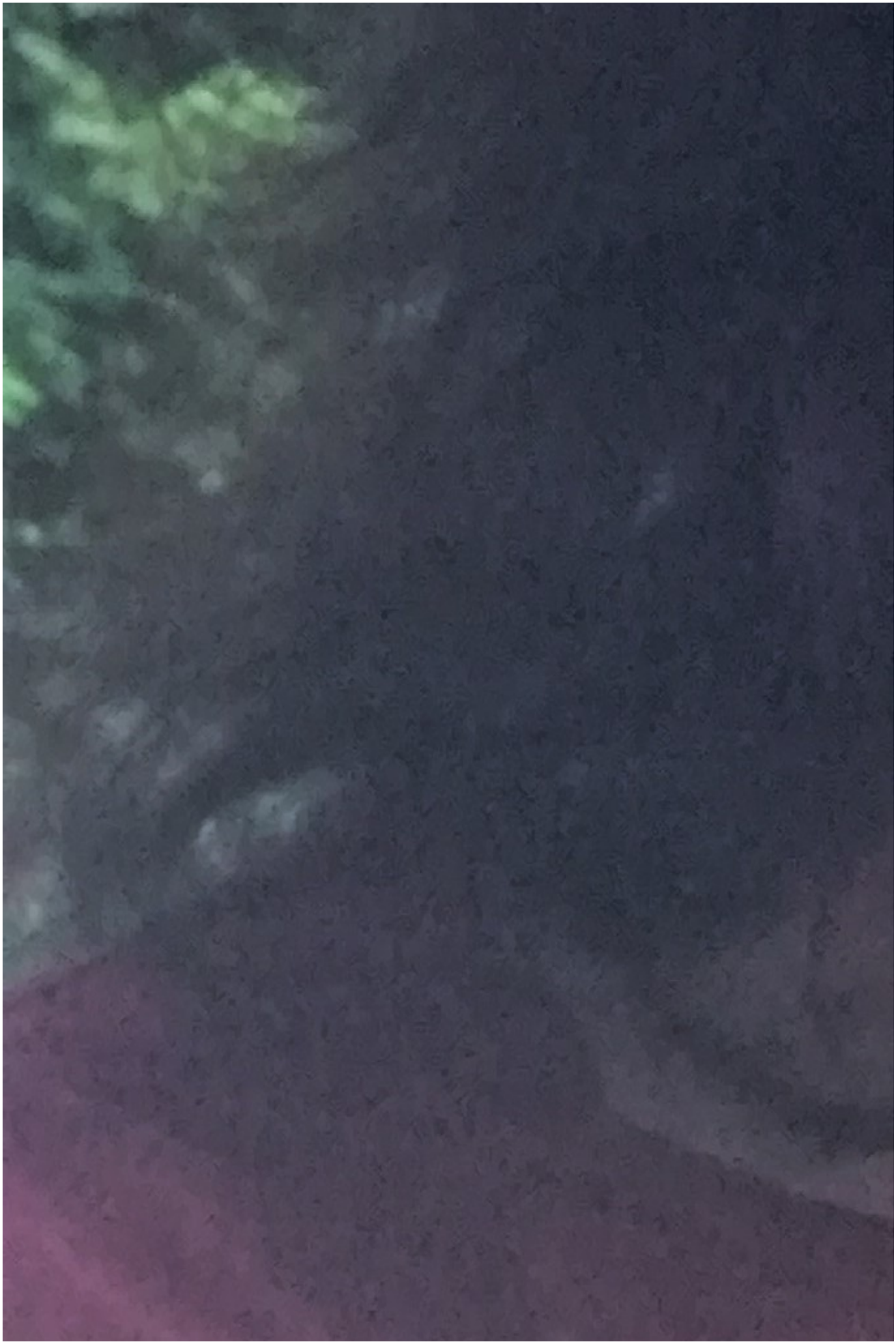

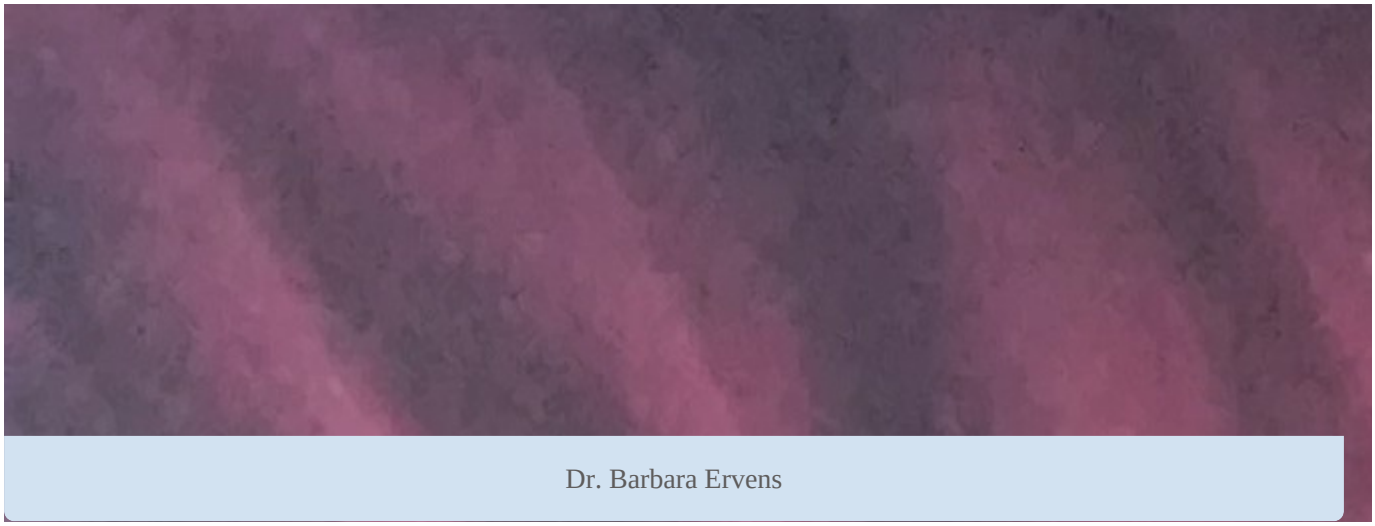

Dr. Barbara Ervens

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Directrice de recherche, (DR2, CNRS)

Institut de Chimie de Clermont-Ferrand(https://iccf.uca.fr/unite/presentation)

