Nicolas ROCHETIN

French citizen
Birth : 28/05/1985 in Avignon (France)

Research Scientist
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Current research

July 2017 – Now : Post-doc at Max Planck Institute for Meteorology, Hamburg (Germany)

Tropical convection life-cycle and spatial organization analysis by the use of high-resolution simulations (ICON model) in the "Clouds and Convection" Group of the "Atmosphere in the Earth System" Department : numerical simulations analysis.

Senior collaborators : Cathy Hohenegger and Bjorn Stevens

Past research

Sept 2015 – June 2017 : Post-doc at Meteo-France, Toulouse (France)

Evaluation of the in-cloud turbulence scheme of a high-resolution model (Meso-NH) in the "Meso-NH" Group of the National Center for Meteorological Research (CNRM) : realistic "case study" numerical simulations production, analysis and comparison with observations.

Senior collaborators : Didier Ricard and Christine Lac

Jan 2014 – Aug 2015 : Post-doc at Meteo-France, Toulouse (France)

Deep convection initiation analysis by mesoscale breeze circulations over semi-arid lands by the use of a high-resolution model (Meso-NH) in the "Mesoscale Meteorology" Group of the National Center for Meteorological Research (CNRM) : semi-idealized numerical simulations production, analysis and comparison with observations, design of a new diagnostic for breeze circulations, assessment of the key role of scale interactions for the deep convection triggering over semi-arid lands

Senior collaborators : Fleur Couvreux and Francoise Guichard

Sept 2012 – Sept 2013 : Post-doc at Columbia University, New-York (USA)

Land surfaces-convection coupling analysis by the use of a single column model in the Earth and Environmental Engineering Department : idealized (radiative-Convective Equlibrium over Land) numerical simulation production and analysis, assessment of the key role of clouds in the non-linear behavior of the land-atmosphere coupled system

Senior collaborator : Pierre Gentine

Oct 2008 – July 2012 : PhD at Paris 6 University, Paris (France)

- Parameterization development and implementation dedicated to the convection scheme of the atmospheric branch of the "Laboratoire de Meteorologie Dynamique" (LMD) global climate model (LMDz-IPSL model) : design of a new stochastic triggering scheme for moist deep convection.

- Land surfaces-convection coupling analysis by the use of a single column model : design of a new idealized experimental framework, the "Radiative-Convective Equilibrium over Land surfaces"

Supervisors : Jean-Yves Grandpeix and Remy Roca

Feb 2008 – Aug 2008 : Master's thesis at Indian Institute of Sciences, Bangalore (India)

Tropical climate intra-seasonal variability analysis by the use of reanalysis data

Supervisor : G. S. Bhat

June 2007 – July 2007 : Master's internship at Paris 6 University, Paris (France)

Parameterization development dedicated to the deep convection scheme of the atmospheric branch of the "Laboratoire de Meteorologie Dynamique" (LMD) global climate model (LMDz-I PSL model) : re-visitation of the governing equations of the unsaturated downdrafts

Supervisor : Jean-Yves Grandpeix

Teaching experience

2008 - 2011 : Teaching assistant in Physics at Paris 6 University

2008 - 2009 : Undergraduate students in Mathematics and Physics : exercises and practical work

2009 - 2010 : Undergraduate students in Medicine : exercises and written exam corrector

2010 - 2011 : Undergraduate students in Mathematics and Physics : practical work and oral exam corrector

2009, 2010 and 2011 : Participation to the "Fetes de la Science"

Education

2012 : PhD degree in Climate Sciences

Title : Interaction between deep convection and surface processes over tropical lands : representation a global climate model

Univ. : Paris 6 (France)

Lab. : Laboratoire de Meteorologie Dynamique

2008 : Master's degree in Mechanics, Energetics and Numerical Modeling

Univ. : Aix-Marseille I (France)

2008 : Engineering degree in Mechanics and Energetics

Univ. : Aix-Marseille I (France)

2005 : Bachelor's degree in Physics and Chemistry

Preparatory courses for engineering schools

2002 : High-school degree

Skills

Climate model development : parameterization design, implementation and evaluation

Climate model analysis : design of experimental framework, 1D and 3D simulations

High-resolution model development : parameterization evaluation

High-resolution model analysis : design of process-oriented diagnostics, 3D simulations

Programming languages : Fortran, Bash, Matlab, Ferret, NCL and PV-Wave

Spoken languages : French (mother tongue), English (fluent), Spanish (fluent)

Publications

- Rochetin N., Couvreux F. and Guichard F. : Morphology of breeze circulations induced by surface flux heterogeneities and their impact on convective initiation, *Q. J. Roy. Met. Soc.*, **2017**, 143, 463-478

- **Rochetin N.**, Lintner B. R., Findell K. L., Sobel A. H. and Gentine P. : Radiative-Convective Equilibrium over a Land Surface, *J. Clim.*, **2014**, 27, 8611-8629

