



Improvement and calibration of clouds in models

12-16 April 2021

Météo-France, Centre International de Conférences, Toulouse, France

30' talk (25' presentation + 5' questions)

15' talk (12' presentation + 3' questions)

5' talk (4' presentation + 1' question)

All times indicated are Toulouse - France standard time.



Toulouse - France



Monday 12 afternoon (moderators: Yunyan Zhang and Daniel Klocke)

Open discussion encouraged on:

<https://docs.google.com/document/d/1miAsY4RBPlyU19YumKL3Jmpc1kEG093MddhKL2A2P0/edit?usp=sharing>

14:20 - 14:30	Introduction to the conference
14:30 - 15:00	Results of the High-Tune project. Fleur Couvreur & Frédéric Hourdin
15:00 - 15:15	Toward Lagrangian simulations of EUREC4A/ATOMIC cloud regimes. Steven Boeing
15:15 - 15:30	Toward realistic cloud transitions during cold air outbreaks in ModelE. Florian Tornow
15:30 - 15:45	Organization development in shallow cumulus precipitating convection. Oumaima Lamaakel
15:45 - 15:55	Break
15:55 - 16:10	The strong impact of weak horizontal convergence on continental shallow convection. Marcin Kurowski
16:10 - 16:15	Interactions between the Amazonian rainforest and cumuli clouds: A large-eddy simulation, high-resolution ECMWF-IFS and observational intercomparison study. Jordi Vila
16:15 - 16:20	Constraining Stochastic Parametrisation Schemes using High-Resolution Model Simulations. Hannah Christensen
16:20 - 16:25	Continental shallow cumulus clouds in E3SM parameterizations against ARM observations and LES. Yunyan Zhang
16:25 - 16:30	On the role of aerosol characteristics and parameterization schemes on Arctic mixed-phase clouds. Luisa Ickes
16:30 - 16:45	A physically-based bimodal diagnostic cloud scheme: description and evaluation. Kwinten Van Weverberg
16:45 - 17:00	Discussion
17:00 - 17:15	Prediction of the bulk liquid fraction of mixed-phase particles in the Predicted Particle Properties (P3) microphysics scheme. Mélissa Cholette
17:15 - 17:30	CLUBB+MF in CAM6: implementation and evaluation of shallow convection cases. Mikael K. Witte
17:30 - 17:45	Towards operational implementation: A stochastic shallow convection scheme. Maike Ahlgrimm
17:45 - 17:55	Break
17:55 - 18:00	Improved parametrization of the boundary layer in Harmonie-Arome with a focus on low clouds. Wim de Rooy
18:00 - 18:05	Local impact of stochastic shallow convection on clouds and precipitation in the tropical Atlantic. Mirjana Sakradzija
18:05 - 18:10	Impacts of a change in deep convection scheme on the ARPEGE data assimilation system. Antoine Hubans
18:10 - 18:15	A Unified Eddy-Diffusivity/Mass-Flux Approach for Modeling Atmospheric Convection. Kay Suselj
18:15 - 18:45	Discussion

Tuesday 13 morning (moderators: Frédéric Hourdin & Daniel Williamson)

Open discussion encouraged on:

https://docs.google.com/document/d/1wQWARplpCh-0gNuwG3lFtcfS5MkiFoyF-oMOBgjn_vg/edit?usp=sharing

09:15 - 09:30	Synthesis of discussion from the previous day
09:30 - 09:45	A machine learning assisted stochastic cloud population model as a parameterization of cumulus convection. Samson Hagos
09:45 - 10:00	Development of a physically-based parameterization of the raindrop formation processes through machine-learning. Azusa Takeishi
10:00 - 10:15	Assessing calibration issues and intrinsic limits of a convection parameterization using machine learning. Romain Roehrig
10:15 - 10:30	Machine-learned atmospheric optical properties for radiative transfer computations. Menno Veerman
10:30 - 10:40	Break
10:40 - 10:55	Parameterization and tuning of cloud and precipitation overlap in LMDz. Ludovic Touze-Peiffer
10:55 - 11:10	Characterising Convection Schemes Using Their Linearised Responses to Convective Tendency Perturbations. Yi-Ling Hwong
11:10 - 11:15	Sensitivity of observable output of modeled microphysics to stochastically perturbed parameters. Tomislava Vukicevic
11:15 - 11:20	A Hybrid Deep Learning CNN-LSTM Model for Predicting Monthly Rainfall Over Japan. Paul Adigun (cancelled)
11:20 - 11:25	Tropical free-tropospheric humidity differences in global storm-resolving models. Theresa Lang
11:25 - 11:30	Microphysical sensitivities in global storm-resolving simulations (SRMs). Ann Kristin Naumann
11:30 - 11:35	Impact of middle atmospheric humidity on boundary layer turbulence and clouds. Neelam Namadev Malap
11:35 - 11:40	Interpretable Machine Learning and Remote Sensing for Cloud Detection and Classification. Thomas Chen (cancelled)
11:40 - 11:50	Break
11:50 - 12:20	Climate model development and the role of machine learning Daniel Williamson
12:20 - 12:50	Discussion

