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Research interests

My research interests focus on the myriad of smaller cumulus clouds that are ubiquitous over tropical oceans, where they are often called "trade-wind cumuli", as well as over land during fairweather. The interaction of these cumuli with atmospheric circulations on much larger scales are thought to be critical for Earth's climate. I am also interested in the processes that shape cloudiness, precipitation and the energy and momentum budget of the atmospheric boundary layer. In my work I use observations, including field campaign data, satellite data and (re-)analysis products; theoretical models, including bulk models of the cloudy boundary layer or column models of the tropical atmosphere; and Large-Eddy Simulation.

Employment

Atmospheric Remote Sensing

Delft University of Technology

1 Dec 2016 → 19 Jul 2050

Research output

40 Days and Nights in the Rains: The Inner Life of the Atlantic ITCZ during BOWTIE

Klocke, D., Wing, A. A., Segura, H., Dengler, M., Bell, M. M., George, G., Nuijens, L., O'Driscoll, O., Mackenzie, R. & More Authors, 2026, In: Bulletin of The American Meteorological Society. 107, 7, p. E1656-E1672 17 p.

Countergradient Momentum Transport in Clear Convective Atmospheric Boundary Layers

de Roode, S. R., Jansson, F., Mak, L. & Nuijens, L., 2025, In: Journal of Advances in Modeling Earth Systems. 17, 9, 22 p., e2024MS004579.

The Influence of Parameterized Shallow Convection on Trade-Wind Clouds and Circulations in the HARMONIE-AROME Mesoscale Model

Savazzi, A. C. M., Nuijens, L., de Rooy, W. & Siebesma, A. P., 2025, In: Journal of Advances in Modeling Earth Systems. 17, 2, 24 p., 2024MS004538.

Momentum Transport in Organized Shallow Cumulus Convection

Savazzi, A. C. M., Nuijens, L., De Rooy, W., Janssens, M. & Siebesma, A. P., 2024, In: Journal of the Atmospheric Sciences. 81, 2, p. 279-296 18 p.

Boundary layer coherent structures and circulations viewed through collocated wind lidar and cloud radar profiling

Neto, J. D. & Nuijens, L., 2023. 1 p.

Combined wind lidar and cloud radar for high-resolution wind profiling

Dias Neto, J., Nuijens, L., Unal, C. & Knoop, S., 2023, In: Earth System Science Data. 15, 2, p. 769-789 21 p.

Clouds Blowing in the Wind: Momentum Transport in Cloudy Boundary Layers Observed From Collocated Wind Lidar and Cloud Radars and Simulated With Dales

Dias Neto, J., Nuijens, L., Unal, C. & Knoop, S., 2022. 1 p.

Momentum fluxes from airborne wind measurements in three cumulus cases over land

Koning, A. M., Nuijens, L., Mallaun, C., Witschas, B. & Lemmerz, C., 2022, In: Atmospheric Chemistry and Physics. 22, 11, p. 7373-7388 16 p.

Momentum transport and the organization of shallow convection

Savazzi, A. C. M., Nuijens, L., De Rooy, W. C. & Siebesma, A. P., 2022. 1 p.

The frictional layer in the observed momentum budget of the trades

Nuijens, L., Savazzi, A., de Boer, G., Brilouet, P. E., George, G., Lothon, M. & Zhang, D., 2022, In: Quarterly Journal of the Royal Meteorological Society. 148, 748, p. 3343-3365 23 p.

The representation of the trade winds in ECMWF forecasts and reanalyses during EUREC4A

Savazzi, A. C. M., Nuijens, L., Sandu, I. & Georg, G., 2022, In: Atmospheric Chemistry and Physics (online). 22, 19, p. 13049-13066 18 p.

Visualising and quantifying momentum transport in cloudy boundary layers using collocated lidar and cloud radars

Neto, J. D., Nuijens, L., Unal, C. & Knoop, S., 2022. 1 p.

Counter-Gradient Momentum Transport Through Subtropical Shallow Convection in ICON-LEM Simulations

Dixit, V., Nuijens, L. & Helfer, K. C., 2021, In: Journal of Advances in Modeling Earth Systems. 13, 6, p. 1-20 20 p., e2020MS002352.

EUREC4A

Stevens, B., Bony, S., Farrell, D., Ament, F., Blyth, A., Nuijens, L., Siebesma, A. P., de Groot, G. E., Helfer, K. C. & More Authors, 2021, In: Earth System Science Data. 13, 8, p. 4067-4119 53 p.

