List of Publications, Theses, and Data sets (2007–2026)

Infrastructure Priority Program SPP 1294
funded by the German Research Foundation (DFG)
(HALO DFG SPP 1294)

Atmospheric and Earth System Research with the Research Aircraft HALO

(High Altitude and Long Range Research Aircraft)

Spokesperson:	Univ.–Prof. Dr. Manfred Wendisch	Leipzig University
Scientific Coordinator:	Dr. Anja Schwarz	Leipzig University
Contact:	Leipzig University, Leipziger Institute for Meteorology (LIM) Stephanstraße 3, 04103 Leipzig, Germany m.wendisch@uni-leipzig.de; anja.schwarz@uni-leipzig.de	

August 26, 2026

HALO SPP 1294 Scientific Journal–Publications in Review or Submitted

Kessler, S., Emig, N., Lachnitt, H.-C., Kunkel, D., Bozem, H., Bense, V., Joppe, P., Kaluza, T., Grooß, J., Zahn, A., Ziereis, H., Riese, M., and Hoor, P.: Biomass burning in Australia: No evidence forcarbonyl sulfide (OCS) enhancement in fire plumes from in-situ measurements during SouthTRAC, Geophys. Res. Lett., submitted, 2025.

HALO SPP 1294 Peer–Reviewed and Accepted Scientific Journal–Publications

Abdelmonem, A., Schnaiter, M., Amsler, P., Hesse, E., Meyer, J., and Leisner, T.: First correlated measurements of the shape and light scattering properties of cloud particles using the new Particle Habit Imaging and Polar Scattering (PHIPS) probe, Atmos. Meas. Tech., 4, 2125–2142, https://doi.org/10.5194/amt-4-2125-2011, 2011.

Abdelmonem, A., Järvinen, E., Duft, D., Hirst, E., Vogt, S., Leisner, T., and Schnaiter, M.: PHIPS–HALO: the airborne Particle Habit Imaging and Polar Scattering probe – Part 1: Design and operation, Atmos. Meas. Tech., 9, 3131–3144, https://doi.org/10.5194/amt-9-3131-2016, 2016.

Afchine, A., Rolf, C., Costa, A., Spelten, N., Riese, M., Buchholz, B., Ebert, V., Heller, R., Kaufmann, S., Minikin, A., Voigt, C., Zöger, M., Smith, J., Lawson, P., Lykov, A., Khaykin, S., and Krämer, M.: Ice particle sampling from aircraft – influence of the probing position on the ice water content, Atmos. Meas. Tech., 11, 4015–4031, https://doi.org/10.5194/amt-11-4015-2018, 2018.

Ajayi, T., Choi, Y., Crosbie, E. C., DiGangi, J. P., Diskin, G. S., Fenn, M. A., Ferrare, R. A., Hair, J. W., Hilario, M. R. A., Hostetler, C. A., Kirschler, S., Moore, R. H., Shingler, T. J., Shook, M. A., Soloff, C., Thornhill, K. L., Voigt, C., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Vertical variability of aerosol properties and trace gases over a remote marine region: a case study over Bermuda, Atmos. Chem. Phys., 24, 9197–9218, https://doi.org/10.5194/acp-24-9197-2024, 2024.

Ajayi, T., Choi, Y., Crosbie, E. C., DiGangi, J. P., Diskin, G. S., Kirschler, S., Moore, R. H., Shook, M. A., Thornhill, K. L., Voigt, C., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Can a Weekly Cycle in Pollutants be Observed Offshore the US East Coast with Airborne Measurements?, ACS ES&T AIR, 2, 2704–2717, https://doi.org/10.1021/acsestair.5c00291, 2025.

Andreae, M. O., Afchine, A., Albrecht, R., Holanda, B. A., Artaxo, P., Barbosa, H. M. J., Borrmann, S., Cecchini, M. A., Costa, A., Dollner, M., Fütterer, D., Järvinen, E., Jurkat, T., Klimach, T., Konemann, T., Knote, C., Krämer, M., Krisna, T., Machado, L. A. T., Mertes, S., Minikin, A., Pöhlker, C., Pöhlker, M. L., Pöschl, U., Rosenfeld, D., Sauer, D., Schlager, H., Schnaiter, M., Schneider, J., Schulz, C., Spanu, A., Sperling, V. B., Voigt, C., Walser, A., Wang, J., Weinzierl, B., Wendisch, M., and Ziereis, H.: Aerosol characteristics and particle production in the upper troposphere over the Amazon Basin, Atmos. Chem. Phys., 18, 921–961, https://doi.org/10.5194/acp-18-921-2018, 2018.

Andrés-Hernández, M. D., Kartal, D., Crowley, J. N., Sinha, V., Regelin, E., Martínez-Harder, M., Nenakhov, V., Williams, J., Harder, H., Bozem, H., Song, W., Thieser, J., Tang, M. J., Hosaynali Beigi, Z., and Burrows, J. P.: Diel peroxy radicals in a semi industrial coastal area: Nighttime formation of free radicals, Atmos. Chem. Phys., 13, 5731–5749, https://doi.org/10.5194/acp-13-5731-2013, 2013.

Andrés Hernández, M. D., Hilboll, A., Ziereis, H., Förster, E., Krüger, O. O., Kaiser, K., Schneider, J., Barnaba, F., Vrekoussis, M., Schmidt, J., Huntrieser, H., Blechschmidt, A.-M., George, M., Nenakhov, V., Harlass, T., Holanda, B. A., Wolf, J., Eirenschmalz, L., Krebsbach, M., Pöhlker, M. L., Kalisz Hedegaard, A. B., Mei, L., Pfeilsticker, K., Liu, Y., Koppmann, R., Schlager, H., Bohn, B., Schumann, U., Richter, A., Schreiner, B., Sauer, D., Baumann, R., Mertens, M., Jöckel, P., Kil-

ian, M., Stratmann, G., Pöhlker, C., Campanelli, M., Pandolfi, M., Sicard, M., Gómez-Amo, J. L., Pujadas, M., Bigge, K., Kluge, F., Schwarz, A., Daskalakis, N., Walter, D., Zahn, A., Pöschl, U., Bönisch, H., Borrmann, S., Platt, U., and Burrows, J. P.: Overview: On the transport and transformation of pollutants in the outflow of major population centres - observational data from the EMeRGe European intensive operational period in summer 2017, Atmos. Chem. Phys., 22, 5877–5924, https://doi.org/10.5194/acp-22-5877-2022, 2022.

Bansmer, S. E., Baumert, A., Sattler, S., Knop, I., Leroy, D., Schwarzenboeck, A., Jurkat-Witschas, T., Voigt, C., Pervier, H., and Esposito, B.: Design, construction and commissioning of the Braunschweig Icing Wind Tunnel, Atmos. Meas. Tech., 11, 3221–3249, https://doi.org/10.5194/amt-11-3221-2018, 2018.

Bardakov, R., Thornton, J. A., Ekman, A. M. L., Krejci, R., Pöhlker, M. L., Curtius, J., Williams, J., Lelieveld, J., and Riipinen, I.: High Concentrations of Nanoparticles From Isoprene Nitrates Predicted in Convective Outflow Over the Amazon, Geophys. Res. Lett., 51, e2024GL109 919, https://doi.org/10.1029/2024GL109919, 2024.

Barry, K. R., Hill, T. C., Jentzsch, C., Moffett, B. F., Stratmann, F., and DeMott, P. J.: Pragmatic protocols for working cleanly when measuring ice nucleating particles, Atmos. Res., 250, 105 419, https://doi.org/10.1016/j.atmosres.2020.105419, 2021.

Bartolome Garcia, I., Spang, R., Ungermann, J., Griessbach, S., Krämer, M., Höpfner, M., and Riese, M.: Observation of cirrus clouds with GLORIA during the WISE campaign: detection methods and cirrus characterization, Atmos. Meas. Tech., 14, 3153–3168, https://doi.org/10.5194/amt-14-3153-2021, 2021.

Bauchinger, S., Engel, A., Jesswein, M., Keber, T., Bönisch, H., Obersteiner, F., Zahn, A., Emig, N., Hoor, P., Lachnitt, H.-C., Weyland, F., Ort, L., and Schuck, T. J.: The extratropical tropopause – trace gas perspective on tropopause definition choice, Atmos. Chem. Phys., 25, 14 167–14 186, https://doi.org/10.5194/acp-25-14167-2025, 2025.

Bauer, R., Grooß, J.-U., Ungermann, J., Bär, M., Geldenhuys, M., and Hoffmann, L.: The Mission Support System (MSS v7.0.4) and its use in planning for the SouthTRAC aircraft campaign, Geoscientific Model Development, 15, 8983–8997, https://doi.org/10.5194/gmd-15-8983-2022, 2022.

Betito, G., Crosbie, E. C., Hostetler, C. A., Kirschler, S., Moore, R. H., Shingler, T. J., Shook, M. A., Siu, L. W., Voigt, C., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: On the Physicochemical Differences between Cloud Droplet Residual Particles and Below-Cloud Particles over the Northwest Atlantic, ACS ES&T Air, 2, 2195–2207, https://doi.org/10.1021/acsestair.5c00150, 2025.

Boettcher, M., Schäfler, A., Sprenger, M., Sodemann, H., Kaufmann, S., Voigt, C., Schlager, H., Summa, D., Di Girolamo, P., Nerini, D., Germann, U., and Wernli, H.: Lagrangian matches between observations from aircraft, lidar and radar in a warm conveyor belt crossing orography, Atmos. Chem. Phys., 21, 5477–5498, https://doi.org/10.5194/acp-21-5477-2021, 2021.

Bohn, B. and Lohse, I.: Calibration and evaluation of CCD spectroradiometers for ground-based and airborne measurements of spectral actinic flux densities, Atmos. Meas. Tech., 10, 3151–3174, https://doi.org/10.5194/amt-10-3151-2017, 2017.

Bohn, B. and Lohse, I.: Optical receiver characterizations and corrections for ground-based and airborne measurements of spectral actinic flux densities, Atmos. Meas. Tech., 16, 209–233, https://doi.org/10.5194/amt-16-209-2023, 2023.

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 Jr., J. H., Sandu, I., Siebesma, P., Speich, S., Szczap, F., Totems, J., Vogel, R., Wendisch, M., and Wirth, M.: EUREC^{4}A: A Field Campaign to Elucidate the Couplings Between Clouds, Convection and Circulation, Surv. Geophys., 38, 1529–1568, https://doi.org/10.1007/s10712-017-9428-0, 2017.

Braga, R. C., Rosenfeld, D., Weigel, R., Jurkat, T., Andreae, M. O., Wendisch, M., Pöhlker, M. L., Klimach, T., Pöschl, U., Pöhlker, C., Voigt, C., Mahnke, C., Borrmann, S., Albrecht, R. I., Molleker, S., Vila, D. A., Machado, L. A. T., and Artaxo, P.: Comparing parameterized versus measured microphysical properties of tropical convective cloud bases during the ACRIDICON–CHUVA campaign, Atmos. Chem. Phys., 17, 7365–7386, https://doi.org/10.5194/acp-17-7365-2017, 2017a.

Braga, R. C., Rosenfeld, D., Weigel, R., Jurkat, T., Andreae, M. O., Wendisch, M., Pöschl, U., Voigt,

C., Mahnke, C., Borrmann, S., Albrecht, R. I., Molleker, S., Vila, D. A., Machado, L. A. T., and Grulich, L.: Further evidence for CCN aerosol concentrations determining the height of warm rain and ice initiation in convective clouds over the Amazon basin, Atmos. Chem. Phys., 17, 14 433–14 456, https://doi.org/10.5194/acp-17-14433-2017, 2017b.

Braga, R. C., Ervens, B., Rosenfeld, D., Andreae, M. O., Förster, J.-D., Fütterer, D., Hernández Pardo, L., Holanda, B. A., Jurkat-Witschas, T., Krüger, O. O., Lauer, O., Machado, L. A. T., Pöhlker, C., Sauer, D., Voigt, C., Walser, A., Wendisch, M., Pöschl, U., and Pöhlker, M. L.: Cloud droplet formation at the base of tropical convective clouds: closure between modeling and measurement results of ACRIDICON–CHUVA, Atmos. Chem. Phys., 21, 17 513–17 528, https://doi.org/10.5194/acp-21-17513-2021, 2021a.

Braga, R. C., Rosenfeld, D., Krüger, O. O., Ervens, B., Holanda, B. A., Wendisch, M., Krisna, T., Pöschl, U., Andreae, M. O., Voigt, C., and Pöhlker, M. L.: Linear relationship between effective radius and precipitation water content near the top of convective clouds: measurement results from ACRIDICON–CHUVA campaign, Atmos. Chem. Phys., 21, 14 079–14 088, https://doi.org/10.5194/acp-21-14079-2021, 2021b.

Braga, R. C., Rosenfeld, D., Andreae, M. O., Pöhlker, C., Pöschl, U., Voigt, C., Weinzierl, B., Wendisch, M., Pöhlker, M. L., and Harrison, D.: Detrainment Dominates CCN Concentrations Around Non-Precipitating Convective Clouds Over the Amazon, Geophys. Res. Lett., 49, e2022GL100 411, https://doi.org/10.1029/2022GL100411, 2022.

Brands, M., Kamphus, M., Böttger, T., Schneider, J., Drewnick, F., Roth, A., Curtius, J., Voigt, C., Borbon, A., Beekmann, M., Bourdon, A., Perrin, T., and Borrmann, S.: Characterization of a newly developed Aircraft-based Laser Ablation Aerosol Mass Spectrometer (ALABAMA) and first field deployment in urban pollution plumes over Paris during MEGAPOLI 2009, Aerosol Sci. Tech., 45, 46–64, https://doi.org/10.1080/02786826.2010.517813, 2011.

Brath, M., Fox, S., Eriksson, P., Harlow, R. C., Burgdorf, M., and Buehler, S. A.: Retrieval of an ice water path over the ocean from ISMAR and MARSS millimeter and submillimeter brightness temperatures, Atmos. Meas. Tech., 11, 611–632, https://doi.org/10.5194/amt-11-611-2018, 2018.

Bräuer, T., Voigt, C., Sauer, D., Kaufmann, S., Hahn, V., Scheibe, M., Schlager, H., Diskin, G. S., Nowak, J. B., DiGangi, J. P., Huber, F., Moore, R. H., and Anderson, B. E.: Airborne Measurements of Contrail Ice Properties - Dependence on Temperature and Humidity, Geophys. Res. Lett., 48, e2020GL092 166, https://doi.org/10.1029/2020GL092166, 2021a.

Bräuer, T., Voigt, C., Sauer, D., Kaufmann, S., Hahn, V., Scheibe, M., Schlager, H., Huber, F., Le Clercq, P., Moore, R. H., and Anderson, B. E.: Reduced ice number concentrations in contrails from low-aromatic biofuel blends, Atmos. Chem. Phys., 21, 16 817–16 826, https://doi.org/10.5194/acp-21-16817-2021, 2021b.

Braun, M., Grooß, J.-U., Woiwode, W., Johansson, S., Höpfner, M., Friedl-Vallon, F., Oelhaf, H., Preusse, P., Ungermann, J., Sinnhuber, B.-M., Ziereis, H., and Braesicke, P.: Nitrification of the lowermost stratosphere during the exceptionally cold Arctic winter 2015–2016, Atmos. Chem. Phys., 19, 13 681–13 699, https://doi.org/10.5194/acp-19-13681-2019, 2019.

Brunner, D., Kuhlmann, G., Henne, S., Koene, E., Kern, B., Wolff, S., Voigt, C., Jöckel, P., Kiemle, C., Roiger, A., Fiehn, A., Krautwurst, S., Gerilowski, K., Bovensmann, H., Borchardt, J., Galkowski, M., Gerbig, C., Marshall, J., Klonecki, A., Prunet, P., Hanfland, R., Pattantyús-Ábrahám, M., Wyszogrodzki, A., and Fix, A.: Evaluation of simulated CO_2 power plant plumes from six high-resolution atmospheric transport models, Atmos. Chem. Phys., 23, 2699–2728, https://doi.org/10.5194/acp-23-2699-2023, 2023.