Coordonnées

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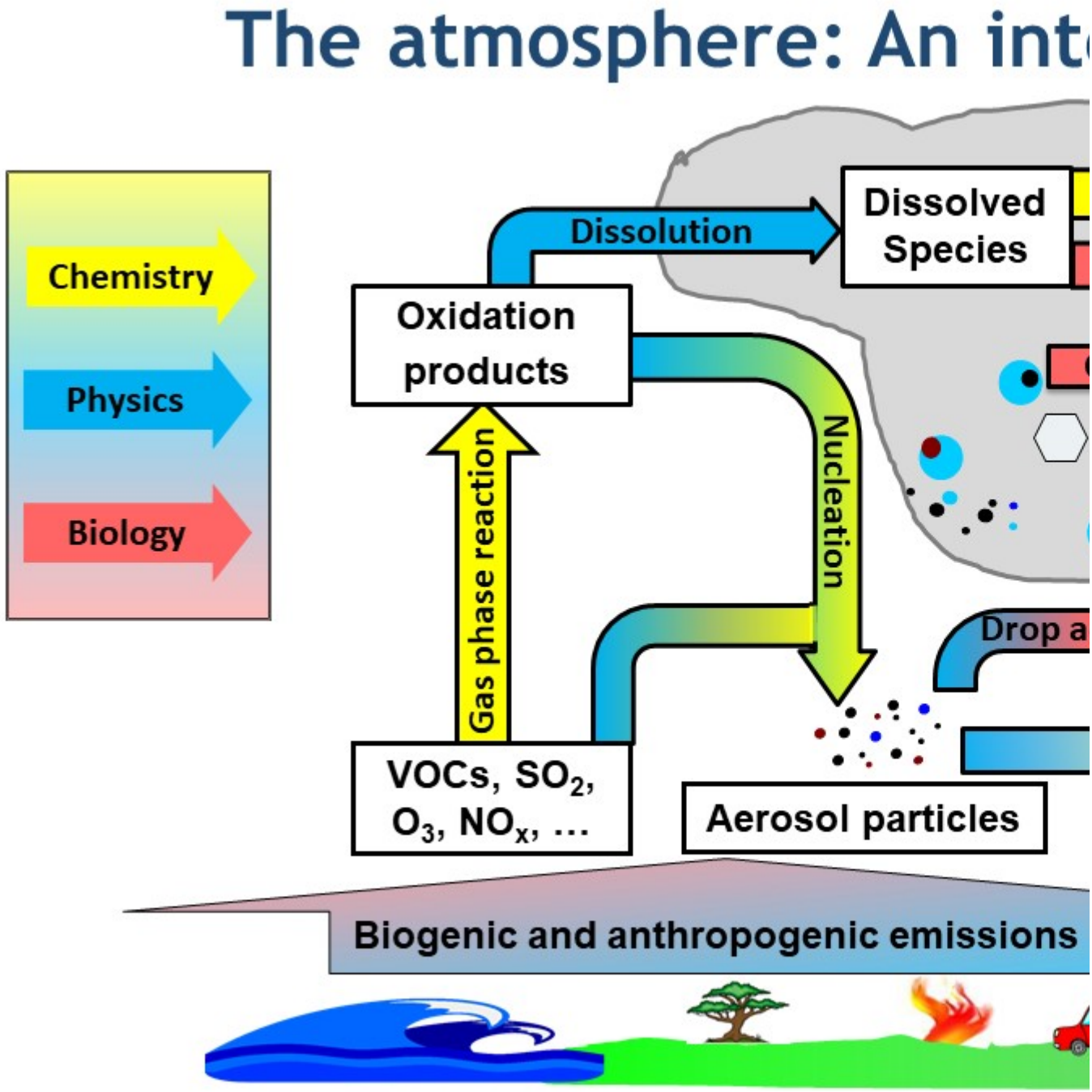
Thèmes de recherche

Earth' atmosphere undergoes continuous changes due to numerous chemical, physical and biological processes. In the current estimates of radiative forcing(https://www.ipcc.ch/working-group/wg1/), clouds and in particular cloud/aerosol interactions represent one of the largest uncertainties. Aerosol particles act as cloud condensation nuclei (CCN) or ice nuclei (IN) that eventually lead to cloud droplets or ice particles, respectively. The aqueous p