Tuesday 13 afternoon

Tutorial on the high-tune explorer, a statistical tool to achieve a process-based calibration of models based on a comparison of Single-Column Models to Large-Eddy Simulations – organized by Frédéric Hourdin and Daniel Williamson (Inscription mandatory: email to fleur.couvreux@meteo.fr)

Wednesday 14 morning

Tutorial on the high-tune renderer to allow Monte-Carlo radiative computation on cloud scenes from LES – organized by Najda Villefranque, Vincent Forest, Vincent Eymet (Inscription mandatory : email to fleur.couvreux@meteo.fr)

Wednesday 14 afternoon (moderators: Fabian Jakub and Yunyan Zhang)

Open discussion encouraged on:

https://docs.google.com/document/d/1gyGJF_-AAKiuUwjTDxlp_nRIF8834yTMrRyOhKzBpU/edit?usp=sharing

14:30 – 14:45	Synthesis of discussion from previous day
14:45 - 15:15	Representing 3D effects in atmospheric radiation schemes. Robin Hogan
15:15 - 15:30	Addressing radiation and cloud uncertainties with the new radiation scheme ecRad in ICON. Sophia Schäfer
15:30 - 15:45	Process-based climate model development harnessing machine learning: III. The Representation of Cumulus Geometry and their 3D Radiative Effects. Najda Villefranque
15:45 - 16:00	Break
16:00 - 16:15	A LES-benchmark case for surface solar irradiance variability under shallow cumulus. Chiel van Heerwaarden
16:15 - 16:30	To what extent does the radiative effect of low-level clouds depend on an accurate description of their vertical structure? Raphaël Lebrun
16:30 - 16:45	Introducing cloud horizontal overlap at NWP scales (1-10 km) in a fast 3D radiative transfer model. Mihail Manev
16:45 - 17:00	The Contributions of Shear and Turbulence to Cloud Overlap for Cumulus Clouds. Thijs Heus
17:00 - 17:15	Uncertainty of shortwave cloud radiative impact due to the parameterization of liquid cloud optical properties. Erfan Jahangir
17:15 - 17:30	Evaluation of low-level marine tropical clouds in CMIP6 models: the ‘too few too bright’ bias. Dimitra Konsta
17:30 - 17:45	Break
17:45 - 17:50	Increasing resolution and resolving convection improves the simulation of cloud-radiative effects over the North Atlantic. Fabian Senf
17:50 - 17:55	Development of a Fast Three-Dimensional Dynamic Radiative Transfer Solver for Numerical Weather Prediction Models. Richard Maier
17:55 - 18:00	Emergent Constraints on Regional Cloud Feedbacks. Nicholas James Lutsko
18:00 - 18:05	Effects of different cloud overlapping parameters on simulated total cloud fraction over the globe and East Asian region. Haibo Wang (cancelled)
18:05 - 18:30	Discussion

Thursday 15 morning (moderators: Fleur Couvreur & Fabian Jakub)

Open discussion encouraged on: <https://docs.google.com/document/d/1zGRfb-UWic69itc4qZefjPKa0hgUeNavSnwOFmJtkko/edit?usp=sharing>