Buchholz, B., Afchine, A., and Ebert, V.: Rapid, optical measurement of the atmospheric pressure on a fast research aircraft using open-path TDLAS, Atmos. Meas. Tech., 7, 3653–3666, https://doi.org/10.5194/amt-7-3653-2014, 2014.

Buchholz, B., Afchine, A., Klein, A., Schiller, C., Krämer, M., and Ebert, V.: HAI, a new airborne, absolute, twin dual-channel, multi-phase TDLAS-hygrometer: background, design, setup, and first flight data, Atmos. Meas. Tech., 10, 35–57, https://doi.org/10.5194/amt-10-35-2017, 2017.

Buehler, S. A., Prange, M., Mrziglod, J., John, V. O., Burgdorf, M., and Lemke, O.: Opportunistic Constant Target Matching – A New Method for Satellite Intercalibration, Earth

Space Sci., 7, e2019EA000 856, https://doi.org/10.1029/2019EA000856, e2019EA000856 10.1029/2019EA000856, 2020.

Bundke, U., Reimann, B., Nillius, B., Jaenicke, R., and Bingemer, H.: Development of a Bioaerosol single particle detector (BIO IN) for the Fast Ice Nucleus CHamber FINCH, Atmos. Meas. Tech., 3, 263–271, https://doi.org/10.5194/amt-3-263-2010, 2010.

Burdanowitz, J., Klepp, C., Bakan, S., and Buehler, S. A.: Simulation of Ship-Track versus Satellite-Sensor Differences in Oceanic Precipitation Using an Island-Based Radar, Remote Sens., 9, 593, https://doi.org/10.3390/rs9060593, 2017.

Burdanowitz, J., Klepp, C., Bakan, S., and Buehler, S. A.: Towards an along-track validation of HOAPS precipitation using OceanRAIN optical disdrometer data over the Atlantic Ocean, Quart. J. Roy. Meteorol. Soc., 144, 235–254, https://doi.org/10.1002/qj.3248, 2018.

Burdanowitz, J., Buehler, S. A., Bakan, S., and Klepp, C.: The sensitivity of oceanic precipitation to sea surface temperature, Atmos. Chem. Phys., 19, 9241–9252, https://doi.org/10.5194/acp-19-9241-2019, 2019.

Burgdorf, M., Hans, I., Prange, M., Lang, T., and Buehler, S. A.: Inter-channel uniformity of a microwave sounder in space, Atmos. Meas. Tech., 11, 4005–4014, https://doi.org/10.5194/amt-11-4005-2018, 2018.

Cecchini, M. A., Machado, L. A. T., Andreae, M. O., Martin, S. T., Albrecht, R. I., Artaxo, P., Barbosa, H. M. J., Borrmann, S., Fütterer, D., Jurkat, T., Mahnke, C., Minikin, A., Molleker, S., Pöhlker, M. L., Pöschl, U., Rosenfeld, D., Voigt, C., Weinzierl, B., and Wendisch, M.: Sensitivities of Amazonian clouds to aerosols and updraft speed, Atmos. Chem. Phys., 17, 10 037–10 050, https://doi.org/10.5194/acp-17-10037-2017, 2017a.

Cecchini, M. A., Machado, L. A. T., Wendisch, M., Costa, A., Krämer, M., Andreae, M. O., Afchine, A., Albrecht, R. I., Artaxo, P., Borrmann, S., Fütterer, D., Klimach, T., Mahnke, C., Martin, S. T., Minikin, A., Molleker, S., Pardo, L. H., Pöhlker, C., Pöhlker, M. L., Pöschl, U., Rosenfeld, D., and Weinzierl, B.: Illustration of microphysical processes in Amazonian deep convective clouds in the gamma phase space: introduction and potential applications, Atmos. Chem. Phys., 17, 14 727–14 746, https://doi.org/10.5194/acp-17-14727-2017, 2017b.

Chauvigné, A., Jourdan, O., Schwarzenboeck, A., Gourbeyre, C., Gayet, J. F., Voigt, C., Schlager, H., Kaufmann, S., Borrmann, S., Molleker, S., Minikin, A., Jurkat, T., and Schumann, U.: Statistical analysis of contrail to cirrus evolution during the Contrail and Cirrus Experiment (CONCERT), Atmos. Chem. Phys., 18, 9803–9822, https://doi.org/10.5194/acp-18-9803-2018, 2018.

Chellappan, S., Zuidema, P., Kirschler, S., Voigt, C., Cairns, B., Crosbie, E. c., Ferrare, R., Hair, J., Painemal, D., Shingler, T., Shook, M., Thornhill, K. I., Tornow, F., and Sorooshian, A.: Microphysical Evolution in Mixed-Phase Midlatitude Marine Cold-Air Outbreaks, J. Atmos. Sci., 81, 1725–1747, https://doi.org/10.1175/JAS-D-23-0203.1, 2024.

Civale, C., Andrés Hernández, M. D., Putaud, J.-P., Barnaba, F., Diémoz, H., Schneider, J., Ziereis, H., Kaiser, K., Schmidt, J., Krüger, O. O., Holanda, B., Baumann, R., Weyland, B., Förster, E., George, M., Liu, Y., Sauer, D., Wolf, J., Bellini, A., Bohn, B., Pfeilsticker, K., and Burrows, J. P.: Pollution transport and transformation over the Po Plain as revealed by airborne and ground-based measurements in July 2017 during EMeRGe, Atmos. Chem. Phys., 26, 9827–9855, https://doi.org/10.5194/acp-26-9827-2026, 2026.

Corral, A. F., Choi, Y., Collister, B. L., Crosbie, E., Dadashazar, H., DiGangi, J. P., Diskin, G. S., Fenn, M., Kirschler, S., Moore, R. H., Nowak, J. B., Shook, M. A., Stahl, C. T., Shingler, T., Thornhill, K. L., Voigt, C., Ziemba, L. D., and Sorooshian, A.: Dimethylamine in cloud water: a case study over the northwest Atlantic Ocean, Environ. Sci.: Atmos., 2, 1534–1550, http://dx.doi.org/10.1039/D2EA00117A, 2022a.

Corral, A. F., Choi, Y., Crosbie, E., Dadashazar, H., DiGangi, J. P., Diskin, G. S., Fenn, M., Harper, D. B., Kirschler, S., Liu, H., Moore, R. H., Nowak, J. B., Scarino, A. J., Seaman, S., Shingler, T., Shook, M. A., Thornhill, K. L., Voigt, C., Zhang, B., Ziemba, L. D., and Sorooshian, A.: Cold Air Outbreaks Promote New Particle Formation Off the U.S. East Coast, Geophys. Res. Lett., 49, e2021GL096 073, https://doi.org/10.1029/2021GL096073, 2022b.

Costa, A., Meyer, J., Afchine, A., Luebke, A., Günther, G., Dorsey, J. R., Gallagher, M. W., Ehrlich,

A., Wendisch, M., Baumgardner, D., Wex, H., and Krämer, M.: Classification of Arctic, midlatitude and tropical clouds in the mixed-phase temperature regime, Atmos. Chem. Phys., 17, 12 219–12 238, https://doi.org/10.5194/acp-17-12219-2017, 2017.

Crosbie, E., Ziemba, L. D., Shook, M. A., Shingler, T., Hair, J. W., Sorooshian, A., Ferrare, R. A., Cairns, B., Choi, Y., DiGangi, J., Diskin, G. S., Hostetler, C., Kirschler, S., Moore, R. H., Painemal, D., Robinson, C., Seaman, S. T., Thornhill, K. L., Voigt, C., and Winstead, E.: Measurement report: Cloud and environmental properties associated with aggregated shallow marine cumulus and cumulus congestus, Atmos. Chem. Phys., 24, 6123–6152, https://doi.org/10.5194/acp-24-6123-2024, 2024.

Curtius, J., Heinritzi, M., Beck, L. J., Pöhlker, M. L., Tripathi, N., Krumm, B. E., Holzbeck, P., Nussbaumer, C. M., Hernández Pardo, L., Klimach, T., Barmpounis, K., Andersen, S. T., Bardakov, R., Bohn, B., Cecchini, M. A., Chaboureau, J.-P., Dauhut, T., Dienhart, D., Dörich, R., Edtbauer, A., Giez, A., Hartmann, A., Holanda, B. A., Joppe, P., Kaiser, K., Keber, T., Klebach, H., Krüger, O. O., Kürten, A., Mallaun, C., Marno, D., Martinez, M., Monteiro, C., Nelson, C., Ort, L., Raj, S. S., Richter, S., Ringsdorf, A., Rocha, F., Simon, M., Sreekumar, S., Tsokankunku, A., Unfer, G. R., Valenti, I. D., Wang, N., Zahn, A., Zauner-Wieczorek, M., Albrecht, R. I., Andreae, M. O., Artaxo, P., Crowley, J., Fischer, H., Harder, H., Herdies, D. L., Machado, L. A. T., Pöhlker, C., Pöschl, U., Possner, A., Pozzer, A., Schneider, J., Williams, J., and Lelieveld, J.: Isoprene nitrates drive new particle formation in Amazon's upper troposphere, Nature, 636, 124–130, https://doi.org/10.1038/s41586-024-08192-4, 2024.

Cziczo, D., Garimella, S., Raddatz, M., Hoehler, K., Schnaiter, M., Saathoff, H., Moehler, O., Abbatt, J. P. D., and Ladino, L. A.: Ice nucleation by surrogates of Martian mineral dust: What can we learn about Mars without leaving Earth?, J. Geophys. Res. Planets, 118, 1945–1954, https://doi.org/10.1002/jgre.20155, 2013.

Dauhut, T., Couvreux, F., Bouniol, D., Beucher, F., Volkmer, L., Pörtge, V., Schäfer, M., Ayet, A., Brilouet, P.-E., Jacob, M., and Wirth, M.: Flower trade-wind clouds are shallow mesoscale convective systems, Q.J.R. Meteorol. Soc., 149, 325–347, https://doi.org/10.1002/qj.4409, 2023.

De La Torre Castro, E., Jurkat-Witschas, T., Afchine, A., Grewe, V., Hahn, V., Kirschler, S., Krämer, M., Lucke, J., Spelten, N., Wernli, H., Zöger, M., and Voigt, C.: Differences in microphysical properties of cirrus at high and mid-latitudes, Atmos. Chem. Phys., 23, 13 167–13 189, https://doi.org/10.5194/acp-23-13167-2023, 2023.

De La Torre Castro, E., Beer, C. G., Jurkat-Witschas, T., Sauer, D., Righi, M., Hendricks, J., and Voigt, C.: A combined observational and modelling approach to evaluate aerosol–cirrus interactions at high and mid-latitudes, Atmos. Chem. Phys., 26, 5879–5899, https://doi.org/10.5194/acp-26-5879-2026, 2026.

Deeter, M., Mao, D., Martínez-Alonso, S., Worden, H., Andreae, M., and Schlager, H.: Impacts of MOPITT cloud detection revisions on observation frequency and mapping of highly polluted scenes, Remote Sens. Environ., 262, 112 516, https://doi.org/10.1016/j.rse.2021.112516, 2021.

Deeter, M. N., Martinez-Alonso, S., Andreae, M. O., and Schlager, H.: Satellite-Based Analysis of CO Seasonal and Interannual Variability Over the Amazon Basin, J. Geophys. Res.: Atmos., 123, 5641–5656, https://doi.org/10.1029/2018JD028425, 2018.

Deeter, M. N., Edwards, D. P., Francis, G. L., Gille, J. C., Mao, D., Martínez-Alonso, S., Worden, H. M., Ziskin, D., and Andreae, M. O.: Radiance-based retrieval bias mitigation for the MOPITT instrument: the version 8 product, Atmos. Meas. Tech., 12, 4561–4580, https://doi.org/10.5194/amt-12-4561-2019, 2019.

Dekoutsidis, G., Wirth, M., and Groß, S.: The effects of warm-air intrusions in the high Arctic on cirrus clouds, Atmos. Chem. Phys., 24, 5971–5987, https://doi.org/10.5194/acp-24-5971-2024, 2024.

Deroubaix, A., Vountas, M., Andrés Hernández, M. D., Brasseur, G. P., Gaubert, B., Holanda, B., Kanaya, Y., Kaiser, K., Kluge, F., Krüger, O. O., Labuhn, I., Lichtenstern, M., Pfeilsticker, K., P"ohlker, M., Schlager, H., Schneider, J., Siour, G., Swain, B., Tuccella, P., Vinjamuri, K. S., Vrekoussis, M., Weyland, B., and Burrows, J.: Tracing carbonaceous aerosols through trace gas–aerosol relationships in urban pollution plumes, npj Clim. Atmos. Sci., 9, https://doi.org/10.1038/s41612-026-01456-y, 2026.

Deutschmann, T., Beirle, S., Frieß, U., Grzegorski, M., Kern, C., Kritten, L., Platt, U., Prados-Román, C., Pukīte, J., Wagner, T., Werner, B., and Pfeilsticker, K.: The Monte Carlo atmospheric radiative transfer model McArtim: Introduction and validation of Jacobians and 3D features, J. Quant. Spectrosc. Radiat. Transf., 112, 1119–1137, https://doi.org/10.1016/j.jqsrt.2010.12.009, 2011.

Dischl, R., Kaufmann, S., and Voigt, C.: Regional and Seasonal Dependence of the Potential Contrail Cover and the Potential Contrail Cirrus Cover over Europe, Aerospace, 9, https://doi.org/10.3390/aerospace9090485, 2022.

Dischl, R., Sauer, D., Voigt, C., Harlaß, T., Sakellariou, F., Märkl, R., Schumann, U., Scheibe, M., Kaufmann, S., Roiger, A., Dörnbrack, A., Renard, C., Gauthier, M., Swann, P., Madden, P., Luff, D., Johnson, M., Ahrens, D., Sallinen, R., Schripp, T., Eckel, G., Bauder, U., and Le Clercq, P.: Measurements of particle emissions of an A350-941 burning 100 % sustainable aviation fuels in cruise, Atmos. Chem. Phys., 24, 11 255–11 273, https://doi.org/10.5194/acp-24-11255-2024, 2024.

Ditas, J., Ma, N., Zhang, Y., Assmann, D., Neumaier, M., Riede, H., Karu, E., Williams, J., Scharffe, D., Wang, Q., Saturno, J., Schwarz, J. P., Katich, J. M., McMeeking, G. R., Zahn, A., Hermann, M., Brenninkmeijer, C. A. M., Andreae, M. O., Pöschl, U., Su, H., and Cheng, Y.: Strong impact of wildfires on the abundance and aging of black carbon in the lowermost stratosphere, PNAS, 115, E11 595–E11 603, https://doi.org/10.1073/pnas.1806868115, 2018.

Dorff, H., Konow, H., and Ament, F.: Horizontal geometry of trade wind cumuli – aircraft observations from a shortwave infrared imager versus a radar profiler, Atmos. Meas. Tech., 15, 3641–3661, https://doi.org/10.5194/amt-15-3641-2022, 2022.

Dorff, H., Konow, H., Schemann, V., and Ament, F.: Observability of moisture transport divergence in Arctic atmospheric rivers by dropsondes, Atmos. Chem. Phys., 24, 8771–8795, https://doi.org/10.5194/acp-24-8771-2024, 2024.

Dorff, H., Ewald, F., Konow, H., Mech, M., Ori, D., Schemann, V., Walbröl, A., Wendisch, M., and Ament, F.: Moisture budget estimates derived from airborne observations in an Arctic atmospheric river during its dissipation, Atmos. Chem. Phys., 25, 8329–8354, https://doi.org/10.5194/acp-25-8329-2025, 2025.

Dyroff, C., Sanati, S., Christner, E., Zahn, A., Balzer, M., Bouquet, H., McManus, J. B., González-Ramos, Y., and Schneider, M.: Airborne in situ vertical profiling of HDO / $H_2{}^{16}O$ in the subtropical troposphere during the MUSICA remote sensing validation campaign, Atmos. Meas. Tech., 8, 2037–2049, https://doi.org/10.5194/amt-8-2037-2015, 2015.

Ebell, K., Orlandi, E., Hünerbein, A., Löhnert, U., and Crewell, S.: Combining ground-based with satellite-based measurements in the atmospheric state retrieval: Assessment of the information content, J. Geophys. Res., 118, 6940–6956, https://doi.org/10.1002/jgrd.50548, 2013.

