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Curriculum Vitae

since Oct 2022	Professor for Atmospheric Physics at University of Wuppertal, jointly with Department Head at Forschungszentrum Jülich
since Sep 2013	Member of Faculty of Physics at University of Wuppertal
since Nov 2012	Coordinator of IAGOS Germany, Co-coordinator of IAGOS Research Infrastructure
since May 2012	Department Head "Global Observation" at Forschungszentrum Jülich, IEK-8
May – Aug 2011	Research stay at Aerodyne Research Inc., Billerica MA, USA
2008 – 2012	DLR Senior Scientist
Sep 2007 – Aug 2009	Visiting Professor at the Department of Environmental and Geographical Sciences of Manchester Metropolitan University, UK
2005 – 2012	Member of Faculty of Physics at LMU Munich
June 2005	Postdoctoral lecture qualification (Habilitation) for Meteorology at LMU Munich
SS 2002	Visiting Professor at the Institute for Experimental Physics of the University of Vienna, Research Group Aerosols
2000 – 2012	Head of the research group Atmospheric Aerosols at the Institut für Physik der Atmosphäre of DLR (DLR-IPA)
1996 – 1999	Research associate at Deutsches Zentrum für Luft- und Raumfahrt – Institut für Physik der Atmosphäre (DLR-IPA) in Oberpfaffenhofen
1990 – 1995	Graduate studies at Technical University Munich (Chair Prof. Dr. R. Niessner) on "Measurement Techniques for Black Carbon"
1989 – 1990	Diploma thesis at LMU Munich (Chair Prof. Dr. J. Peisl) on the "Process of Surface Melting of Aluminium Single Crystals"
1983 – 1990	Scientific education in Physics and Meteorology at Ludwig-Maximillians-University (LMU) Munich and at the University of Hamburg

Community Activities

Jan 2019 – June 2023	Coordinator of EU H2020 project ENVRI-FAIR (https://envri.eu/home-envri-fair/)
Since 2015	Member of the Board of European Environmental Research Infrastructures
since 2010	Member of WMO Global Atmosphere Watch – Scientific Advisory Group on Aerosols

Activities relevant for ANCEN

PART 1: Activities during my work at DLR (1996 – 2012)

1. Research on particle emissions from aircraft and their climate impact

Selected publications: Petzold and Schröder (1998); Schröder et al. (1998); Petzold et al. (1999a); Petzold et al. (1999b); Schröder et al. (2000); Schumann et al. (2002); Petzold et al. (2005b)

Habilitation Thesis: Petzold (2006)

2. Project coordination

Experimental co-ordinator of the EU project PartEmis (Measurement and Prediction of Emissions of Aerosols and Gaseous Precursors from Gas Turbine Engines); 04/2000 – 03/2003; overview publications: Wilson et al. (2004); Petzold et al. (2005a)

EASA study SAMPLE (Sampling and measurement of aircraft particulate emissions); overview publication: Petzold et al. (2011)

Contribution to SAMPLE II (EASA.2009.OP.18: Studying, sampling and measurement of aircraft particulate emissions, final report published 2011)

3. Committee Activities (until 2010)

SAE–E31 Particulate Subcommittee of the Society of Automotive Engineers (SAE International)

Working Group 3 Emissions – Technical Issues of the Committee on Aviation Environmental Protection (CAEP) of the International Civil Aviation Organisation (ICAO)

PART 2: Activities in the Framework of IAGOS (since 2012)

1. Co-Coordination of Research Infrastructure IAGOS

IAGOS Overview: Petzold et al. (2015); Thouret et al. (2022); see also www.iagos.org

2. Routine observations of water vapour and relative humidity on board of passenger aircraft

Relevant publications: Petzold et al. (2017); Petzold et al. (2020); Rolf et al. (2023)

3. Activities in recent and ongoing European Projects:

ACACIA (GA 875036) Advancing the Science for Aviation and ClimAte; ACACIA targeted the relevant non-CO_2 emissions from civil aviation (ozone and methane from NO_x emissions, contrails and contrail-cirrus, indirect aerosol effects). The project finished in 2024.

My role was to coordinate the work package on the development of new observation strategies for water vapour and contrails on one hand, and NOx – ozone chemistry on the other hand.

CICONIA (GA 101114613) CICONIA's ambition is to improve the understanding of non-CO2 emissions with regards to the current aircraft/engine technologies and operating fleet, as well as their evolution and their climate effects, but with the clear objective to evaluate and develop impact reduction solutions covering several promising mitigation options on flight operations, through the definition of innovative dedicated Concepts of Operations (CONOPS) and their assessment in comparison to legacy operations. The project started in 2023.

My role is to coordinate the provision of IAGOS routine humidity observations for the evaluation of forecast products on ice-supersaturated air masses for a climate-optimised flight route planning, and to oversee the evaluation of these forecast products.

PART 3: Selected Publications

Petzold, A., and Schröder, F.: Jet engine exhaust aerosol characterisation, Aerosol Science and Technology, 28, 62-76, https://doi.org/10.1080/02786829808965512, 1998.

Petzold, A., Döpelheuer, A., Brock, C. A., and Schröder, F.: In situ observations and model calculations of black carbon emission by aircraft at cruise altitude, Journal of Geophysical Research-Atmospheres, 104, 22171-22181, https://doi.org/10.1029/1999JD900460, 1999a.

Petzold, A., Ström, J., Schroder, F. P., and Karcher, B.: Carbonaceous aerosol in jet engine exhaust: Emission characteristics and implications for heterogeneous chemical reactions, Atmospheric Environment, 33, 2689-2698, https://doi.org/10.1016/s1352-2310(98)00314-8, 1999b.

