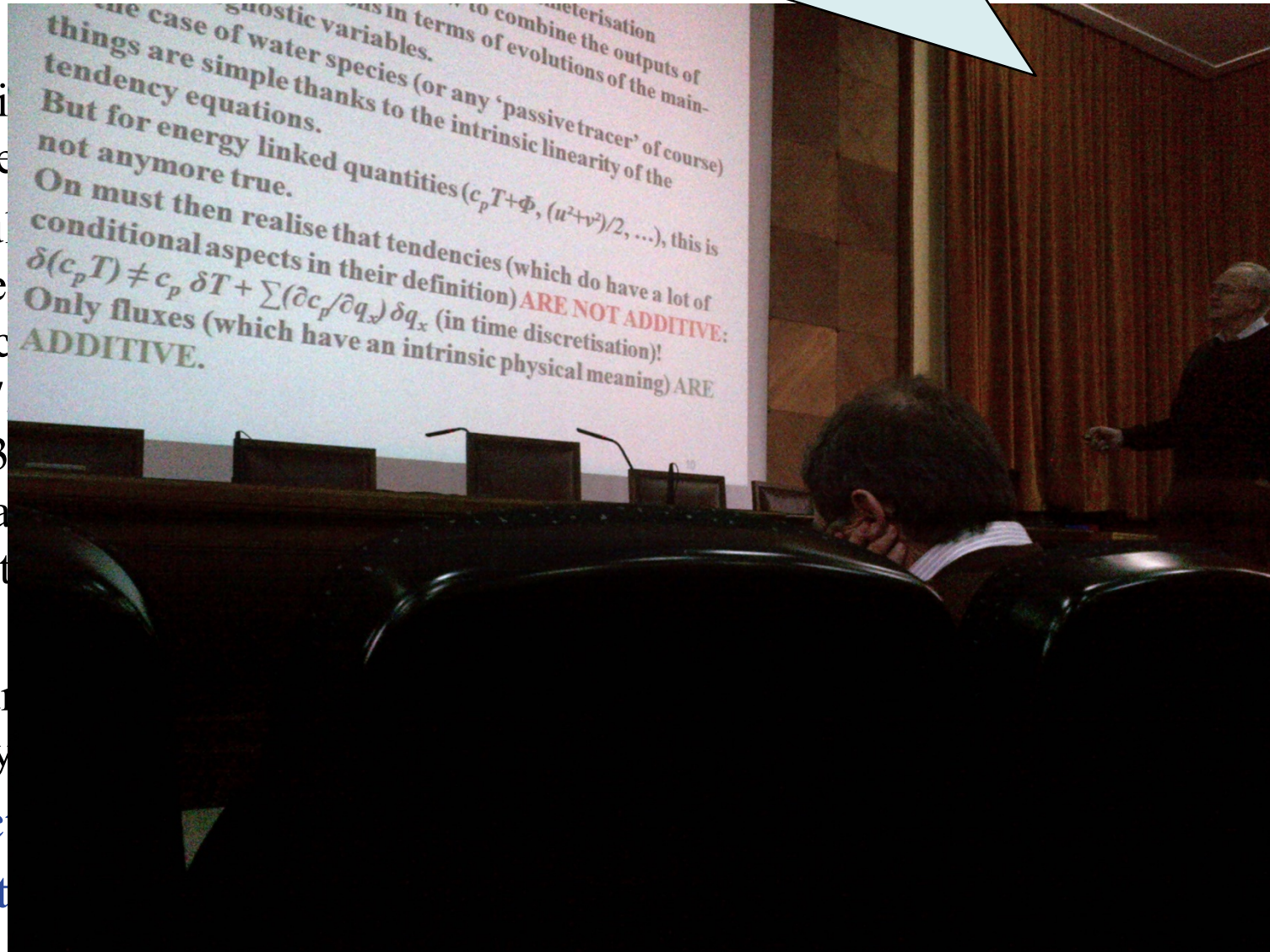




JFG is making a point that tendencies are not additive in the time discretization (Palma de Mallorca, Spain, March 2013)

## Non-exhaustive list of problems JFG dealt with

- **NAM-SCA**, Approximate  
2012; Yano et al.
- **3MT**, Modulo  
Order moment  
for turbulence  
Gerard 2007  
Geleyn 2013  
parameteriza  
convection, t  
France
- **TKESV**, Tur  
(Machulskay
- **New convec**
- **Cellular aut**



... parameterisation  
... to combine the outputs of  
... in terms of evolutions of the main-  
... variables.  
... case of water species (or any 'passive tracer' of course)  
... things are simple thanks to the intrinsic linearity of the  
... tendency equations.  
But for energy linked quantities ( $c_p T + \Phi$ ,  $(u^2 + v^2)/2$ , ...), this is  
not anymore true.  
One must then realise that tendencies (which do have a lot of  
conditional aspects in their definition) **ARE NOT ADDITIVE**:  
 $\delta(c_p T) \neq c_p \delta T + \sum (\partial c_p / \partial q_x) \delta q_x$  (in time discretisation)!  
Only fluxes (which have an intrinsic physical meaning) **ARE**  
**ADDITIVE**.

# Management and Good Friends

IEC 1.1.1



# ... and a Real Gentleman

Once upon a time in Cambridge



# Savona, March 2012



# Great thanks, Jean-François!