Ebert, M., Weigel, R., Kandler, K., Günther, G., Molleker, S., Grooß, J.-U., Vogel, B., Weinbruch, S., and Borrmann, S.: Chemical analysis of refractory stratospheric aerosol particles collected within the arctic vortex and inside polar stratospheric clouds, Atmos. Chem. Phys., 16, 8405–8421, https://doi.org/10.5194/acp-16-8405-2016, 2016.

Ehrlich, A., Zöger, M., Giez, A., Nenakhov, V., Mallaun, C., Maser, R., Röschenthaler, T., Luebke, A. E., Wolf, K., Stevens, B., and Wendisch, M.: A new airborne broadband radiometer system and an efficient method to correct dynamic thermal offsets, Atmos. Meas. Tech., 16, 1563–1581, https://doi.org/10.5194/amt-16-1563-2023, 2023.

Ehrlich, A., Crewell, S., Herber, A., Klingebiel, M., Lüpkes, C., Mech, M., Becker, S., Borrmann, S., Bozem, H., Buschmann, M., Clemen, H.-C., De La Torre Castro, E., Dorff, H., Dupuy, R., Eppers, O., Ewald, F., George, G., Giez, A., Grawe, S., Gourbeyre, C., Hartmann, J., Jäkel, E., Joppe, P., Jourdan, O., Jurányi, Z., Kirbus, B., Lucke, J., Luebke, A. E., Maahn, M., Maherndl, N., Mallaun, C., Mayer, J., Mertes, S., Mioche, G., Moser, M., Müller, H., Pörtge, V., Risse, N., Roberts, G., Rosenburg, S., Röttenbacher, J., Schäfer, M., Schaefer, J., Schäfler, A., Schirmacher, I., Schneider, J., Schnitt, S., Stratmann, F., Tatzelt, C., Voigt, C., Walbröl, A., Weber, A., Wetzel, B., Wirth, M., and Wendisch, M.: A comprehensive in situ and remote sensing data set collected during the HALO–$(\mathcal{AC})^3$ aircraft campaign, Earth Syst. Sci. Data, 17, 1295–1328, https://doi.org/10.5194/essd-17-1295-2025, 2025.

Ekinci, F., Eppers, O., Appel, O., Ploeger, F., Dragoneas, A., Molleker, S., Brauner, P., Lachnitt, H.-C.,

Weyland, F., Ort, L., Emig, N., Clemen, H.-C., Tomsche, L., Ebert, M., Hoor, P., Vogel, B., Cheng, Y., Schneider, J., Borrmann, S., and Köllner, F.: Enhancement of ammonium nitrate aerosol in the Northern Hemisphere lower stratosphere linked to Asian summer monsoon outflow, Atmos. Chem. Phys., 26, 10 399–10 421, https://doi.org/10.5194/acp-26-10399-2026, 2026.

Ewald, F., Groß, S., Hagen, M., Hirsch, L., Delanoë, J., and Bauer-Pfundstein, M.: Calibration of a 35 GHz airborne cloud radar: lessons learned and intercomparisons with 94 GHz cloud radars, Atmos. Meas. Tech., 12, 1815–1839, https://doi.org/10.5194/amt-12-1815-2019, 2019.

Ewald, F., Groß, S., Wirth, M., Delanoë, J., Fox, S., and Mayer, B.: Why we need radar, lidar, and solar radiance observations to constrain ice cloud microphysics, Atmos. Meas. Tech., 14, 5029–5047, https://doi.org/10.5194/amt-14-5029-2021, 2021.

Fiedler, V., Arnold, F., Schlager, H., Dörnbrack, A., Pirjola, L., and Stohl, A.: East Asian SO_2 pollution plume over Europe – Part 2: Evolution and potential impact, Atmos. Chem. Phys., 9, 4729–4745, https://doi.org/10.5194/acp-9-4729-2009, 2009a.

Fiedler, V., Nau, R., Ludmann, S., Arnold, F., Schlager, H., and Stohl, A.: East Asian SO_2 pollution plume over Europe – Part 1: Airborne trace gas measurements and source identification by particle dispersion model simulations, Atmos. Chem. Phys., 9, 4717–4728, https://doi.org/10.5194/acp-9-4717-2009, 2009b.

Fiehn, A., Kostinek, J., Eckl, M., Klausner, T., Gałkowski, M., Chen, J., Gerbig, C., Röckmann, T., Maazallahi, H., Schmidt, M., Korbeń, P., Nęcki, J., Jagoda, P., Wildmann, N., Mallaun, C., Bun, R., Nickl, A.-L., Jöckel, P., Fix, A., and Roiger, A.: Estimating CH4, CO2 and CO emissions from coal mining and industrial activities in the Upper Silesian Coal Basin using an aircraft-based mass balance approach, Atmos. Chem. Phys., 20, 12 675–12 695, https://doi.org/10.5194/acp-20-12675-2020, 2020.

Fiehn, A., Eckl, M., Kostinek, J., Gałkowski, M., Gerbig, C., Rothe, M., Röckmann, T., Menoud, M., Maazallahi, H., Schmidt, M., Korbeń, P., Nęcki, J., Stanisavljević, M., Swolkień, J., Fix, A., and Roiger, A.: Source apportionment of methane emissions from the Upper Silesian Coal Basin using isotopic signatures, Atmos. Chem. Phys., 23, 15 749–15 765, https://doi.org/10.5194/acp-23-15749-2023, 2023.

Fischer, L., Kiemle, C., and Craig, G. C.: Height-resolved variability of midlatitude tropospheric water vapor measured by an airborne lidar, Geophys. Res. Lett., 39, L06 803, https://doi.org/10.1029/2011GL050621, 2012.

Fischer, L., Craig, G. C., and Kiemle, C.: Horizontal structure function and vertical correlation analysis of mesoscale water vapor variability observed by airborne lidar, J. Geophys. Res., 118, 7579–7590, https://doi.org/10.1002/jgrd.50588, 2013.

Fricke, C., Ehrlich, A., Jäkel, E., Bohn, B., Wirth, M., and Wendisch, M.: Influence of local surface albedo variability and ice crystal shape on passive remote sensing of thin cirrus, Atmos. Chem. Phys., 14, 1943–1958, https://doi.org/10.5194/acp-14-1943-2014, 2014.

Friedl-Vallon, F., Gulde, T., Hase, F., Kleinert, A., Kulessa, T., Maucher, G., Neubert, T., Olschewski, F., Piesch, C., Preusse, P., Rongen, H., Sartorius, C., Schneider, H., Schönfeld, A., Tan, V., Bayer, N., Blank, J., Dapp, R., Ebersoldt, A., Fischer, H., Graf, F., Guggenmoser, T., Höpfner, M., Kaufmann, M., Kretschmer, E., Latzko, T., Nordmeyer, H., Oelhaf, H., Orphal, J., Riese, M., Schardt, G., Schillings, J., Sha, M. K., Suminska-Ebersoldt, O., and Ungermann, J.: Instrument concept of the imaging Fourier transform spectrometer GLORIA, Atmos. Meas. Tech., 7, 3565–3577, https://doi.org/10.5194/amt-7-3565-2014, 2014.

Gałkowski, M., Jordan, A., Rothe, M., Marshall, J., Koch, F.-T., Chen, J., Agusti-Panareda, A., Fix, A., and Gerbig, C.: In situ observations of greenhouse gases over Europe during the CoMet 1.0 campaign aboard the HALO aircraft, Atmos. Meas. Tech., 14, 1525–1544, https://doi.org/10.5194/amt-14-1525-2021, 2021.

Gallo, F., Sorooshian, A., Ziemba, L., Betito, G., Corral, A. F., Crosbie, E., Edwards, E.-L., Hilario, M. R. A., Kirschler, S., Robinson, C., Shook, M. A., Thornhill, K. L., Voigt, C., Winstead, E., Zeider, K., and Moore, R.: Impact of Shipping Emission Regulations on Atmospheric Vanadium Along U.S. North Atlantic Coast and Over the Western North Atlantic Ocean, J. Geophys. Res.: Atmos., 131, e2025JD045 004, https://doi.org/10.1029/2025JD045004, e2025JD045004 2025JD045004, 2026.

Gayet, J.-F., Shcherbakov, V., Voigt, C., Schumann, U., Schäuble, D., Jessberger, P., Petzold, A., Minikin, A., Schlager, H., Dubovik, O., and Lapyonok, T.: The evolution of microphysical and optical properties of an A380 contrail in the vortex phase, Atmos. Chem. Phys., 12, 6629–6643, https://doi.org/10.5194/acp-12-6629-2012, 2012.

Geldenhuys, M., Kaifler, B., Preusse, P., Ungermann, J., Alexander, P., Krasauskas, L., Rhode, S., Woiwode, W., Ern, M., Rapp, M., and Riese, M.: Observations of Gravity Wave Refraction and Its Causes and Consequences, J. Geophys. Res.: Atmos., 128, e2022JD036 830, https://doi.org/10.1029/2022JD036830, 2023.

General, S., Pöhler, D., Sihler, H., Bobrowski, N., Frieß, U., Zielcke, J., Horbanski, M., Shepson, P. B., Stirm, B. H., Simpson, W. R., Weber, K., Fischer, C., and Platt, U.: The Heidelberg Airborne Imaging DOAS Instrument (HAIDI) - A novel imaging DOAS device for 2-D and 3-D imaging of trace gases and aerosols, Atmos. Meas. Tech., 7, 3459–3485, https://doi.org/10.5194/amt-7-3459-2014, 2014.

General, S., Bobrowski, N., Pöhler, D., Weber, K., Fischer, C., and Platt, U.: Airborne I-DOAS measurements at Mt. Etna: BrO and OClO evolution in the plume, J. Volcanol. Geoth. Res., 300, 175–186, https://doi.org/10.1016/j.jvolgeores.2014.05.012, 2015.

George, G., Stevens, B., Bony, S., Pincus, R., Fairall, C., Schulz, H., Kölling, T., Kalen, Q. T., Klingebiel, M., Konow, H., Lundry, A., Prange, M., and Radtke, J.: JOANNE: Joint dropsonde Observations of the Atmosphere in tropical North atlaNtic meso-scale Environments, Earth Syst. Sci. Data, 13, 5253–5272, https://doi.org/10.5194/essd-13-5253-2021, 2021.

George, M., Andrés Hernández, M. D., Nenakhov, V., Liu, Y., and Burrows, J. P.: Airborne measurement of peroxy radicals using chemical amplification coupled with cavity ring-down spectroscopy: the PeRCEAS instrument, Atmos. Meas. Tech., 13, 2577–2600, https://doi.org/10.5194/amt-13-2577-2020, 2020.

George, M., Andrés Hernández, M. D., Nenakhov, V., Liu, Y., Burrows, J. P., Bohn, B., Förster, E., Obersteiner, F., Zahn, A., Harlaß, T., Ziereis, H., Schlager, H., Schreiner, B., Kluge, F., Bigge, K., and Pfeilsticker, K.: Airborne observations of peroxy radicals during the EMeRGe campaign in Europe, Atmos. Chem. Phys., 23, 7799–7822, https://doi.org/10.5194/acp-23-7799-2023, 2023.

Gisinger, S., Bramberger, M., Doernbrack, A., and Bechtold, P.: Severe Convectively Induced Turbulence Hitting a Passenger Aircraft and Its Forecast by the ECMWF IFS Model, Geophys. Res. Lett., 51, https://doi.org/10.1029/2024GL113037, 2024.

Gloeckner, H. M., Mieslinger, T., Robbins-Blanch, N., George, G., Kluft, L., Kölling, T., Bony, S., Windmiller, J. M., and Stevens, B.: BEACH: Barbados and Eastern Atlantic Combined High-altitude dropsonde datasets, Earth Syst. Sci. Data, 18, 4425–4450, https://doi.org/10.5194/essd-18-4425-2026, 2026.

Gonzalez, M. E., Corral, A. F., Crosbie, E., Dadashazar, H., Diskin, G. S., Edwards, E.-L., Kirschler, S., Moore, R. H., Robinson, C. E., Schlosser, J. S., Shook, M., Stahl, C., Thornhill, K. L., Voigt, C., Winstead, E., Ziemba, L. D., and Sorooshian, A.: Correction: Relationships between supermicrometer particle concentrations and cloud water sea salt and dust concentrations: analysis of MONARC and ACTIVATE data, Environ. Sci.: Atmos., pp. –, http://dx.doi.org/10.1039/D3EA90004E, (2023).

Gonzalez, M. E., Corral, A. F., Crosbie, E., Dadashazar, H., Diskin, G. S., Edwards, E.-L., Kirschler, S., Moore, R. H., Robinson, C. E., Schlosser, J. S., Shook, M., Stahl, C., Thornhill, K. L., Voigt, C., Winstead, E., Ziemba, L. D., and Sorooshian, A.: Relationships between supermicrometer particle concentrations and cloud water sea salt and dust concentrations: analysis of MONARC and ACTIVATE data, Environ. Sci.: Atmos., 2, 738–752, http://dx.doi.org/10.1039/D2EA00049K, 2022.

Gottschaldt, K.-D., Schlager, H., Baumann, R., Bozem, H., Eyring, V., Hoor, P., Jöckel, P., Jurkat, T., Voigt, C., Zahn, A., and Ziereis, H.: Trace gas composition in the Asian summer monsoon anticyclone: A case study based on aircraft observations and model simulations, Atmos. Chem. Phys., 17, 6091–6111, https://doi.org/10.5194/acp-17-6091-2017, 2017.

Gottschaldt, K.-D., Schlager, H., Baumann, R., Cai, D. S., Eyring, V., Graf, P., Grewe, V., Jöckel, P., Jurkat-Witschas, T., Voigt, C., Zahn, A., and Ziereis, H.: Dynamics and composition of the Asian summer monsoon anticyclone, Atmos. Chem. Phys., 18, 5655–5675, https://doi.org/10.5194/acp-18-5655-2018, 2018.

Grawe, S., Jentzsch, C., Schaefer, J., Wex, H., Mertes, S., and Stratmann, F.: Next-generation ice-nucleating particle sampling on board aircraft: characterization of the High-volume flow aERosol particle filter sAmpler (HERA), Atmos. Meas. Tech., 16, 4551–4570, https://doi.org/10.5194/amt-16-4551-2023, 2023.

Groß, S., Esselborn, M., Abicht, F., Wirth, M., Fix, A., and Minikin, A.: Airborne high spectral resolution lidar observation of pollution aerosol during EUCAARI-LONGREX, Atmos. Chem. Phys., 13, 2435–2444, https://doi.org/10.5194/acp-13-2435-2013, 2013a.

Groß, S., Esselborn, M., Weinzierl, B., Wirth, M., Fix, A., and Petzold, A.: Aerosol classification by airborne high spectral resolution lidar observations, Atmos. Chem. Phys., 13, 2487–2505, https://doi.org/10.5194/acp-13-2487-2013, 2013b.

Groß, S., Wirth, M., Schäfler, A., Fix, A., Kaufmann, S., and Voigt, C.: Potential of airborne lidar measurements for cirrus cloud studies, Atmos. Meas. Tech., 7, 2745–2755, https://doi.org/10.5194/amt-7-2745-2014, 2014.

Groß, S., Freudenthaler, V., Schepanski, K., Toledano, C., Schäfler, A., Ansmann, A., and Weinzierl, B.: Optical properties of long-range transported Saharan dust over Barbados as measured by dual-wavelength depolarization Raman lidar measurements, Atmos. Chem. Phys., 15, 11 067–11 080, https://doi.org/10.5194/acp-15-11067-2015, 2015a.

Groß, S., Freudenthaler, V., Wirth, M., and Weinzierl, B.: Towards an aerosol classification scheme for future EarthCARE lidar observations and implications for research needs, Atmos. Sci. Lett., 16, 77–82, https://doi.org/10.1002/asl2.524, 2015b.

Groß, S., Gasteiger, J., Freudenthaler, V., Müller, T., Sauer, D., Toledano, C., and Ansmann, A.: Saharan dust contribution to the Caribbean summertime boundary layer – a lidar study during SALTRACE, Atmos. Chem. Phys., 16, 11 535–11 546, https://doi.org/10.5194/acp-16-11535-2016, 2016.