Petzold, A., Fiebig, M., Fritzsche, L., Stein, C., Schumann, U., Wilson, C. W., Hurley, C. D., Arnold, F., Katragkou, E., Baltensperger, U., Gysel, M., Nyeki, S., Hitzenberger, R., Giebl, H., Hughes, K. J., Kurtenbach, R., Wiesen, P., Madden, P., Puxbaum, H., Vrchoticky, S., and Wahl, C.: Particle emissions from aircraft engines – a survey of the european project partemis, Meteorologische Zeitschrift, 14, 465-476, https://doi.org/10.1127/0941-2948/2005/0054, 2005a.

Petzold, A., Gysel, M., Vancassel, X., Hitzenberger, R., Puxbaum, H., Vrchoticky, S., Weingartner, E., Baltensperger, U., and Mirabel, P.: On the effects of organic matter and sulphur-containing compounds on the ccn activation of combustion particles, Atmospheric Chemistry and Physics, 5, 3187–3203, https://doi.org/10.5194/acp-5-3187-2005, 2005b.

Petzold, A.: Particle emissions from aviation: Microphysics, chemistry, and climate impact, Deutsches Zentrum für Luft- und Raumfahrt e.V., Köln, Habilitation Thesis, Ludwig-Maximilians-Universität München, DLR-FB 2006-2, 96, 2006.

Petzold, A., Marsh, R., Johnson, M., Miller, M., Sevcenco, Y., Delhaye, D., Ibrahim, A., Williams, P., Bauer, H., Crayford, A., Bachalo, W. D., and Raper, D.: Evaluation of methods for measuring particulate matter emissions from gas turbines, Environmental Science & Technology, 45, 3562–3568, https://doi.org/10.1021/es103969v, 2011.

Petzold, A., Thouret, V., Gerbig, C., Zahn, A., Brenninkmeijer, C. A. M., Gallagher, M., Hermann, M., Pontaud, M., Ziereis, H., Boulanger, D., Marshall, J., Nédélec, P., Smit, H. G. J., Frieß, U., Flaud, J.-M., Wahner, A., Cammas, J.-P., Volz-Thomas, A., and IAGOS-Team: Global-scale atmosphere monitoring by in-service aircraft – current achievements and future prospects of the european research infrastructure iagos, Tellus Series B-Chemical and Physical Meteorology, 67, 28452, https://doi.org/10.3402/tellusb.v67.28452, 2015.

Petzold, A., Krämer, M., Neis, P., Rolf, C., Rohs, S., Berkes, F., Smit, H. G. J., Gallagher, M., Beswick, K., Lloyd, G., Baumgardner, D., Spichtinger, P., Nedelec, P., Ebert, V., Buchholz, B., Riese, M., and Wahner, A.: Upper tropospheric water vapour and its interaction with cirrus clouds as seen from iagos long-term routine in situ observations, Faraday Discussions, 200, 229-249, https://doi.org/10.1039/c7fd00006e, 2017.

Petzold, A., Neis, P., Rütimann, M., Rohs, S., Berkes, F., Smit, H. G. J., Krämer, M., Spelten, N., Spichtinger, P., Nédélec, P., and Wahner, A.: Ice-supersaturated air masses in the northern mid-latitudes from regular in situ observations by passenger aircraft: Vertical distribution, seasonality and tropospheric fingerprint, Atmospheric Chemistry and Physics, 20, 8157-8179, https://doi.org/10.5194/acp-20-8157-2020, 2020.

Rolf, C., Rohs, S., Smit, H. G. J., Krämer, M., Bozóki, Z., Hofmann, S., Franke, H., Maser, R., Hoor, P., and Petzold, A.: Evaluation of compact hygrometers for continuous airborne measurements, Meteorologische Zeitschrift, 20, https://doi.org/10.1127/metz/2023/1187, 2023.

Schröder, F., Kärcher, B., Duroure, C., Ström, J., Petzold, A., Gayet, J. F., Strauss, B., Wendling, P., and Borrmann, S.: On the transition of contrails into cirrus clouds, Journal of the Atmospheric Sciences, 57, 464-480, https://doi.org/10.1175/1520-0469(2000)057<0464:OTTOCI>2.0.CO;2, 2000.

Schröder, F. P., Kärcher, B., Petzold, A., Baumann, R., Busen, R., Hoell, C., and Schumann, U.: Ultrafine aerosol particles in aircraft plumes: In situ observations, Geophysical Research Letters, 25, 2789-2792, https://doi.org/10.1029/98GL02078, 1998.

Schumann, U., Arnold, F., Busen, R., Curtius, J., Kärcher, B., Kiendler, A., Petzold, A., Schlager, H., Schröder, F., and Wohlfrom, K. H.: Influence of fuel sulfur on the composition of aircraft exhaust plumes: The experiments sulfur 1-7, Journal of Geophysical Research-Atmospheres, 107, 4247, https://doi.org/10.1029/2001JD000813, 2002.

Thouret, V., Clark, H., Petzold, A., Nédélec, P., and Zahn, A.: Iagos: Monitoring atmospheric composition for air quality and climate by passenger aircraft, in: Handbook of air quality and climate change, edited by: Akimoto, H., and Tanimoto, H., Springer Nature Singapore, Singapore, 1-14, 2022.

Wilson, C. W., Petzold, A., Nyeki, S., Schumann, U., and Zellner, R.: Measurement and prediction of emissions of aerosols and gaseous precursors from gas turbine engines (partemis): An overview, Aerospace Science and Technology, 8, 131–143, https://doi.org/10.1016/j.ast.2003.10.006, 2004.