09:00 - 09:15	Synthesis of discussion from previous day
09:15 - 09:30	Convective momentum transport through the subtropical shallow convection in LES simulations. Vishal Dixit
09:30-09:45	Turbulent effects and dynamics of the cloud-environment interface in a LES of a growing cumulus congestus. Clément Strauss
09:45- 10:00	Improved Ice Aggregation Formulation in a Two-Moment Microphysics Scheme. Markus Karrer
10:00 - 10:15	Process-oriented Evaluation of cloud parameterizations using a Cloud System Concept. Claudia J. Stubenrauch
10:15-10:25	Break
10:25 - 10:30	Improving convection in LES through detailed land-surface modelling. Bart J.H. van Stratum
10:30 - 10:35	Application of Remote Sensing to Study Dynamical and Morphological Characteristics of Meso-Scale Convective Systems to Develop 'Thunderstorms Numerical Prediction Model (TNPM)'Over Tropics'. Virendra Kumar Goswami
10:35 - 10:40	Evaluation and improvement of cloud and precipitation processes of NICAM with ULTIMATE. Masaki Satoh
10:40 - 10:45	Aerosol-cloud-turbulence interactions in well-coupled Arctic boundary layers over open water. Jan Chylik
10:45 – 10:50	Questions on the 5-min talks
10:50 - 11:05	Realities of developing and improving parameterizations related to clouds in global climate models. Hideaki Kawai
11:05 - 11:20	Sensitivity of ice formation processes in the ice modes scheme. Tim Lüttmer
11:20 - 11:35	A new diagnostic cloud scheme for heterogeneous moist parameterisations. Martin Köhler
11:35 - 11:50	Improvement of a representation of mixed-phase clouds, and its impact on a global cloud-system-resolving simulation. Akira T. Noda
11:50 - 11:55	Cloud microphysical parameterization and Orography influence on extreme rainfall event of Kerala (2018). Sandeep Pattnaik
11:55 - 12:00	A cold pool perturbation scheme to improve convective initiation in convection-permitting models. Mirjam Hirt
12:00 - 12:05	Recent developments in prognostic physics in ARPEGE-Climate: Turbulence in the presence of convection and discretization of convective vertical velocity in PCMT. Jean-François Guérémy
12:05 - 12:10	Persistence behaviour of heat and momentum fluxes in convective surface layer turbulence. Subharthi Chowdhuri
12:10 – 12:15	Questions on the 5-min talks
12:15 - 12:25	Break
12:25 - 12:55	Using LES and observations to inform the representation of convective organization and memory in next-generation Earth System Models. Roel Neggers
12:55 - 13:15	Discussion

Thursday 15 afternoon

Side meeting on the grey zone intercomparison (if interested send an email to rachel.honnert@meteo.fr and lorenzo.tomassini@metoffice.gov.uk).

Friday 16 afternoon (moderators: Frédéric Hourdin & Daniel Klocke)

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<https://docs.google.com/document/d/1pJ6lhcywAcYP6AT9uZzc3XjwAGIMXm5eISmoyOEu-dE/edit?usp=sharing>

14:15 - 14:30	Synthesis of discussion from the previous day
14:30 - 14:45	Comparing convective memory in different schemes with imposed fixed RCE state. Maxime Colin
14:45 - 15:00	Memory properties in cloud-resolving simulations of the diurnal cycle of deep convection. Chimène Laure Daleu
15:00 - 15:15	Object-oriented analysis of coherent boundary-layer structures in high-resolution simulations. Florent Brient
15:15 - 15:30	Pressure Drag for Shallow Cumulus Clouds: From Thermals to the Cloud Ensemble. Jian-Feng Gu
15:30 - 15:45	Some challenges for the future representation of clouds in global models. Richard Michael Forbes
15:45 - 15:55	Break
15:55 - 16:25	CLIMA's Approach Toward Data-Informed Climate Models With Quantified Uncertainties . Tapio Schneider
16:25 - 16:40	On the use of Emulators, built from Ensembles of Large Eddy Simulations, to study Clouds and Aerosol-Cloud Interactions. Graham Feingold
16:40 - 16:55	Science and Deployment Plan for the Department of Energy (DOE) 3rd Atmospheric Radiation Measurement (ARM) Mobile Facility: Coupled Observational-Modeling Studies of Land-Aerosol-Cloud Interactions in the Southeastern United States. Chongai Kuang
16:55 - 17:10	How semi-automatic tuning tools can help parameterization improvement: Application to the sub-grid water distribution of a statistical cloud scheme. Louis d'Alençon
17:10 - 17:20	Break
17:20-17:25	Characterising the shape, size and orientation of cloud-feeding coherent boundary layer structures Leif Denby
17:25 - 17:30	A new terrain-following vertical coordinate formulation to improve the simulation of fog and low stratus in atmospheric models. Stephanie Westerhuis
17:30 - 17:35	Higher Vertical Resolution for Select Physical Processes in the Energy Exascale Earth System Model (E3SM). Hsiang-He Lee
17:35 - 17:40	Vertical grid-refinement for stratocumulus clouds in ECHAM-HAM. David Neubauer
17:40 - 18:00	Final Discussion