Groß, S., Jurkat-Witschas, T., Li, Q., Wirth, M., Urbanek, B., Krämer, M., Weigel, R., and Voigt, C.: Investigating an indirect aviation effect on mid-latitude cirrus clouds – linking lidar-derived optical properties to in situ measurements, Atmos. Chem. Phys., 23, 8369–8381, https://doi.org/10.5194/acp-23-8369-2023, 2023.

Groß, S., Ewald, F., Stevens, B., Wirth, M., Dekoutsidis, G., Ehrlich, A., Kouklaki, D., Krüger, K., Rosenburg, S., Volkmer, L., von Bismark, J., Hirsch, L., Luebke, A. E., Marinou, E., Mayer, B., Pinol Sole, M., Wendisch, M., Windmiller, J., Amiridis, V., Koopman, R., Kubota, T., and Rapp, M.: Persistent EarthCARE underflight studies of the ITCZ and organized convection (PERCUSION): contribution to EarthCARE validation, Atmos. Meas. Tech., 19, 3933–3959, https://doi.org/10.5194/amt-19-3933-2026, 2026.

Gruber, S., Blahak, U., Haenel, F., Kottmeier, C., Leisner, T., Muskatel, H., Storelvmo, T., and Vogel, B.: A Process Study on Thinning of Arctic Winter Cirrus Clouds With High-Resolution ICON-ART Simulations, J. Geophys. Res., 124, 5860–5888, https://doi.org/10.1029/2018JD029815, 2019.

Gryspeerdt, E., Sourdeval, O., Quaas, J., Delanoë, J., Krämer, M., and Kühne, P.: Ice crystal number concentration estimates from lidar–radar satellite remote sensing – Part 2: Controls on the ice crystal number concentration, Atmos. Chem. Phys., 18, 14 351–14 370, https://doi.org/10.5194/acp-18-14351-2018, 2018.

Gryspeerdt, E., Mülmenstädt, J., Gettelman, A., Malavelle, F. F., Morrison, H., Neubauer, D., Partridge, D. G., Stier, P., Takemura, T., Wang, H., Wang, M., and Zhang, K.: Surprising similarities in model and observational aerosol radiative forcing estimates, Atmos. Chem. Phys., 20, 613–623, https://doi.org/10.5194/acp-20-613-2020, 2020.

Gutleben, M. and Groß, S.: Turbulence analysis in long-range-transported Saharan dust layers with airborne lidar, Geophys. Res. Lett., 48, e2021GL094 418, https://doi.org/10.1029/2021GL094418, 2021.

Gutleben, M., Groß, S., and Wirth, M.: Cloud macro-physical properties in Saharan-dust-laden and dust-free North Atlantic trade wind regimes: a lidar case study, Atmos. Chem. Phys., 19, 10 659–10 673, https://doi.org/10.5194/acp-19-10659-2019, 2019a.

Gutleben, M., Groß, S., Wirth, M., Emde, C., and Mayer, B.: Impacts of Water Vapor on Saharan Air Layer Radiative Heating, Geophys. Res. Lett., 46, 14 854–14 862, https://doi.org/10.1029/2019GL085344, 2019b.

Gutleben, M., Groß, S., Wirth, M., and Mayer, B.: Radiative effects of long-range-transported Saharan air layers as determined from airborne lidar measurements, Atmos. Chem. Phys., 20, 12 313–12 327, https://doi.org/10.5194/acp-20-12313-2020, 2020.

Gutleben, M., Groß, S., Heske, C., and Wirth, M.: Wintertime Saharan dust transport towards the Caribbean: an airborne lidar case study during EUREC^{4}A, Atmos. Chem. Phys., 22, 7319–7330, https://doi.org/10.5194/acp-22-7319-2022, 2022.

Ha, P. T. M., Kanaya, Y., Taketani, F., Andrés Hernández, M. D., Schreiner, B., Pfeilsticker, K., and Sudo, K.: Implementation of HONO into the chemistry–climate model CHASER (V4.0): roles in tropospheric chemistry, Geosci. Model Dev., 16, 927–960, https://doi.org/10.5194/gmd-16-927-2023, 2023.

Ha, P. T. M., Kanaya, Y., Yamaji, K., Itahashi, S., Chatani, S., Sekiya, T., Hernández, M. D. A., Burrows, J. P., Schlager, H., Lichtenstern, M., Poehlker, M., and Holanda, B.: Assessing BC and CO emissions from China using EMeRGe aircraft observations and WRF/CMAQ modelling, Atmos. Chem. Phys., 25, 13 429–13 452, https://doi.org/10.5194/acp-25-13429-2025, 2025.

Haenel, F., Woiwode, W., Buchmüller, J., Friedl-Vallon, F., Höpfner, M., Johansson, S., Khosrawi, F., Kirner, O., Kleinert, A., Oelhaf, H., Orphal, J., Ruhnke, R., Sinnhuber, B.-M., Ungermann, J., Weimer, M., and Braesicke, P.: Challenge of modelling GLORIA observations of upper troposphere-lowermost stratosphere trace gas and cloud distributions at high latitudes: a case study with state-of-the-art models, Atmos. Chem. Phys., 22, 2843–2870, https://doi.org/10.5194/acp-22-2843-2022, 2022.

Hamryszczak, Z. T., Pozzer, A., Obersteiner, F., Bohn, B., Steil, B., Lelieveld, J., and Fischer, H.: Distribution of hydrogen peroxide over Europe during the BLUESKY aircraft campaign, Atmos. Chem. Phys., 22, 9483–9497, https://doi.org/10.5194/acp-22-9483-2022, 2022.

Hanumanthu, S., Vogel, B., Müller, R., Brunamonti, S., Fadnavis, S., Li, D., Ölsner, P., Naja, M., Singh, B. B., Kumar, K. R., Sonbawne, S., Jauhiainen, H., Vömel, H., Luo, B., Jorge, T., Wienhold, F. G., Dirkson, R., and Peter, T.: Strong day-to-day variability of the Asian Tropopause Aerosol Layer (ATAL) in August 2016 at the Himalayan foothills, Atmos. Chem. Phys., 20, 14 273–14 302, https://doi.org/10.5194/acp-20-14273-2020, 2020.

Harlass, T., Dischl, R., Kaufmann, S., Maerkl, R., Sauer, D., Scheibe, M., Stock, P., Braeuer, T., Doernbrack, A., Roiger, A., Schlager, H., Schumann, U., Puehl, M., Schripp, T., Grein, T., Bondorf, L., Renard, C., Gauthier, M., Johnson, M., Luff, D., Madden, P., Swann, P., Ahrens, D., Sallinen, R., and Voigt, C.: Measurement report: In-flight and ground-based measurements of nitrogen oxide emissions from latest-generation jet engines and 100 % sustainable aviation fuel, Atmos. Chem. Phys., 24, 11 807–11 822, https://doi.org/10.5194/acp-24-11807-2024, 2024.

Harris, E., Sinha, B., van Pinxteren, D., Schneider, J., Poulain, L., Collett, J., D'Anna, B., Fahlbusch, B., Foley, S., Fomba, K. W., George, C., Gnauk, T., Henning, S., Lee, T., Mertes, S., Roth, A., Stratmann, F., Borrmann, S., Hoppe, P., and Herrmann, H.: In-cloud sulfate addition to single particles resolved with sulfur isotope analysis during HCCT-2010, Atmos. Chem. Phys., 14, 4219–4235, https://doi.org/10.5194/acp-14-4219-2014, 2014.

Harvey, B., Methven, J., Sanchez, C., and Schäfler, A.: Diabatic generation of negative potential vorticity and its impact on the North Atlantic jet stream, Q.J.R. Meteorol Soc., 146, 1477–1497, https://doi.org/10.1002/qj.3747, 2020.

Hauck, M., Fritsch, F., Garny, H., and Engel, A.: Deriving stratospheric age of air spectra using an idealized set of chemically active trace gases, Atmos. Chem. Phys., 19, 5269–5291, https://doi.org/10.5194/acp-19-5269-2019, 2019.

Hauck, M., Bönisch, H., Hoor, P., Keber, T., Ploeger, F., Schuck, T. J., and Engel, A.: A convolution of observational and model data to estimate age of air spectra in the northern hemispheric lower stratosphere, Atmos. Chem. Phys., 20, 8763–8785, https://doi.org/10.5194/acp-20-8763-2020, 2020.

He, K., Xu, T., Förste, C., Petrovic, S., Wang, Z., Tian, Y., and Flechtner, F.: Integrated GNSS Doppler velocity determination for GEOHALO airborne gravimetry, GPS Solutions, 25, 146, https://doi.org/10.1007/s10291-021-01183-2, 2021.

Heller, R., Voigt, C., Beaton, S., Dörnbrack, A., Giez, A., Kaufmann, S., Mallaun, C., Schlager, H., Wagner, J., Young, K., and Rapp, M.: Mountain waves modulate the water vapor distribution in the

UTLS, Atmos. Chem. Phys., 17, 14 853–14 869, https://doi.org/10.5194/acp-17-14853-2017, 2017.

Henning, S., Dieckmann, K., Ignatius, K., Schäfer, M., Zedler, P., Harris, E., Sinha, B., van Pinxteren, D., Mertes, S., Birmili, W., Merkel, M., Wu, Z., Wiedensohler, A., Wex, H., Herrmann, H., and Stratmann, F.: Influence of cloud processing on CCN activation behaviour in the Thuringian Forest, Germany during HCCT-2010, Atmos. Chem. Phys., 14, 7859–7868, https://doi.org/10.5194/acp-14-7859-2014, 2014.

Hermann, M., Weigelt, A., Assmann, D., Pfeifer, S., Müller, T., Conrath, T., Voigtländer, J., Heintzenberg, J., Wiedensohler, A., Martinsson, B. G., Deshler, T., Brenninkmeijer, C. A. M., and Zahn, A.: An optical particle size spectrometer for aircraft-borne measurements in IAGOS-CARIBIC, Atmos. Meas. Tech., 9, 2179–2194, https://doi.org/10.5194/amt-9-2179-2016, 2016.

Hernández Pardo, L., Machado, L. A. T., Morrison, H., Cecchini, M. A., Andreae, M. O., Pöhlker, C., Pöschl, U., Rosenfeld, D., Vendrasco, E. P., Voigt, C., Wendisch, M., and Pöhlker, M. L.: Observed and Simulated Variability of Droplet Spectral Dispersion in Convective Clouds Over the Amazon, J. Geophys. Res., 126, e2021JD035 076, https://doi.org/10.1029/2021JD035076, 2021.

Hoerger, C. C., Claude, A., Plass-Duelmer, C., Reimann, S., Eckart, E., Steinbrecher, R., Aalto, J., Arduini, J., Bonnaire, N., Cape, J. N., Colomb, A., Connolly, R., Diskova, J., Dumitrean, P., Ehlers, C., Gros, V., Hakola, H., Hill, M., Hopkins, J. R., Jäger, J., Junek, R., Kajos, M. K., Klemp, D., Leuchner, M., Lewis, A. C., Locoge, N., Maione, M., Martin, D., Michl, K., Nemitz, E., O'Doherty, S., Pérez Ballesta, P., Ruuskanen, T. M., Sauvage, S., Schmidbauer, N., Spain, T. G., Straube, E., Vana, M., Vollmer, M. K., Wegener, R., and Wenger, A.: ACTRIS non-methane hydrocarbon intercomparison experiment in Europe to support WMO GAW and EMEP observation networks, Atmos. Meas. Tech., 8, 2715–2736, https://doi.org/10.5194/amt-8-2715-2015, 2015.

Holanda, B. A., Pöhlker, M. L., Walter, D., Saturno, J., Sörgel, M., Ditas, J., Ditas, F., Schulz, C., Franco, M. A., Wang, Q., Donth, T., Artaxo, P., Barbosa, H. M. J., Borrmann, S., Braga, R., Brito, J., Cheng, Y., Dollner, M., Kaiser, J. W., Klimach, T., Knote, C., Krüger, O. O., Fütterer, D., Lavrič, J. V., Ma, N., Machado, L. A. T., Ming, J., Morais, F. G., Paulsen, H., Sauer, D., Schlager, H., Schneider, J., Su, H., Weinzierl, B., Walser, A., Wendisch, M., Ziereis, H., Zöger, M., Pöschl, U., Andreae, M. O., and Pöhlker, C.: Influx of African biomass burning aerosol during the Amazonian dry season through layered transatlantic transport of black carbon-rich smoke, Atmos. Chem. Phys., 20, 4757–4785, https://doi.org/10.5194/acp-20-4757-2020, 2020.

Holanda, B. A., Franco, M. A., Walter, D., Artaxo, P., Carbone, S., Cheng, Y., Chowdhury, S., Ditas, F., Gysel-Beer, M., Klimach, T., Kremper, L. A., Krüger, O. O., Lavric, J. V., Lelieveld, J., Ma, C., Machado, L. A. T., Modini, R. L., Morais, F. G., Pozzer, A., Saturno, J., Su, H., Wendisch, M., Wolff, S., Pöhlker, M. L., Andreae, M. O., Pöschl, U., and Pöhlker, C.: African biomass burning affects aerosol cycling over the Amazon, Nat. Commun. Earth Environ., 4, https://doi.org/10.1038/s43247-023-00795-5, 2023.

Hollstein, A. and Fischer, J.: Radiative transfer solutions for coupled atmosphere ocean systems using the matrix operator technique, J. Quant. Spectrosc. Radiat. Transf., 113, 536–548, https://doi.org/10.1016/j.jqsrt.2012.01.010, 2012.

Hollstein, A. and Ruhtz, T.: Method for retrieving the polarization properties of a waveplate assembled in a multispectral, complete polarimeter, Opt. Lett., 34, 2599–2601, https://doi.org/10.1364/OL.34.002599, 2009.

Hollstein, A., Ruhtz, T., Fischer, J., and Preusker, R.: Optimization of system parameters for a complete multispectral polarimeter, Appl. Opt., 48, 4767–4773, https://doi.org/10.1364/AO.48.004767, 2009.

Horstjann, M., Nenakhov, V., and Burrows, J.: Frequency stabilization of blue extended cavity diode lasers by external cavity optical feedback, Appl. Phys. B, 106, 261–266, https://doi.org/10.1007/s00340-011-4705-y, 2012.

Horstjann, M., Andrés-Hernández, M. D., Nenakhov, V., Chrobry, A., and Burrows, J. P.: Peroxy radical detection for airborne atmospheric measurements using absorption spectroscopy of NO_2, Atmos. Meas. Tech., 7, 1245–1257, https://doi.org/10.5194/amt-7-1245-2014, 2014.

Huhs, O., Borchardt, J., Krautwurst, S., Gerilowski, K., Bovensmann, H., Bösch, H., and Burrows, J. P.:

Impact of stray light on greenhouse gas concentration retrievals and emission estimates as observed with the passive airborne remote sensing imager MAMAP2D-Light, Atmos. Meas. Tech., 19, 871–898, https://doi.org/10.5194/amt-19-871-2026, 2026.

Hüneke, T., Aderhold, O.-A., Bounin, J., Dorf, M., Gentry, E., Grossmann, K., Grooß, J.-U., Hoor, P., Jöckel, P., Kenntner, M., Knapp, M., Knecht, M., Lörks, D., Ludmann, S., Matthes, S., Raecke, R., Reichert, M., Weimar, J., Werner, B., Zahn, A., Ziereis, H., and Pfeilsticker, K.: The novel HALO mini-DOAS instrument: inferring trace gas concentrations from airborne UV/visible limb spectroscopy under all skies using the scaling method, Atmos. Meas. Tech., 10, 4209–4234, https://doi.org/10.5194/amt-10-4209-2017, 2017.

Jacob, M., Ament, F., Gutleben, M., Konow, H., Mech, M., Wirth, M., and Crewell, S.: Investigating the liquid water path over the tropical Atlantic with synergistic airborne measurements, Atmos. Meas. Tech., 12, 3237–3254, https://doi.org/10.5194/amt-12-3237-2019, 2019.

Jacob, M., Kollias, P., Ament, F., Schemann, V., and Crewell, S.: Multilayer cloud conditions in trade wind shallow cumulus – confronting two ICON model derivatives with airborne observations, Geosci. Model Dev., 13, 5757–5777, https://doi.org/10.5194/gmd-13-5757-2020, 2020.