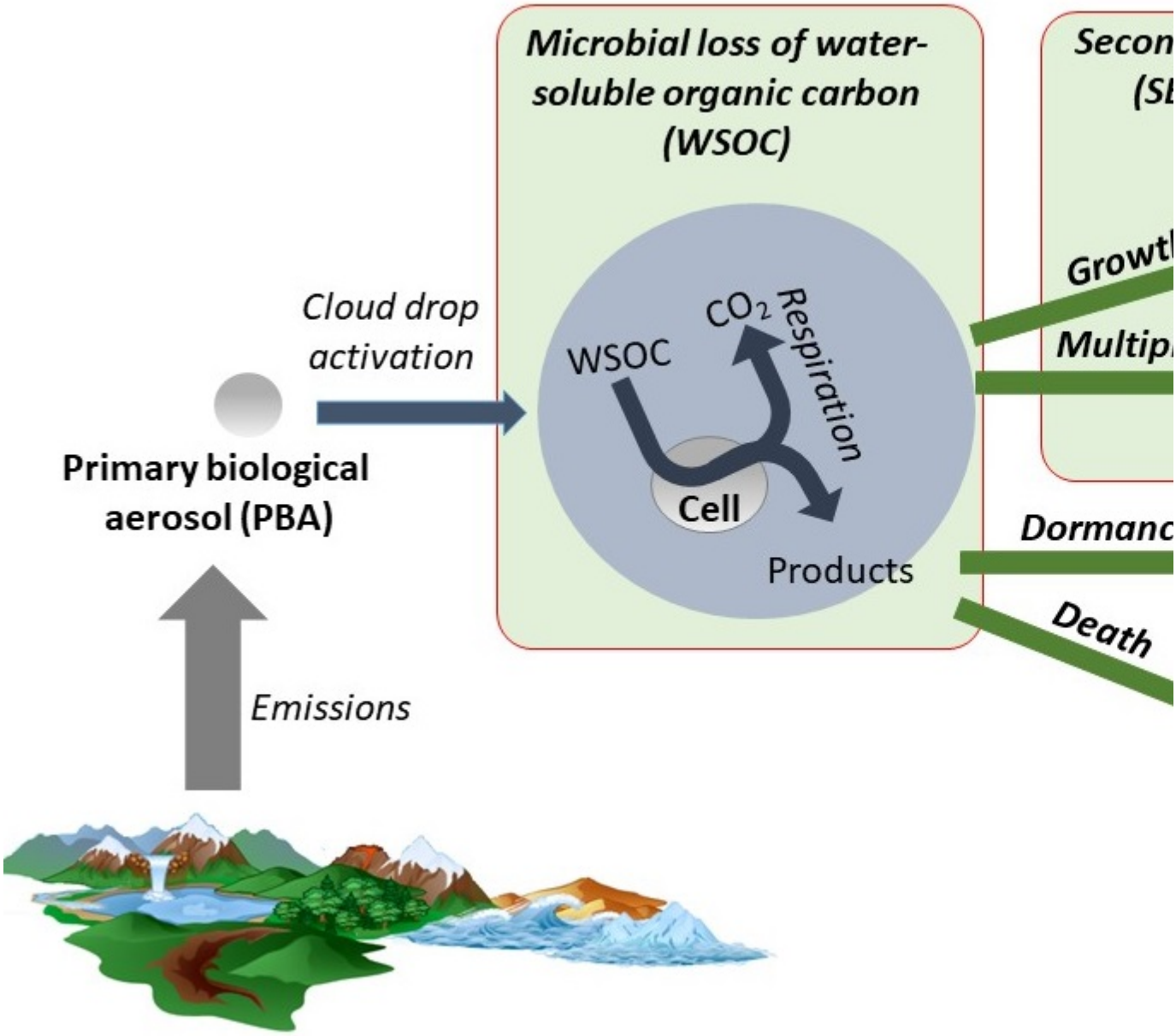
hase of cloud droplets and wet particles represents a medium where efficient chemical reactions can occur that lead to the modification of the composition of aerosol particles, cloud /rain water and the surrounding gas phase. Less attention has been given to the role of biological processes that occur in clouds. Microorganisms, such as bacteria, cannot not only act as IN but they also utilize organic substrates in cloud droplets and transform them into CO_2 and other products, in competition to chemical processes. Thus, in order to understand the formation, evolution and radiative impact of clouds interdisciplinary efforts are needed to improve upon the description of relevant processes on all scales.

My research focuses on the development and application of small-scale models that describe in detail chemical, microphysical and biological processes in clouds.
Find a complete publication list sorted by topics here.

Previous work includes

- the development of detailed ***CHEMICAL*** mechanisms of reactions occurring in cloud droplets. My early work was the development of the chemical aqueous phase radical mechanism (CAPRAM(https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2002JD002202)). In addition, I was one of the first researchers who suggested that in addition to sulfate, also organic aerosol may be formed in cloud droplets and in aqueous aerosol (aqSOA(https://www.atmos-chem-phys.net/11/11069/2011/acp-11-11069-2011.html)).