Organisation in Shallow Cumulus Convection [PPT]

Siebesma, A. P., Feingold, G. & Nuijens, L., 2021. 7 p.

Surface-Layer Wind Shear and Momentum Transport From Clear-Sky to Cloudy Weather Regimes Over Land

Koning, A. M., Nuijens, L., Bosveld, F. C., Siebesma, A. P., van Dorp, P. A. & Jonker, H. J. J., 2021, In: Journal of Geophysical Research: Atmospheres. 126, 21, p. 1-18 18 p., e2021JD035087.

The Morphology of Simulated Trade-Wind Convection and Cold Pools Under Wind Shear

Helfer, K. C. & Nuijens, L., 2021, In: Journal of Geophysical Research: Atmospheres. 126, 20, p. 1-15 15 p., e2021JD035148.

The role of shallow convection in the momentum budget of the trades from large-eddy-simulation hindcasts

Helfer, K. C., Nuijens, L. & Vijay Dixit, V., 2021, In: Quarterly Journal of the Royal Meteorological Society. 147, 737, p. 2490-2505 16 p.

How Wind Shear Affects Trade-wind Cumulus Convection

Helfer, K. C., Nuijens, L., de Roode, S. R. & Siebesma, A. P., 2020, In: Journal of Advances in Modeling Earth Systems. 12, 12, 19 p., e2020MS002183.

The Influence of Convective Momentum Transport and Vertical Wind Shear on the Evolution of a Cold Air Outbreak

Saggiorato, B., Nuijens, L., Siebesma, P., de Roode, S., Sandu, I. & Papritz, L., 2020, In: Journal of Advances in Modeling Earth Systems. 12, 6, p. 1-22 22 p., e2019MS001991.

Boundary Layer Clouds and Convection over Subtropical Oceans in our Current and in a Warmer Climate

Nuijens, L. & Siebesma, A. P., 2019, In: Current Climate Change Reports. 5, 2, p. 80-94 15 p.

Influence of deepening and mesoscale organization of shallow convection on stratiform cloudiness in the downstream trades

Vogel, R., Nuijens, L. & Stevens, B., 2019, In: Quarterly Journal of the Royal Meteorological Society. 146 (2020), 726, p. 174-185 12 p.

Observed influence of moist convection and cloudiness on boundary layer wind and momentum flux profiles over land
Koning, M., Nuijens, L., Siebesma, P., Bosveld, F. C., Jonker, H. & Verzijlbergh, R., 2019. 1 p.

The interaction of tropical convection with its environment - new observational insights
Jakob, C., Louf, V., Savazzi, A., Protat, A., Siebesma, P. & Nuijens, L., 2019. 1 p.

Congestus modes in circulating equilibria of the tropical atmosphere in a two-column model
Nuijens, L. & Emanuel, K., 1 Jan 2018, In: Quarterly Journal of the Royal Meteorological Society. 144, 717, p. 2676-2692 27 p.

The response of shallow convection and momentum transport to the wind profile in Large Eddy Simulations
Helfer, K., Nuijens, L., de Roode, S. & Siebesma, P., 2018, In: Geophysical Research Abstracts (online). 20, 1 p., EGU2018-12599.

EUREC⁴A: A Field Campaign to Elucidate the Couplings Between Clouds, Convection and Circulation
Bony, S., Stevens, B., Ament, F., Bigorre, S., Chazette, P., Crewell, S., Delanoë, J., Emanuel, K., Farrell, D., Flamant, C., Gross, S., Hirsch, L., Karstensen, J., Mayer, B., Nuijens, L., Ruppert, J. H., Sandu, I., Siebesma, P., Speich, S. & Szczap, F. & 4 others, Totems, J., Vogel, R., Wendisch, M. & Wirth, M., 27 Sept 2017, In: Surveys in Geophysics: an international review journal covering the entire field of geosciences and related areas. 38, p. 1529–1568 40 p.

Implications of Warm Rain in Shallow Cumulus and Congestus Clouds for Large-Scale Circulations
Nuijens, L., Emanuel, K., Masunaga, H. & L'Ecuyer, T., 27 Sept 2017, In: Surveys in Geophysics: an international review journal covering the entire field of geosciences and related areas. 38, 6, p. 1257-1282 26 p.

Shallow cumulus and congestus modes in circulating equilibria of the tropical atmosphere in a two-column RCE model
Nuijens, L. & Emanuel, K., 2017, In: Geophysical Research Abstracts (online). 19, 1 p., EGU2017-9075.