Jäkel, E., Wendisch, M., Krisna, T. C., Ewald, F., Kölling, T., Jurkat, T., Voigt, C., Cecchini, M. A., Machado, L. A. T., Afchine, A., Costa, A., Krämer, M., Andreae, M. O., Pöschl, U., Rosenfeld, D., and Yuan, T.: Vertical distribution of the particle phase in tropical deep convective clouds as derived from cloud-side reflected solar radiation measurements, Atmos. Chem. Phys., 17, 9049–9066, https://doi.org/10.5194/acp-17-9049-2017, 2017.

Järvinen, E. and Schnaiter, F. M.: Low and consistent asymmetry parameters in Arctic and mid-latitude cirrus, Atmos. Chem. Phys., 26, 2465–2486, https://doi.org/10.5194/acp-26-2465-2026, 2026.

Järvinen, E., Schnaiter, M., Mioche, G., Jourdan, O., Shcherbakov, V. N., Costa, A., Afchine, A., Krämer, M., Heidelberg, F., Jurkat, T., Voigt, C., Schlager, H., Nichman, L., Gallagher, M., Hirst, E., Schmitt, C., Bansemer, A., Heymsfield, A., Lawson, P., Tricoli, U., Pfeilsticker, K., Vochezer, P., Möhler, O., and Leisner, T.: Quasi-Spherical Ice in Convective Clouds, J. Atmos. Sci., 73, 3885–3910, https://doi.org/10.1175/JAS-D-15-0365.1, 2016.

Järvinen, E., Jourdan, O., Neubauer, D., Yao, B., Liu, C., Andreae, M. O., Lohmann, U., Wendisch, M., McFarquhar, G. M., Leisner, T., and Schnaiter, M.: Additional global climate cooling by clouds due to ice crystal complexity, Atmos. Chem. Phys., 18, 15 767–15 781, https://doi.org/10.5194/acp-18-15767-2018, 2018a.

Järvinen, E., Wernli, H., and Schnaiter, M.: Investigations of Mesoscopic Complexity of Small Ice Crystals in Midlatitude Cirrus, Geophys. Res. Lett., 45, 11 465–11 472, https://doi.org/10.1029/2018GL079079, 2018b.

Järvinen, E., Nehlert, F., Xu, G., Waitz, F., Mioche, G., Dupuy, R., Jourdan, O., and Schnaiter, M.: Investigating the vertical extent and short-wave radiative effects of the ice phase in Arctic summertime low-level clouds, Atmos. Chem. Phys., 23, 7611–7633, https://doi.org/10.5194/acp-23-7611-2023, 2023.

Javed, U., Kubistin, D., Martinez, M., Pollmann, J., Rudolf, M., Parchatka, U., Reiffs, A., Thieser, J., Schuster, G., Horbanski, M., Pöhler, D., Crowley, J. N., Fischer, H., Lelieveld, J., and Harder, H.: Laser-induced fluorescence-based detection of atmospheric nitrogen dioxide and comparison of different techniques during the PARADE 2011 field campaign, Atmos. Meas. Tech., 12, 1461–1481, https://doi.org/10.5194/amt-12-1461-2019, 2019.

Jeßberger, P., Voigt, C., Schumann, U., Sölch, I., Schlager, H., Kaufmann, S., Petzold, A., Schäuble, D., and Gayet, J.-F.: Aircraft type influence on contrail properties, Atmos. Chem. Phys., 13, 11 965–11 984, https://doi.org/10.5194/acp-13-11965-2013, 2013.

Jesswein, M., Bozem, H., Lachnitt, H.-C., Hoor, P., Wagenhäuser, T., Keber, T., Schuck, T., and Engel, A.: Comparison of inorganic chlorine in the Antarctic and Arctic lowermost stratosphere by separate late winter aircraft measurements, Atmos. Chem. Phys., 21, 17 225–17 241, https://doi.org/10.5194/acp-21-17225-2021, 2021.

Jesswein, M., Fernandez, R. P., Berná, L., Saiz-Lopez, A., Grooß, J.-U., Hossaini, R., Apel, E. C., Hornbrook, R. S., Atlas, E. L., Blake, D. R., Montzka, S., Keber, T., Schuck, T., Wagenhäuser,

T., and Engel, A.: Global seasonal distribution of CH_2Br_2 and $CHBr_3$ in the upper troposphere and lower stratosphere, Atmos. Chem. Phys., 22, 15 049–15 070, https://doi.org/10.5194/acp-22-15049-2022, 2022.

Jesswein, M., Lauther, V., Emig, N., Hoor, P., Keber, T., Lachnitt, H.-C., Ort, L., Schuck, T., Strobel, J., Van Luijt, R., Volk, C. M., Weyland, F., and Engel, A.: Tracing elevated abundance of CH_2Cl_2 in the subarctic upper troposphere to the Asian Summer Monsoon, Atmos. Chem. Phys., 25, 8107–8126, https://doi.org/10.5194/acp-25-8107-2025, 2025.

Jo, D. S., Hodzic, A., Emmons, L. K., Tilmes, S., Schwantes, R. H., Mills, M. J., Campuzano-Jost, P., Hu, W., Zaveri, R. A., Easter, R. C., Singh, B., Lu, Z., Schulz, C., Schneider, J., Shilling, J. E., Wisthaler, A., and Jimenez, J. L.: Future changes in isoprene-epoxydiol-derived secondary organic aerosol (IEPOX SOA) under the Shared Socioeconomic Pathways: the importance of physicochemical dependency, Atmos. Chem. Phys., 21, 3395–3425, https://doi.org/10.5194/acp-21-3395-2021, 2021.

Johansson, S., Woiwode, W., Höpfner, M., Friedl-Vallon, F., Kleinert, A., Kretschmer, E., Latzko, T., Orphal, J., Preusse, P., Ungermann, J., Santee, M. L., Jurkat-Witschas, T., Marsing, A., Voigt, C., Giez, A., Krämer, M., Rolf, C., Zahn, A., Engel, A., Sinnhuber, B.-M., and Oelhaf, H.: Airborne limb-imaging measurements of temperature, HNO_3, O_3, $ClONO_2$, H_2O and CFC-12 during the Arctic winter 2015/16: characterization, in-situ validation and comparison to Aura/MLS, Atmos. Meas. Tech., 11, 4737–4756, https://doi.org/10.5194/amt-11-4737-2018, 2018.

Johansson, S., Santee, M. L., Grooß, J.-U., Höpfner, M., Braun, M., Friedl-Vallon, F., Khosrawi, F., Kirner, O., Kretschmer, E., Oelhaf, H., Orphal, J., Sinnhuber, B.-M., Tritscher, I., Ungermann, J., Walker, K. A., and Woiwode, W.: Unusual chlorine partitioning in the 2015/16 Arctic winter lowermost stratosphere: observations and simulations, Atmos. Chem. Phys., 19, 8311–8338, https://doi.org/10.5194/acp-19-8311-2019, 2019.

Johansson, S., Wetzel, G., Friedl-Vallon, F., Glatthor, N., Höpfner, M., Kleinert, A., Neubert, T., Sinnhuber, B.-M., and Ungermann, J.: Biomass burning pollution in the South Atlantic upper troposphere: GLORIA trace gas observations and evaluation of the CAMS model, Atmos. Chem. Phys., 22, 3675–3691, https://doi.org/10.5194/acp-22-3675-2022, 2022.

Johansson, S., Höpfner, M., Friedl-Vallon, F., Glatthor, N., Gulde, T., Huijnen, V., Kleinert, A., Kretschmer, E., Maucher, G., Neubert, T., Nordmeyer, H., Piesch, C., Preusse, P., Riese, M., Sinnhuber, B.-M., Ungermann, J., Wetzel, G., and Woiwode, W.: Ammonia in the upper troposphere–lower stratosphere (UTLS): GLORIA airborne measurements for CAMS model evaluation in the Asian monsoon and in biomass burning plumes above the South Atlantic, Atmos. Chem. Phys., 24, 8125–8138, https://doi.org/10.5194/acp-24-8125-2024, 2024.

Jurkat, T., Voigt, C., Arnold, F., Schlager, H., Aufmhoff, H., Schmale, J., Schneider, J., Lichtenstern, M., and Dörnbrack, A.: Airborne stratospheric ITCIMS-measurements of SO_2, HCl, and HNO_3 in the aged plume of volcano Kasatochi, J. Geophys. Res., 115, https://doi.org/10.1029/2010JD013890, 2010.

Jurkat, T., Voigt, C., Arnold, F., Schlager, H., Kleffmann, J., Aufmhoff, H., Schäuble, D., Schäfer, M., and Schumann, U.: Measurements of HONO, NO, NO_y and SO_2 in aircraft exhaust plumes at cruise, Geophys. Res. Lett., 38, https://doi.org/10.1029/2011GL046884, 2011.

Jurkat, T., Voigt, C., Kaufmann, S., Zahn, A., Sprenger, M., Hoor, P., Bozem, H., Müller, S., Dörnbrack, A., Schlager, H., Bönisch, H., and Engel, A.: A quantitative analysis of stratospheric HCl, HNO3, and O3 in the tropopause region near the subtropical jet, Geophys. Res. Lett., 41, 3315–3321, https://doi.org/10.1002/2013GL059159, 2014.

Jurkat, T., Kaufmann, S., Voigt, C., Schäuble, D., Jeßberger, P., and Ziereis, H.: The airborne mass spectrometer AIMS – Part 2: Measurements of trace gases with stratospheric or tropospheric origin in the UTLS, Atmos. Meas. Tech., 9, 1907–1923, https://doi.org/10.5194/amt-9-1907-2016, 2016.

Jurkat, T., Voigt, C., Kaufmann, S., Grooß, J.-U., Ziereis, H., Dörnbrack, A., Hoor, P., Bozem, H., Engel, A., Bönisch, H., Keber, T., Hüneke, T., Pfeilsticker, K., Zahn, A., Walker, K. A., Boone, C. D., Bernath, P. F., and Schlager, H.: Depletion of ozone and reservoir species of chlorine and nitrogen oxide in the lower Antarctic polar vortex measured from aircraft, Geophys. Res. Lett., 44, 6440–6449, https://doi.org/10.1002/2017GL073270, 2017.

Jurkat-Witschas, T., Voigt, C., Groß, S., Kaufmann, S., Sauer, D., la Torre Castro, E. D., Krämer, M., Schäler, A., Afchine, A., Attinger, R., Garcia, I. B., Beer, C. G., Bugliaro, L., Clemen, H.-C., Dekoutsidis, G., Ehrlich, A., Grawe, S., Hahn, V., Hendricks, J., Järvinen, E., Klimach, T., Krüger, K., Krüger, O., Lucke, J., Luebke, A. E., Marsing, A., Mayer, B., Mayer, J., Mertes, S., Milenko, R.-Z., Moser, M., Müller, H., Nenakhov, V., Pöhlker, M., Pöschl, U., Poertge, V., Rautenhaus, M., Righi, M., Röttenbacher, J., Schaefer, J., Schnaiter, M., Schneider, J., Schumann, U., Spelten, N., Stratmann, F., Tomsche, L., Wagner, S., Wang, Z., Weber, A., Wendisch, M., Wernli, H., Wetzel, B., Wirth, M., Zahn, A., Ziereis, H., and Zöger, M.: CIRRUS-HL: Picturing High- and Midlatitude Summer Cirrus and Contrail Cirrus above Europe with Airborne Measurements aboard the Research Aircraft HALO, Bull. Amer. Meteorol. Soc., 106, E2300 – E2327, https://doi.org/10.1175/BAMS-D-23-0270.1, 2025.

Kachula, O., Vogel, B., Günther, G., and Müller, R.: An optimization-based approach to track the Asian summer monsoon anticyclone across daily and interannual variability, Atmos. Chem. Phys., 25, 15 171–15 195, https://doi.org/10.5194/acp-25-15171-2025, 2025.

Kaiser, J., Wolfe, G. M., Bohn, B., Broch, S., Fuchs, H., Ganzeveld, L. N., Gomm, S., Häseler, R., Hofzumahaus, A., Holland, F., Jäger, J., Li, X., Lohse, I., Lu, K., Prévôt, A. S. H., Rohrer, F., Wegener, R., Wolf, R., Mentel, T. F., Kiendler-Scharr, A., Wahner, A., and Keutsch, F. N.: Evidence for an unidentified non-photochemical ground-level source of formaldehyde in the Po Valley with potential implications for ozone production, Atmos. Chem. Phys., 15, 1289–1298, https://doi.org/10.5194/acp-15-1289-2015, 2015.

Kaluza, T., Kunkel, D., and Hoor, P.: Composite analysis of the tropopause inversion layer in extratropical baroclinic waves, Atmos. Chem. Phys., 19, 6621–6636, https://doi.org/10.5194/acp-19-6621-2019, 2019.

Kaluza, T., Kunkel, D., and Hoor, P.: On the occurrence of strong vertical wind shear in the tropopause region: a 10-year ERA5 northern hemispheric study, Weather Clim. Dynam., 2, 631–651, https://doi.org/10.5194/wcd-2-631-2021, 2021.

Karalis, M., Svensson, G., Wendisch, M., and Tjernström, M.: Lagrangian single-column modeling of Arctic air mass transformation during HALO-$(\mathcal{AC})^3$, Atmos. Chem. Phys., 25, 13 177–13 198, https://doi.org/10.5194/acp-25-13177-2025, 2025.

Kaufmann, M., Blank, J., Guggenmoser, T., Ungermann, J., Engel, A., Ern, M., Friedl-Vallon, F., Gerber, D., Grooß, J. U., Guenther, G., Höpfner, M., Kleinert, A., Kretschmer, E., Latzko, T., Maucher, G., Neubert, T., Nordmeyer, H., Oelhaf, H., Olschewski, F., Orphal, J., Preusse, P., Schlager, H., Schneider, H., Schuettemeyer, D., Stroh, F., Suminska-Ebersoldt, O., Vogel, B., Volk, C. M., Woiwode, W., and Riese, M.: Retrieval of three-dimensional small-scale structures in upper-tropospheric/lower-stratospheric composition as measured by GLORIA, Atmos. Meas. Tech., 8, 81–95, https://doi.org/10.5194/amt-8-81-2015, 2015.

Kaufmann, S., Voigt, C., Jeßberger, P., Jurkat, T., Schlager, H., Schwarzenboeck, A., Klingebiel, M., and Thornberry, T.: In situ measurements of ice saturation in young contrails, Geophys. Res. Lett., 41, 702–709, https://doi.org/10.1002/2013GL058276, 2014.

Kaufmann, S., Voigt, C., Jurkat, T., Thornberry, T., Fahey, D. W., Gao, R.-S., Schlage, R., Schäuble, D., and Zöger, M.: The airborne mass spectrometer AIMS – Part 1: AIMS-H_2O for UTLS water vapor measurements, Atmos. Meas. Tech., 9, 939–953, https://doi.org/10.5194/amt-9-939-2016, 2016.

Kaufmann, S., Voigt, C., Heller, R., Jurkat-Witschas, T., Krämer, M., Rolf, C., Zöger, M., Giez, A., Buchholz, B., Ebert, V., Thornberry, T., and Schumann, U.: Intercomparison of midlatitude tropospheric and lower-stratospheric water vapor measurements and comparison to ECMWF humidity data, Atmos. Chem. Phys., 18, 16 729–16 745, https://doi.org/10.5194/acp-18-16729-2018, 2018.

Kaufmann, S., Dischl, R., and Voigt, C.: Regional and seasonal impact of hydrogen propulsion systems on potential contrail cirrus cover, Atmos. Environ.: X, 24, https://doi.org/10.1016/j.aeaoa.2024.100298, 2024.

Kaumanns, J., Ungermann, J., Vogel, B., Johansson, S., Kretschmer, E., Plöger, F., Preuße, P., Woiwode, W., and Riese, M.: Quantification of inmixing of Asian Monsoon air by multi-species classification in a match flight experiment, Atmos. Chem. Phys., 26, 9083–9111, https://doi.org/10.5194/

acp-26-9083-2026, 2026.

Keber, T., Bönisch, H., Hartick, C., Hauck, M., Lefrancois, F., Obersteiner, F., Ringsdorf, A., Schohl, N., Schuck, T., Hossaini, R., Graf, P., Jöckel, P., and Engel, A.: Bromine from short-lived source gases in the extratropical northern hemispheric upper troposphere and lower stratosphere (UTLS), Atmos. Chem. Phys., 20, 4105–4132, https://doi.org/10.5194/acp-20-4105-2020, 2020.