- **Rochetin N.**, Grandpeix J-Y., Rio C., Couvreux F. : Deep Convection triggering by boundary layer thermals, Part II : The stochastic triggering parameterization for the LMD's GCM (LMDz), *J. Atm. Sc.*, **2014**, 71, 515-538

- **Rochetin N.**, Grandpeix J-Y., Rio C., Couvreux F. : Deep Convection triggering by boundary layer thermals, Part I : LES Analysis and Stochastic triggering formulation, *J. Atm. Sc.*, **2014**, 71, 496-514

- Rio C., Grandpeix J-Y., Hourdin F., Guichard F., Couvreux F., Lafore J-P., Fridlind A., Mrowiec A., **Rochetin N.**, Idelkadi A., Lefebvre M-P., Musat I., Roehrig R. and Bony S. : Control of deep convection sub-cloud lifting processes : The ALP Closure revisited, *Clim. Dyn.*, **2012**, 40, 2271-2292

- Hourdin F., Grandpeix J-Y., Rio C., Bony S., Jam A., Cheruy F., **Rochetin N.**, Fairhead L., Idelkadi A., Musat I., Dufresne J-L., Lefebvre M-P., Lahellec A. and Roehrig R. : From LMDz5A to LMDz5B : Revisiting the parametrizations of clouds and convection in the atmospheric component of the IPLS-CM5 climate model, *Clim. Dyn.,* **2012**, 40, 2193-2222

- Prigent C., **Rochetin N.**, Aires F., Defer E., Grandpeix J-Y., Jimenez C. and Papa F. : Impact of the inundation occurrence on the Deep Convection at Continental Scale from satellite observations and modelling experiments, *J. Geo. Res.*, **2011**, 116, 1984-2012

Conferences

- **Rochetin N.**, Ricard D. and Lac C. : Evaluation and Improving of the representation of turbulence in deep clouds, Workshop on Atmospheric Modeling, **2016**, Toulouse (France)

- **Rochetin N.**, Couvreux F. and Guichard F. : Role of surface heterogeneities for deep convection initiation, 7th International Conference on the Global Water and Energy Cycle, **2014**, The Hague (Netherlands)

- **Rochetin N.**, Couvreux F. and Guichard F. : Role of surface heterogeneities for deep convection initiation, EMBRACE FP7 Project Workshop, **2014**, Utrecht (Netherlands)

- **Rochetin N.**, Couvreux F. Grandpeix J-Y. And Rio C. : A new stochastic parameterization for deep convection triggering by boundary layer thermals, 4th WGNE Workshop on systematic errors in weather and climate models, **2013**, Exeter (UK)

- **Rochetin N.**, Couvreux F. Grandpeix J-Y. And Rio C. : A new stochastic parameterization for deep convection triggering by boundary layer thermals, WGNE : The physics of weather and climate models workshop, **2012**, Pasadena (USA)

- **Rochetin N.** and Grandpeix J-Y. : A new parameterization for the coupling between shallow and deep convection, Workshop on Atmospheric Modeling, **2011**, Toulouse (France)
- **Rochetin N.,** Grandpeix J-Y. And Cerlini P. : Study of the sensitivity of convection to the surface conditions : comparison between CRM and SCM simulations, Workshop on Atmospheric Modeling, **2011**, Toulouse (France)
- **Rochetin N.,** Grandpeix J-Y. And Cerlini P. : Study of the sensitivity of convection to the surface conditions based on CRM and SCM simulations, 3rd AMMA Conference, **2009**, Ouagadougou (Burkina Faso)

Seminars

- **Rochetin N.** : Towards a multi-scale representation of deep convection in climate models, Max Planck Institute for Meteorology, **2017**, Hamburg (Germany)
- **Rochetin N.**, Couvreux F. and Guichard F. : Deep convection triggering and deep convection at equilibrium over a land surface, **2014**, Meteo-France, Toulouse (France)
- **Rochetin N.**, Gentine P., Lintner B., Findell K. and Sobel A. : Radiative-Convective Equilibrium over a land surface, **2013**, Columbia University, New-York (USA)
- **Rochetin N.**, Grandpeix J-Y, Couvreux F. and Rio C. : Deep convection triggering by boundary layer thermals : Stochastic formulation and parameterization for climate models, **2013**, NOAA-GFDL Princeton University, Princeton (USA)
- **Rochetin N.**, Grandpeix J-Y, Couvreux F. and Rio C. : Deep convection triggering by boundary layer ther;als : Stochastic formulation and parameterization for climate models, **2013**, NASA-GISS Columbia University, New-York (USA)
- **Rochetin N.**, Grandpeix J-Y, Couvreux F. and Rio C. : Deep convection triggering by boundary layer ther;als : Stochastic formulation and parameterization for climate models, **2013**, Columbia University, New-York (USA)