- the implementation and analysis of ***MICROPHYSICAL*** data and processes in cloud models. We showed that the representation of CCN(https://www.atmos-chem-phys.net/10/4795/2010/) properties can be largely simplified for most cases. In detailed model studies of ice microphysics, we explored the sensitivities(https://agupubs.onlinelibrary.wiley.com/doi/10.1002/grl.50580) and key parameters(https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2011JD015729) of ice nucleation in mixed-phase clouds.



Currently, my work is focused on ***BIOLOGICAL*** processes in clouds within the project MOBIDIC (**Mo**deling **Bi**ologically-**D**riven Processes **i**n **C**louds) project. We explore by means of model studies on various scales, processes of biological particles (bacteria) in the atmosphere. These processes include emission, dospersion and transport but also bacterial cell growth/multiplication and the utilization of organics by bacteria in cloud water.

Activités / CV

RESEARCH EXPERIENCE

2021 – present Senior Scientist, National Centre for Scientific Research (CNRS), Institute of Chemistry of Clermont-Ferrand, University Clermont Auvergne,

2018 – 2021 Research Scientist, Institute of Chemistry of Clermont-Ferrand, University Clermont Auvergne

2011 – 2018 Research Scientist III, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, and NOAA, Earth System Research Laboratory, Chemical Sciences Division, Boulder, CO, USA

2008 - 2011 Research Scientist II, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, and NOAA, Earth System Research Laboratory, Chemical Sciences Division, Boulder, CO, USA

2005 – 2008 Research Scientist I, Atmospheric Science Department, Colorado State University, Fort Collins, and NOAA, Earth System Research Laboratory, Chemical Sciences Division, Boulder, CO, USA

2002 – 2004 Postdoctoral Fellow, Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University, Fort Collins, and NOAA, Environmental Technology Laboratory, Boulder, CO, USA

2001 – 2002 Postdoctoral Fellow, Institute for Tropospheric Research, Leipzig, GERMANY

1998 – 2001 Research Assistant, Institute for Tropospheric Research, Leipzig, GERMANY

1997 – 1998 Research Assistant, Institute for Physical and Theoretical Chemistry, University Essen, GERMANY

Research Assistant, Institute for Physical and Theoretical Chemistry, University Essen, GERMANY

Informations complémentaires

MOST RECENT PUBLICATIONS

Link to Full publication list (Google Scholar)(https://scholar.google.com/citations?user=Dh6mAAUAAAAJ&hl=en)

Barth, M. C., B. Ervens, H. Herrmann, A. Tilgner, V. F. McNeill, W. G. Tsui, L. Deguillaume, N. Chaumerliac, A. Carlton, and S. M. Lance, Box Model Intercomparison of Cloud Chemistry, *J. Geophys. Res.*, https://doi.org/10.1029/2021JD035486(https://doi.org/10.1029/2021JD035486), **2021, in press**.

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Zhang, M., Khaled, A., Amato, P., Delort, A.-M., and Ervens, B.: Sensitivities to biological aerosol particle properties and ageing processes: potential implications for aerosol–cloud interactions and optical properties, *Atmos. Chem. Phys.*, 21, 3699 - 3724, https://doi.org/10.5194/acp-21-3699-2021(https://doi.org/10.5194/acp-21-3699-2021), **2021**. (editor's highlight)

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Jaber, S., Joly, M., Brissy, M., Leremboure, M., Khaled, A., Ervens, B., and Delort, A.-M.: Biotic and abiotic transformation of amino acids in cloud water: Experimental studies and atmospheric implications, *Biogeosciences*, 18, 1067–1080, https://doi.org/10.5194/bg-18-1067-2021(https://doi.org/10.5194/bg-18-

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Ervens, B. and P. Amato, The global impact of bacterial processes on carbon mass, *Atmos. Chem. Phys.,* 20, 1777–1794, doi.org/10.5194/acp-20-1777-2020, **2020.**

Rechercher

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