Khosrawi, F., Kirner, O., Sinnhuber, B.-M., Johansson, S., Höpfner, M., Santee, M. L., Froidevaux, L., Ungermann, J., Ruhnke, R., Woiwode, W., Oelhaf, H., and Braesicke, P.: Denitrification, dehydration and ozone loss during the 2015/2016 Arctic winter, Atmos. Chem. Phys., 17, 12 893–12 910, https://doi.org/10.5194/acp-17-12893-2017, 2017.

Kiemle, C., Groß, S., Wirth, M., and Bugliaro, L.: Airborne Lidar Observations of Water Vapor Variability in Tropical Shallow Convective Environment, Surv. Geophys., 38, 1425–1443, https://doi.org/10.1007/s10712-017-9431-5, 2017.

Kilian, M., Grewe, V., Jöckel, P., Kerkweg, A., Mertens, M., Zahn, A., and Ziereis, H.: Ozone source attribution in polluted European areas during summer 2017 as simulated with MECO(n), Atmos. Chem. Phys., 24, 13 503–13 523, https://acp.copernicus.org/articles/24/13503/2024/, 2024.

Kirbus, B., Schirmacher, I., Klingebiel, M., Schäfer, M., Ehrlich, A., Slättberg, N., Lucke, J., Moser, M., Müller, H., and Wendisch, M.: Thermodynamic and cloud evolution in a cold-air outbreak during HALO-(AC)^3: quasi-Lagrangian observations compared to the ERA5 and CARRA reanalyses, Atmos. Chem. Phys., 24, 3883–3904, https://doi.org/10.5194/acp-24-3883-2024, 2024.

Kirschler, S., Voigt, C., Anderson, B., Campos Braga, R., Chen, G., Corral, A. F., Crosbie, E., Dadashazar, H., Ferrare, R. A., Hahn, V., Hendricks, J., Kaufmann, S., Moore, R., Pöhlker, M. L., Robinson, C., Scarino, A. J., Schollmayer, D., Shook, M. A., Thornhill, K. L., Winstead, E., Ziemba, L. D., and Sorooshian, A.: Seasonal updraft speeds change cloud droplet number concentrations in low-level clouds over the western North Atlantic, Atmos. Chem. Phys., 22, 8299–8319, https://doi.org/10.5194/acp-22-8299-2022, 2022.

Kirschler, S., Voigt, C., Anderson, B. E., Chen, G., Crosbie, E. C., Ferrare, R. A., Hahn, V., Hair, J. W., Kaufmann, S., Moore, R. H., Painemal, D., Robinson, C. E., Sanchez, K. J., Scarino, A. J., Shingler, T. J., Shook, M. A., Thornhill, K. L., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Overview and statistical analysis of boundary layer clouds and precipitation over the western North Atlantic Ocean, Atmos. Chem. Phys., 23, 10 731–10 750, https://doi.org/10.5194/acp-23-10731-2023, 2023.

Klebach, H., Caudillo-Plath, L., Heinritzi, M., Russell, D. M., Rörup, B., Baalbaki, R., Shen, J., Sommer, E., Kürten, A., Alfaouri, D., Almeida, J., Amorim, A., Beck, L. J., Beckmann, H., Berntheusel, M., Christoudias, T., Dada, L., DeVivo, J., Donahue, N., Duplissy, J., El Haddad, I., Hansel, A., Harder, H., He, X.-C., Kulmala, M., Kunkler, F., Lehtipalo, K., Liu, L., Mentler, B., Petäjä, T., Rato, P., Richter, S., Schobesberger, S., Scholz, W., Simon, M., Thakur, R. C., Tomé, A., Tong, Y., Top, J., Volkamer, R., Winkler, P. M., Yang, B., Zauner-Wieczorek, M., Zhang, J., Kirkby, J., and Curtius, J.: Rapid new particle formation driven by methanesulfonic acid and amines, Environ. Sci.: Atmos., 6, 1028–1039, https://doi.org/10.1039/d5ea00081e, 2026.

Kleinert, A., Friedl-Vallon, F., Guggenmoser, T., Höpfner, M., Neubert, T., Ribalda, R., Sha, M. K., Ungermann, J., Blank, J., Ebersoldt, A., Kretschmer, E., Latzko, T., Oelhaf, H., Olschewski, F., and Preusse, P.: Level 0 to 1 processing of the imaging Fourier transform spectrometer GLORIA: generation of radiometrically and spectrally calibrated spectra, Atmos. Meas. Tech., 7, 4167–4184, https://doi.org/10.5194/amt-7-4167-2014, 2014.

Kleinert, A., Krisch, I., Ungermann, J., Adibekyan, A., Gutschwager, B., and Monte, C.: Characterization of blackbody inhomogeneity and its effect on the retrieval results of the GLORIA instrument, Atmos. Meas. Tech., 11, 3871–3882, https://doi.org/10.5194/amt-11-3871-2018, 2018.

Klingebiel, M., Ehrlich, A., Gryschka, M., Risse, N., Maherndl, N., Schirmacher, I., Rosenburg, S., Hörnig, S., Moser, M., Jäkel, E., Schäfer, M., Deneke, H., Mech, M., Voigt, C., and Wendisch, M.: Airborne observations of cloud properties during their evolution from organized streets to isotropic cloud structures along an Arctic cold-air outbreak, Atmos. Chem. Phys., 25, 9787–9801, https://acp.copernicus.org/articles/25/9787/2025/, 2025.

Kloss, C., Sellitto, P., von Hobe, M., Berthet, G., Smale, D., Krysztofiak, G., Xue, C., Qiu, C., Jégou, F., Ouerghemmi, I., and Legras, B.: Australian Fires 2019–2020: Tropospheric and Stratospheric

Pollution Throughout the Whole Fire Season, Front. Environ. Sci., Volume 9 - 2021, https://doi.org/10.3389/fenvs.2021.652024, 2021.

Kluge, F., Hüneke, T., Knecht, M., Lichtenstern, M., Rotermund, M., Schlager, H., Schreiner, B., and Pfeilsticker, K.: Profiling of formaldehyde, glyoxal, methylglyoxal, and CO over the Amazon: Normalised excess mixing ratios and related emission factors in biomass burning plumes, Atmos. Chem. Phys., 20, 12 363–12 389, https://doi.org/10.5194/acp-20-12363-2020, 2020.

Kluge, F., Hüneke, T., Lerot, C., Rosanka, S., Rotermund, M. K., Taraborrelli, D., Weyland, B., and Pfeilsticker, K.: Airborne glyoxal measurements in the marine and continental atmosphere: comparison with TROPOMI observations and EMAC simulations, Atmos. Chem. Phys., 23, 1369–1401, https://doi.org/10.5194/acp-23-1369-2023, 2023.

Kneifel, S., Redl, S., Orlandi, E., Löhnert, U., Cadeddu, M. P., Turner, D. D., and Chen, M.-T.: Absorption Properties of Supercooled Liquid Water between 31 and 225 GHz: Evaluation of Absorption Models Using Ground-Based Observations, J. Appl. Meteorol. Clim., 53, 1028 – 1045, https://doi.org/10.1175/JAMC-D-13-0214.1, 2014.

Knobloch, S., Kaifler, B., Dörnbrack, A., and Rapp, M.: Horizontal Wavenumber Spectra Across the Middle Atmosphere From Airborne Lidar Observations During the 2019 Southern Hemispheric SSW, Geophys. Res. Lett., 50, e2023GL104 357, https://doi.org/10.1029/2023GL104357, 2023.

Kölling, T., Zinner, T., and Mayer, B.: Aircraft-based stereographic reconstruction of 3-D cloud geometry, Atmos. Meas. Tech., 12, 1155–1166, https://doi.org/10.5194/amt-12-1155-2019, 2019.

König, N., Wetzel, G., Hopfner, M., Friedl-Vallon, F., Johansson, S., Kleinert, A., Schneider, M., Ertl, B., and Ungermann, J.: Retrieval of Water Vapour Profiles from GLORIA Nadir Observations, Remote Sens., 13, https://doi.org/10.3390/rs13183675, 2021.

Konow, H., Jacob, M., Ament, F., Crewell, S., Ewald, F., Hagen, M., Hirsch, L., Jansen, F., Mech, M., and Stevens, B.: A unified data set of airborne cloud remote sensing using the HALO Microwave Package (HAMP), Earth Syst. Sci. Data, 11, 921–934, https://doi.org/10.5194/essd-11-921-2019, 2019.

Konow, H., Ewald, F., George, G., Jacob, M., Klingebiel, M., Kölling, T., Luebke, A. E., Mieslinger, T., Pörtge, V., Radtke, J., Schäfer, M., Schulz, H., Vogel, R., Wirth, M., Bony, S., Crewell, S., Ehrlich, A., Forster, L., Giez, A., Gödde, F., Groß, S., Gutleben, M., Hagen, M., Hirsch, L., Jansen, F., Lang, T., Mayer, B., Mech, M., Prange, M., Schnitt, S., Vial, J., Walbröl, A., Wendisch, M., Wolf, K., Zinner, T., Zöger, M., Ament, F., and Stevens, B.: EUREC^{4}A's *HALO*, Earth Syst. Sci. Data, 13, 5545–5563, https://doi.org/10.5194/essd-13-5545-2021, 2021.

Kostinek, J., Roiger, A., Eckl, M., Fiehn, A., Luther, A., Wildmann, N., Klausner, T., Fix, A., Knote, C., Stohl, A., and Butz, A.: Estimating Upper Silesian coal mine methane emissions from airborne in situ observations and dispersion modeling, Atmos. Chem. Phys., 21, 8791–8807, https://doi.org/10.5194/acp-21-8791-2021, 2021.

Kottmeier, C., Wieser, A., Corsmeier, U., Kalthoff, N., Gasch, P., Kirsch, B., Ebert, D., Ulanowski, Z., Schell, D., Franke, H., Schmidmer, F., Frielingsdorf, J., Feuerle, T., and Hankers, R.: A new versatile dropsonde for atmospheric soundings – the KITsonde, Atmos. Meas. Tech., 18, 3161–3178, https://doi.org/10.5194/amt-18-3161-2025, 2025.

Krämer, M., Rolf, C., Luebke, A., Afchine, A., Spelten, N., Costa, A., Meyer, J., Zöger, M., Smith, J., Herman, R. L., Buchholz, B., Ebert, V., Baumgardner, D., Borrmann, S., Klingebiel, M., and Avallone, L.: A microphysics guide to cirrus clouds – Part 1: Cirrus types, Atmos. Chem. Phys., 16, 3463–3483, https://doi.org/10.5194/acp-16-3463-2016, 2016.

Krämer, M., Rolf, C., Spelten, N., Afchine, A., Fahey, D., Jensen, E., Khaykin, S., Kuhn, T., Lawson, P., Lykov, A., Pan, L. L., Riese, M., Rollins, A., Stroh, F., Thornberry, T., Wolf, V., Woods, S., Spichtinger, P., Quaas, J., and Sourdeval, O.: A microphysics guide to cirrus - Part II: Climatologies of clouds and humidity from observations, Atmos. Chem. Phys., 20, 12 569–12 608, https://doi.org/10.5194/acp-20-12569-2020, 2020.

Krasauskas, L., Ungermann, J., Ensmann, S., Krisch, I., Kretschmer, E., Preusse, P., and Riese, M.: 3-D tomographic limb sounder retrieval techniques: irregular grids and Laplacian regularisation, Atmos. Meas. Tech., 12, 853–872, https://doi.org/10.5194/amt-12-853-2019, 2019.

Krasauskas, L., Ungermann, J., Preusse, P., Friedl-Vallon, F., Zahn, A., Ziereis, H., Rolf, C., Plöger,

F., Konopka, P., Vogel, B., and Riese, M.: 3-D tomographic observations of Rossby wave breaking over the North Atlantic during the WISE aircraft campaign in 2017, Atmos. Chem. Phys., 21, 10 249–10 272, https://doi.org/10.5194/acp-21-10249-2021, 2021.

Krasauskas, L., Kaifler, B., Rhode, S., Ungermann, J., Woiwode, W., and Preusse, P.: Oblique Propagation and Refraction of Gravity Waves Over the Andes Observed by GLORIA and ALIMA During the SouthTRAC Campaign, J. Geophys. Res.: Atmos., 128, e2022JD037 798, https://doi.org/10.1029/2022JD037798, 2023.

Krause, J., Hoor, P., Engel, A., Plöger, F., Grooß, J.-U., Bönisch, H., Keber, T., Sinnhuber, B.-M., Woiwode, W., and Oelhaf, H.: Mixing and ageing in the polar lower stratosphere in winter 2015–2016, Atmos. Chem. Phys., 18, 6057–6073, https://doi.org/10.5194/acp-18-6057-2018, 2018.

Krautwurst, S., Gerilowski, K., Borchardt, J., Wildmann, N., Gałkowski, M., Swolkień, J., Marshall, J., Fiehn, A., Roiger, A., Ruhtz, T., Gerbig, C., Necki, J., Burrows, J. P., Fix, A., and Bovensmann, H.: Quantification of CH_4 coal mining emissions in Upper Silesia by passive airborne remote sensing observations with the Methane Airborne MAPper (MAMAP) instrument during the CO_2 and Methane (CoMet) campaign, Atmos. Chem. Phys., 21, 17 345–17 371, https://doi.org/10.5194/acp-21-17345-2021, 2021.

Krautwurst, S., Fruck, C., Wolff, S., Borchardt, J., Huhs, O., Gerilowski, K., Gałkowski, M., Kiemle, C., Quatrevalet, M., Wirth, M., Mallaun, C., Burrows, J. P., Gerbig, C., Fix, A., Bösch, H., and Bovensmann, H.: Identification and quantification of CH_4 emissions from Madrid landfills using airborne imaging spectrometry and greenhouse gas lidar, Atmos. Chem. Phys., 25, 14 669–14 702, https://doi.org/10.5194/acp-25-14669-2025, 2025.

Kretschmer, E., Bachner, M., Blank, J., Dapp, R., Ebersoldt, A., Friedl-Vallon, F., Guggenmoser, T., Gulde, T., Hartmann, V., Lutz, R., Maucher, G., Neubert, T., Oelhaf, H., Preusse, P., Schardt, G., Schmitt, C., Schönfeld, A., and Tan, V.: In–flight control and communication architecture of the GLORIA imaging limb sounder on atmospheric research aircraft, Atmos. Meas. Tech., 8, 2543–2553, https://doi.org/10.5194/amt-8-2543-2015, 2015.

Krisna, T. C., Wendisch, M., Ehrlich, A., Jäkel, E., Werner, F., Weigel, R., Borrmann, S., Mahnke, C., Pöschl, U., Andreae, M. O., Voigt, C., and Machado, L. A. T.: Comparing airborne and satellite retrievals of cloud optical thickness and particle effective radius using a spectral radiance ratio technique: two case studies for cirrus and deep convective clouds, Atmos. Chem. Phys., 18, 4439–4462, https://doi.org/10.5194/acp-18-4439-2018, 2018.

Krüger, K., Schäfler, A., Wirth, M., Weissmann, M., and Craig, G. C.: Vertical structure of the lower-stratospheric moist bias in the ERA5 reanalysis and its connection to mixing processes, Atmos. Chem. Phys., 22, 15 559–15 577, https://doi.org/10.5194/acp-22-15559-2022, 2022a.

Krüger, M. L., Mertes, S., Klimach, T., Cheng, Y., Su, H., Schneider, J., Andreae, M., Pöschl, U., and Rose, D.: Assessment of cloud supersaturation by size-resolved aerosol particle and cloud condensation nuclei (CCN) measurements, Atmos. Meas. Tech., 7, 2615–2629, https://doi.org/10.5194/amt-7-2615-2014, 2014.

Krüger, O. O., Holanda, B. A., Chowdhury, S., Pozzer, A., Walter, D., Pöhlker, C., Andrés Hernández, M. D., Burrows, J. P., Voigt, C., Lelieveld, J., Quaas, J., Pöschl, U., and Pöhlker, M. L.: Black carbon aerosol reductions during COVID-19 confinement quantified by aircraft measurements over Europe, Atmos. Chem. Phys., 22, 8683–8699, https://doi.org/10.5194/acp-22-8683-2022, 2022b.

Krysztofiak, G., Catoire, V., Hamer, P. D., Marécal, V., Robert, C., Engel, A., Bönisch, H., Grossmann, K., Quack, B., Atlas, E., and Pfeilsticker, K.: Evidence of convective transport in tropical West Pacific region during SHIVA experiment, Atmos. Sci. Lett., 19, e798, https://doi.org/10.1002/asl.798, 2018.

Krysztofiak, G., Catoire, V., Dudok de Wit, T., Kinnison, D. E., Ravishankara, A. R., Brocchi, V., Atlas, E., Bozem, H., Commane, R., D'Amato, F., Daube, B., Diskin, G. S., Engel, A., Friedl-Vallon, F., Hintsa, E., Hurst, D. F., Hoor, P., Jegou, F., Jucks, K. W., Kleinboehl, A., Kuellmann, H., Kort, E. A., McKain, K., Moore, F. L., Obersteiner, F., Ramos, Y. G., Schuck, T., Toon, G. C., Viciani, S., Wetzel, G., Williams, J., and Wofsy, S. C.: N2O Temporal Variability from the Middle Troposphere to the Middle Stratosphere Based on Airborne and Balloon-Borne Observations during the Period 1987-2018, Atmosphere, 14, https://doi.org/10.3390/atmos14030585, 2023.

Kunkel, D., Hoor, P., Kaluza, T., Ungermann, J., Kluschat, B., Giez, A., Lachnitt, H.-C., Kaufmann, M., and Riese, M.: Evidence of small-scale quasi-isentropic mixing in ridges of extratropical baroclinic waves, Atmos. Chem. Phys., 19, 12 607–12 630, https://doi.org/10.5194/acp-19-12607-2019, 2019.

Kunz, A., Spelten, N., Konopka, P., Müller, R., Forbes, R. M., and Wernli, H.: Comparison of Fast In situ Stratospheric Hygrometer (FISH) measurements of water vapor in the upper troposphere and lower stratosphere (UTLS) with ECMWF (re)analysis data, Atmos. Chem. Phys., 14, 10 803–10 822, https://doi.org/10.5194/acp-14-10803-2014, 2014.

Kupiszewski, P., Weingartner, E., Vochezer, P., Schnaiter, M., Bigi, A., Gysel, M., Rosati, B., Toprak, E., Mertes, S., and Baltensperger, U.: The Ice Selective Inlet: a novel technique for exclusive extraction of pristine ice crystals in mixed–phase clouds, Atmos. Meas. Tech., 8, 3087–3106, https://doi.org/10.5194/amt-8-3087-2015, 2015.

Kupiszewski, P., Zanatta, M., Mertes, S., Vochezer, P., Lloyd, G., Schneider, J., Schenk, L., Schnaiter, M., Baltensperger, U., Weingartner, E., and Gysel, M.: Ice residual properties in mixed-phase clouds at the high-alpine Jungfraujoch site, J. Geophys. Res., 121, 12 343–12 362, https://doi.org/10.1002/2016JD024894, 2016.

Kwiezinski, C., Weller, C., van Pinxteren, D., Brüggemann, M., Mertes, S., Stratmann, F., and Herrmann, H.: Determination of highly polar compounds in atmospheric aerosol particles at ultra-trace levels using ion chromatography Orbitrap mass spectrometry, J. Sep. Sci., 44, 2343–2357, https://doi.org/10.1002/jssc.202001048, 2021.

Laborde, M., Schnaiter, M., Linke, C., Saathoff, H., Naumann, K.-H., Möhler, O., Berlenz, S., Wagner, U., Taylor, J. W., Liu, D., Flynn, M., Allan, J. D., Coe, H., Heimerl, K., Dahlkötter, F., Weinzierl, B., Wollny, A. G., Zanatta, M., Cozic, J., Laj, P., Hitzenberger, R., Schwarz, J. P., and Gysel, M.: Single Particle Soot Photometer intercomparison at the AIDA chamber, Atmos. Meas. Tech., 5, 3077–3097, https://doi.org/10.5194/amt-5-3077-2012, 2012.

Lacher, L., Adams, M. P., Barry, K., Bertozzi, B., Bingemer, H., Boffo, C., Bras, Y., Büttner, N., Castarede, D., Cziczo, D. J., DeMott, P. J., Fösig, R., Goodell, M., Höhler, K., Hill, T. C. J., Jentzsch, C., Ladino, L. A., Levin, E. J. T., Mertes, S., Möhler, O., Moore, K. A., Murray, B. J., Nadolny, J., Pfeuffer, T., Picard, D., Ramírez-Romero, C., Ribeiro, M., Richter, S., Schrod, J., Sellegri, K., Stratmann, F., Swanson, B. E., Thomson, E. S., Wex, H., Wolf, M. J., and Freney, E.: The Puy de Dôme ICe Nucleation Intercomparison Campaign (PICNIC): comparison between online and offline methods in ambient air, Atmos. Chem. Phys., 24, 2651–2678, https://doi.org/10.5194/acp-24-2651-2024, 2024.

Lammert, A. and Ament, F.: Capabilities and uncertainties of aircraft measurements for the validation of satellite precipitation products – a virtual case study, Meteorol. Z., 24, 495–502, http://dx.doi.org/10.1127/metz/2015/0663, 2015.

Lauther, V., Vogel, B., Wintel, J., Rau, A., Hoor, P., Bense, V., Müller, R., and Volk, C. M.: In situ observations of CH_2Cl_2 and $CHCl_3$ show efficient transport pathways for very short-lived species into the lower stratosphere via the Asian and the North American summer monsoon, Atmos. Chem. Phys., 22, 2049–2077, https://doi.org/10.5194/acp-22-2049-2022, 2022.

Law, K., Roiger, A., Thomas, J., Marelle, L., Raut, J.-C., Dalsøren, S., Fuglestvedt, J., Tuccella, P., Weinzierl, B., and Schlager, H.: Local Arctic air pollution: Sources and impacts, Ambio, 46, 453–463, https://doi.org/10.1007/s13280-017-0962-2, 2017.

Law, K. S., Stohl, A., Quinn, P. K., Brock, C. A., Burkhart, J. F., Paris, J.-D., Ancellet, G., Singh, H. B., Roiger, A., Schlager, H., Dibb, J., Jacob, D. J., Arnold, S. R., Pelon, J., and Thomas, J. L.: ARCTIC AIR POLLUTION New Insights from POLARCAT-IPY, Bull. Amer. Meteorol. Soc., 95, 1873+, https://doi.org/10.1175/BAMS-D-13-00017.1, 2014.

Lennartz, S. T., Krysztofiak, G., Marandino, C. A., Sinnhuber, B.-M., Tegtmeier, S., Ziska, F., Hossaini, R., Krüger, K., Montzka, S. A., Atlas, E., Oram, D. E., Keber, T., Bönisch, H., and Quack, B.: Modelling marine emissions and atmospheric distributions of halocarbons and dimethyl sulfide: the influence of prescribed water concentration vs. prescribed emissions, Atmos. Chem. Phys., 15, 11 753–11 772, https://doi.org/10.5194/acp-15-11753-2015, 2015.

Li, X., Rohrer, F., Hofzumahaus, A., Brauers, T., Häseler, R., Bohn, B., Broch, S., Fuchs, H., Gomm, S., Holland, F., Jäger, J., Kaiser, J., Keutsch, F. N., Lohse, I., Lu, K., Tillmann, R., Wegener, R.,

Wolfe, G. M., Mentel, T. F., Kiendler-Scharr, A., and Wahner, A.: Missing gas-phase source of HONO inferred from Zeppelin measurements in the troposphere, Science, 344, 292–296, https://doi.org/10.1126/science.1248999, 2014.

Li, X.-Y., Wang, H., Chen, J., Endo, S., George, G., Cairns, B., Chellappan, S., Zeng, X., Kirschler, S., Voigt, C., Sorooshian, A., Crosbie, E., Chen, G., Ferrare, R. A., Gustafson, W. I., Hair, J. W., Kleb, M. M., Liu, H., Moore, R., Painemal, D., Robinson, C., Scarino, A. J., Shook, M., Shingler, T. J., Thornhill, K. L., Tornow, F., Xiao, H., Ziemba, L. D., and Zuidema, P.: Large-Eddy Simulations of Marine Boundary Layer Clouds Associated with Cold-Air Outbreaks during the ACTIVATE Campaign. Part I: Case Setup and Sensitivities to Large-Scale Forcings, J. Atmos. Sci., 79, 73 – 100, https://doi.org/10.1175/JAS-D-21-0123.1, 2022.

Li, X.-Y., Wang, H., Chen, J., Endo, S., Kirschler, S., Voigt, C., Crosbie, E., Ziemba, L. D., Painemal, D., Cairns, B., Hair, J. W., Corral, A. F., Robinson, C., Dadashazar, H., Sorooshian, A., Chen, G., Ferrare, R. A., Kleb, M. M., Liu, H., Moore, R., Scarino, A. J., Shook, M. A., Shingler, T. J., Thornhill, K. L., Tornow, F., Xiao, H., and Zeng, X.: Large-Eddy Simulations of Marine Boundary-Layer Clouds Associated with Cold-Air Outbreaks During the ACTIVATE Campaign. Part II: Aerosol-Meteorology-Cloud Interaction, J. Atmos. Sci., 80, 1025–1045, https://doi.org/10.1175/JAS-D-21-0324.1, 2023a.

Li, X.-Y., Wang, H., Chakraborty, T., Sorooshian, A., Ziemba, L. D., Voigt, C., Thornhill, K. L., and Yuan, E.: On the Prediction of Aerosol-Cloud Interactions Within a Data-Driven Framework, Geophys. Res. Lett., 51, https://doi.org/10.1029/2024GL110757, 2024.

Li, Y., Mahnke, C., Rohs, S., Bundke, U., Spelten, N., Dekoutsidis, G., Groß, S., Voigt, C., Schumann, U., Petzold, A., and Krämer, M.: Upper-tropospheric slightly ice-subsaturated regions: frequency of occurrence and statistical evidence for the appearance of contrail cirrus, Atmos. Chem. Phys., 23, 2251–2271, https://doi.org/10.5194/acp-23-2251-2023, 2023b.

Lin, C.-Y., Chen, W.-C., Chien, Y.-Y., Chou, C. C. K., Liu, C.-Y., Ziereis, H., Schlager, H., Förster, E., Obersteiner, F., Krüger, O. O., Holanda, B. A., Pöhlker, M. L., Kaiser, K., Schneider, J., Bohn, B., Pfeilsticker, K., Weyland, B., Andrés Hernández, M. D., and Burrows, J. P.: Effects of transport on a biomass burning plume from Indochina during EMeRGe-Asia identified by WRF-Chem, Atmos. Chem. Phys., 23, 2627–2647, https://doi.org/10.5194/acp-23-2627-2023, 2023.

Liu, Y., Andrés Hernández, M. D., George, M., and Burrows, J. P.: Experimental determination of Rayleigh scattering cross-sections at 408 nm, Appl. Phys. B, 129, https://doi.org/10.1007/s00340-023-08025-8, 2023a.

Liu, Y., Su, H., Wang, S., Wei, C., Tao, W., Pöhlker, M. L., Pöhlker, C., Holanda, B. A., Krüger, O. O., Hoffmann, T., Wendisch, M., Artaxo, P., Pöschl, U., Andreae, M. O., and Cheng, Y.: Strong particle production and condensational growth in the upper troposphere sustained by biogenic VOCs from the canopy of the Amazon Basin, Atmos. Chem. Phys., 23, 251–272, https://doi.org/10.5194/acp-23-251-2023, 2023b.

Lu, B., Barthelmes, F., Petrovic, S., Förste, C., Flechtner, F., Luo, Z., He, K., and Li, M.: Airborne Gravimetry of GEOHALO Mission: Data Processing and Gravity Field Modeling, J. Geophys. Res., 122, 10 586–10 604, https://doi.org/10.1002/2017JB014425, 2017.

Luebke, A. E., Afchine, A., Costa, A., Grooß, J.-U., Meyer, J., Rolf, C., Spelten, N., Avallone, L. M., Baumgardner, D., and Krämer, M.: The origin of midlatitude ice clouds and the resulting influence on their microphysical properties, Atmos. Chem. Phys., 16, 5793–5809, https://doi.org/10.5194/acp-16-5793-2016, 2016.

Luebke, A. E., Ehrlich, A., Schäfer, M., Wolf, K., and Wendisch, M.: An assessment of macrophysical and microphysical cloud properties driving radiative forcing of shallow trade-wind clouds, Atmos. Chem. Phys., 22, 2727–2744, https://doi.org/10.5194/acp-22-2727-2022, 2022.

Machado, L. A. T., Calheiros, A. J. P., Biscaro, T., Giangrande, S., Silva Dias, M. A. F., Cecchini, M. A., Albrecht, R., Andreae, M. O., Araujo, W. F., Artaxo, P., Borrmann, S., Braga, R., Burleyson, C., Eichholz, C. W., Fan, J., Feng, Z., Fisch, G. F., Jensen, M. P., Martin, S. T., Pöschl, U., Pöhlker, C., Pöhlker, M. L., Ribaud, J.-F., Rosenfeld, D., Saraiva, J. M. B., Schumacher, C., Thalman, R., Walter, D., and Wendisch, M.: Overview: Precipitation characteristics and sensitivities to environmental conditions during GoAmazon2014/5 and ACRIDICON-CHUVA, Atmos. Chem. Phys., 18, 6461–6482,

https://doi.org/10.5194/acp-18-6461-2018, 2018.

Märkl, R. S., Voigt, C., Sauer, D., Dischl, R. K., Kaufmann, S., Harlaß, T., Hahn, V., Roiger, A., Weiß-Rehm, C., Burkhardt, U., Schumann, U., Marsing, A., Scheibe, M., Dörnbrack, A., Renard, C., Gauthier, M., Swann, P., Madden, P., Luff, D., Sallinen, R., Schripp, T., and Le Clercq, P.: Powering aircraft with 100 % sustainable aviation fuel reduces ice crystals in contrails, Atmos. Chem. Phys., 24, 3813–3837, https://doi.org/10.5194/acp-24-3813-2024, 2024.

Marsing, A., Jurkat-Witschas, T., Grooß, J.-U., Kaufmann, S., Heller, R., Engel, A., Hoor, P., Krause, J., and Voigt, C.: Chlorine partitioning in the lowermost Arctic vortex during the cold winter 2015/2016, Atmos. Chem. Phys., 19, 10 757–10 772, https://doi.org/10.5194/acp-19-10757-2019, 2019.

Marsing, A., Meerkötter, R., Heller, R., Kaufmann, S., Jurkat-Witschas, T., Krämer, M., Rolf, C., and Voigt, C.: Investigating the radiative effect of Arctic cirrus measured in situ during the winter 2015–2016, Atmos. Chem. Phys., 23, 587–609, https://doi.org/10.5194/acp-23-587-2023, 2023.

Martin, S. T., Artaxo, P., Machado, L. A. T., Manzi, A. O., Souza, R. A. F., Schumacher, C., Wang, J., Andreae, M. O., Barbosa, H. M. J., Fan, J., Fisch, G., Goldstein, A. H., Guenther, A., Jimenez, J. L., Pöschl, U., Silva Dias, M. A., Smith, J. N., and Wendisch, M.: Introduction: Observations and Modeling of the Green Ocean Amazon (GoAmazon2014/5), Atmos. Chem. Phys., 16, 4785–4797, https://doi.org/10.5194/acp-16-4785-2016, 2016.

Martin, S. T., Artaxo, P., Machado, L., Manzi, A. O., Souza, R. A. F., Schumacher, C., Wang, J., Biscaro, T., Brito, J., Calheiros, A., Jardine, K., Medeiros, A., Portela, B., de Sá, S. S., Adachi, K., Aiken, A. C., Albrecht, R., Alexander, L., Andreae, M. O., Barbosa, H. M. J., Buseck, P., Chand, D., Comstock, J. M., Day, D. A., Dubey, M., Fan, J., Fast, J., Fisch, G., Fortner, E., Giangrande, S., Gilles, M., Goldstein, A. H., Guenther, A., Hubbe, J., Jensen, M., Jimenez, J. L., Keutsch, F. N., Kim, S., Kuang, C., Laskin, A., McKinney, K., Mei, F., Miller, M., Nascimento, R., Pauliquevis, T., Pekour, M., Peres, J., Petäjä, T., Pöhlker, C., Pöschl, U., Rizzo, L., Schmid, B., Shilling, J. E., Silva Dias, M. A., Smith, J. N., Tomlinson, J. M., Tóta, J., and Wendisch, M.: The Green Ocean Amazon Experiment (GoAmazon2014/5) Observes Pollution Affecting Gases, Aerosols, Clouds, and Rainfall over the Rain Forest, Bull. Amer. Meteorol. Soc., 98, 981–997, https://doi.org/10.1175/BAMS-D-15-00221.1, 2017.

Mech, M., Orlandi, E., Crewell, S., Ament, F., Hirsch, L., Hagen, M., Peters, G., and Stevens, B.: HAMP - the microwave package on the High Altitude and LOng range research aircraft HALO, Atmos. Meas. Tech., 7, 4539–4553, https://doi.org/10.5194/amt-7-4539-2014, 2014.

Mech, M., Maahn, M., Kneifel, S., Ori, D., Orlandi, E., Kollias, P., Schemann, V., and Crewell, S.: PAMTRA 1.0: the Passive and Active Microwave radiative TRAnsfer tool for simulating radiometer and radar measurements of the cloudy atmosphere, Geosci. Model Dev., 13, 4229–4251, https://doi.org/10.5194/gmd-13-4229-2020, 2020.

Mech, M., Ehrlich, A., Herber, A., Lüpkes, C., Wendisch, M., Becker, S., Boose, Y., Chechin, D., Crewell, S., Dupuy, R., Gourbeyre, C., Hartmann, J., Jäkel, E., Jourdan, O., Kliesch, L.-L., Klingebiel, M., Kulla, B., Mioche, G., Moser, M., Risse, N., Ruiz-Donoso, E., Schäfer, M., Stapf, J., and Voigt, C.: MOSAiC-ACA and AFLUX - Arcticairborne campaigns characterizingthe exit area of MOSAiC, Sci. Data, 9, https://doi.org/10.1038/s41597-022-01900-7, 2022.

Mei, F., Wang, J., Comstock, J. M., Weigel, R., Krämer, M., Mahnke, C., Shilling, J. E., Schneider, J., Schulz, C., Long, C. N., Wendisch, M., Machado, L. A. T., Schmid, B., Krisna, T., Pekour, M., Hubbe, J., Giez, A., Weinzierl, B., Zoeger, M., Pöhlker, M. L., Schlager, H., Cecchini, M. A., Andreae, M. O., Martin, S. T., de Sá, S. S., Fan, J., Tomlinson, J., Springston, S., Pöschl, U., Artaxo, P., Pöhlker, C., Klimach, T., Minikin, A., Afchine, A., and Borrmann, S.: Comparison of aircraft measurements during GoAmazon2014/5 and ACRIDICON-CHUVA, Atmos. Meas. Tech., 13, 661–684, https://doi.org/10.5194/amt-13-661-2020, 2020.

Menekay, D., Lucke, J., Jurkat-Witschas, T., Voigt, C., Kirschler, S., and Bourdon, A.: An airborne in-situ dataset of cloud microphysical properties in supercooled large droplet icing conditions, Earth Syst. Sci. Data, 18, 5837–5853, https://doi.org/10.5194/essd-18-5837-2026, 2026.

Mikhailov, E., Vlasenko, S., Rose, D., and Pöschl, U.: Mass-based hygroscopicity parameter interaction model and measurement of atmospheric aerosol water uptake, Atmos. Chem. Phys., 13, 717–740, https://doi.org/10.5194/acp-13-717-2013, 2013.

Millán, L., Hoor, P., Hegglin, M. I., Manney, G. L., Jeffery, P. S., Weyland, F. M., Leblanc, T.,

Walker, K. A., Boenisch, H., Kunkel, D., Petropavlovskikh, I., and Ye, H.: Ozone Trends in the Upper Troposphere-Lower Stratosphere Using Equivalent Latitude-Potential Temperature Coordinates, Geophys. Res. Lett., 52, e2025GL118 651, https://doi.org/10.1029/2025GL118651, e2025GL118651 2025GL118651, 2025.

Molleker, S., Borrmann, S., Schlager, H., Luo, B., Frey, W., Klingebiel, M., Weigel, R., Ebert, M., Mitev, V., Matthey, R., Woiwode, W., Oelhaf, H., Dörnbrack, A., Stratmann, G., Grooß, J.-U., Günther, G., Vogel, B., Müller, R., Krämer, M., Meyer, J., and Cairo, F.: Microphysical properties of synoptic-scale polar stratospheric clouds: in situ measurements of unexpectedly large HNO_3-containing particles in the Arctic vortex, Atmos. Chem. Phys., 14, 10 785–10 801, https://doi.org/10.5194/acp-14-10785-2014, 2014.

Moore, R. H., Shook, M. A., Ziemba, L. D., DiGangi, J. P., Winstead, E. L., Rauch, B., Jurkat, T., Thornhill, K. L., Crosbie, E. C., Robinson, C., Shingler, T. J., and Anderson, B. E.: Take-off engine particle emission indices for in-service aircraft at Los Angeles International Airport, Scientific Data, 4, 170 198, https://doi.org/10.1038/sdata.2017.198, 2017a.

Moore, R. H., Thornhill, K. L., Weinzierl, B., Sauer, D., D'Ascoli, E., Kim, J., Lichtenstern, M., Scheibe, M., Beaton, B., Beyersdorf, A. J., Barrick, J., Bulzan, D., Corr, C. A., Crosbie, E., Jurkat, T., Martin, R., Riddick, D., Shook, M., Slover, G., Voigt, C., White, R., Winstead, E., Yasky, R., Ziemba, L. D., Brown, A., Schlager, H., and Anderson, B. E.: Biofuel blending reduces particle emissions from aircraft engines at cruise conditions, Nature, 543, 411–415, https://doi.org/10.1038/nature21420, 2017b.

Moser, M., Voigt, C., Jurkat-Witschas, T., Hahn, V., Mioche, G., Jourdan, O., Dupuy, R., Gourbeyre, C., Schwarzenboeck, A., Lucke, J., Boose, Y., Mech, M., Borrmann, S., Ehrlich, A., Herber, A., Lüpkes, C., and Wendisch, M.: Microphysical and thermodynamic phase analyses of Arctic low-level clouds measured above the sea ice and the open ocean in spring and summer, Atmos. Chem. Phys., 23, 7257–7280, https://doi.org/10.5194/acp-23-7257-2023, 2023.

Moser, M., Voigt, C., Eppers, O., Lucke, J., De La Torre Castro, E., Mayer, J., Dupuy, R., Mioche, G., Jourdan, O., Clemen, H.-C., Schneider, J., Joppe, P., Mertes, S., Wetzel, B., Borrmann, S., Klingebiel, M., Mech, M., Lüpkes, C., Crewell, S., Ehrlich, A., Herber, A., and Wendisch, M.: The Arctic Low-Level Mixed-Phase Haze Regime and its Microphysical Differences to Mixed-Phase Clouds, Atmos. Chem. Phys., 26, 1867–1887, https://doi.org/10.5194/acp-26-1867-2026, 2026.

Müller, J. J., Schäfer, M., Rosenburg, S., Ehrlich, A., and Wendisch, M.: High-resolution maps of Arctic surface skin temperature and type retrieved from airborne thermal infrared imagery collected during the HALO–$(\mathcal{AC})^3$ campaign, Atmos. Meas. Tech., 18, 4695–4708, https://doi.org/10.5194/amt-18-4695-2025, 2025.

Müller, S., Hoor, P., Bozem, H., Gute, E., Vogel, B., Zahn, A., Bönisch, H., Keber, T., Krämer, M., Rolf, C., Riese, M., Schlager, H., and Engel, A.: Impact of the Asian monsoon on the extratropical lower stratosphere: trace gas observations during TACTS over Europe 2012, Atmos. Chem. Phys., 16, 10 573–10 589, https://doi.org/10.5194/acp-16-10573-2016, 2016.

Mülmenstädt, J. and Feingold, G.: The Radiative Forcing of Aerosol–Cloud Interactions in Liquid Clouds: Wrestling and Embracing Uncertainty, Curr. Clim. Change Rep., 4, 23–40, https://doi.org/10.1007/s40641-018-0089-y, 2018.

Mülmenstädt, J., Gryspeerdt, E., Salzmann, M., Ma, P.-L., Dipu, S., and Quaas, J.: Separating radiative forcing by aerosol–cloud interactions and rapid cloud adjustments in the ECHAM–HAMMOZ aerosol–climate model using the method of partial radiative perturbations, Atmos. Chem. Phys., 19, 15 415–15 429, https://doi.org/10.5194/acp-19-15415-2019, 2019.

Namdari, S., Ajayi, T., Choi, Y., Crosbie, E. C., Digangi, J. P., Diskin, G. S., Kirschler, S., Liu, H., Nowak, J. B., Shook, M. A., Soloff, C., Thornhill, K. L., Voigt, C., Winstead, E. L., Zhang, B., Ziemba, L. D., and Sorooshian, A.: A comprehensive analysis of new particle formation across the northwest Atlantic: Analysis of ACTIVATE airborne data, Atmos. Environ., 338, https://doi.org/10.1016/j.atmosenv.2024.120831, 2024.

Namdari, S., Dmitrovic, S., Chen, G., Choi, Y., Crosbie, E., DiGangi, J. P., Diskin, G. S., Ferrare, R. A., Hair, J. W., Kirschler, S., Nowak, J. B., Thornhill, K. L., Voigt, C., Vömel, H., Zeng, X., and Sorooshian, A.: Intercomparison of wind speed, temperature, and humidity data between dropson-

des and aircraft in situ measurements, Atmos. Meas. Tech., 18, 4325–4345, https://doi.org/10.5194/amt-18-4325-2025, 2025.

Namdari, S., Ajayi, T., Choi, Y., Crosbie, E. C., Digangi, J. P., Diskin, G. S., Edwards, E.-L., Hair, J. W., Hostetler, C. A., Kirschler, S., Nowak, J. B., Shook, M., Thornhill, K. L., Voigt, C., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Particulate nitrate over the Northwest Atlantic: Insights gained by comparing airborne AMS and PILS measurements, Atmos. Environ., 370, https://doi.org/10.1016/j.atmosenv.2026.121824, 2026.

Naumann, A. K. and Kiemle, C.: The vertical structure and spatial variability of lower-tropospheric water vapor and clouds in the trades, Atmos. Chem. Phys., 20, 6129–6145, https://doi.org/10.5194/acp-20-6129-2020, 2020.

Nickl, A.-L., Mertens, M., Roiger, A., Fix, A., Amediek, A., Fiehn, A., Gerbig, C., Galkowski, M., Kerkweg, A., Klausner, T., Eckl, M., and Jöckel, P.: Hindcasting and forecasting of regional methane from coal mine emissions in the Upper Silesian Coal Basin using the online nested global regional chemistry–climate model MECO(n) (MESSy v2.53), Geosci. Model Dev., 13, 1925–1943, https://doi.org/10.5194/gmd-13-1925-2020, 2020.

Nussbaumer, C. M., Parchatka, U., Tadic, I., Bohn, B., Marno, D., Martinez, M., Rohloff, R., Harder, H., Kluge, F., Pfeilsticker, K., Obersteiner, F., Zöger, M., Doerich, R., Crowley, J. N., Lelieveld, J., and Fischer, H.: Modification of a conventional photolytic converter for improving aircraft measurements of NO_2 via chemiluminescence, Atmos. Meas. Tech., 14, 6759–6776, https://doi.org/10.5194/amt-14-6759-2021, 2021.

Obersteiner, F., Bönisch, H., Keber, T., O'Doherty, S., and Engel, A.: A versatile, refrigerant- and cryogen-free cryofocusing–thermodesorption unit for preconcentration of traces gases in air, Atmos. Meas. Tech., 9, 5265–5279, https://doi.org/10.5194/amt-9-5265-2016, 2016.

Oelhaf, H., Sinnhuber, B.-M., Woiwode, W., Bönisch, H., Bozem, H., Engel, A., Fix, A., Friedl-Vallon, F., Grooß, J.-U., Hoor, P., Johansson, S., Jurkat-Witschas, T., Kaufmann, S., Krämer, M., Krause, J., Kretschmer, E., Lörks, D., Marsing, A., Orphal, J., Pfeilsticker, K., Pitts, M., Poole, L., Preusse, P., Rapp, M., Riese, M., Rolf, C., Ungermann, J., Voigt, C., Volk, C. M., Wirth, M., Zahn, A., and Ziereis, H.: POLSTRACC: Airborne experiment for studying the Polar Stratosphere in a Changing Climate with the high-altitude long-range research aircraft HALO, Bull. Amer. Meteorol. Soc., https://doi.org/10.1175/BAMS-D-18-0181.1, 2019.

Oertel, A., Boettcher, M., Joos, H., Sprenger, M., Konow, H., Hagen, M., and Wernli, H.: Convective activity in an extratropical cyclone and its warm conveyor belt – a case-study combining observations and a convection-permitting model simulation, Q.J.R. Meteorol. Soc., 145, 1406–1426, https://doi.org/10.1002/qj.3500, 2019.

Oertel, A., Sprenger, M., Joos, H., Boettcher, M., Konow, H., Hagen, M., and Wernli, H.: Observations and simulation of intense convection embedded in a warm conveyor belt - how ambient vertical wind shear determines the dynamical impact, Weather Clim. Dynam., 2, 89–110, https://doi.org/10.5194/wcd-2-89-2021, 2021.

Ohyama, H., Morino, I., Velazco, V. A., Klausner, T., Bagtasa, G., Kiel, M., Frey, M., Hori, A., Uchino, O., Matsunaga, T., Deutscher, N. M., DiGangi, J. P., Choi, Y., Diskin, G. S., Pusede, S. E., Fiehn, A., Roiger, A., Lichtenstern, M., Schlager, H., Wang, P. K., Chou, C. C.-K., Andrés-Hernández, M. D., and Burrows, J. P.: Validation of XCO2 and XCH4 retrieved from a portable Fourier transform spectrometer with those from in situ profiles from aircraft-borne instruments, Atmos. Meas. Tech., 13, 5149–5163, https://doi.org/10.5194/amt-13-5149-2020, 2020.

Painemal, D., Chellappan, S., Smith Jr, W. L., Spangenberg, D., Park, J. M., Ackerman, A., Chen, J., Crosbie, E., Ferrare, R., Hair, J., Kirschler, S., Li, X.-Y., McComiskey, A., Moore, R. H., Sanchez, K., Sorooshian, A., Tornow, F., Voigt, C., Wang, H., Winstead, E., Zeng, X., Ziemba, L., and Zuidema, P.: Wintertime Synoptic Patterns of Midlatitude Boundary Layer Clouds Over the Western North Atlantic: Climatology and Insights From In Situ ACTIVATE Observations, J. Geophys. Res.: Atmos., 128, https://doi.org/10.1029/2022JD037725, 2023.

Paulus, F. M., Karalis, M., George, G., Svensson, G., Wendisch, M., and Neggers, R. A. J.: Airborne Measurements of Mesoscale Divergence at High Latitudes during HALO-(AC)^3, J. Atmos. Sci., 81, 2051 – 2067, https://doi.org/10.1175/JAS-D-24-0034.1, 2024.

Peterson, P. K., Pratt, K. A., Simpson, W. R., Nghiem, S. V., Pérez, L. X. P., Boone, E. J., Pöhler, D., Zielcke, J., General, S., Shepson, P. B., Frieß, U., Platt, U., and Stirm, B. H.: The role of open lead interactions in atmospheric ozone variability between Arctic coastal and inland sites, Elem. Sci. Anth., 4, http://doi.org/10.12952/journal.elementa.000109, 2016.

Peterson, P. K., Pöhler, D., Sihler, H., Zielcke, J., General, S., Frieß, U., Platt, U., Simpson, W. R., Nghiem, S. V., Shepson, P. B., Stirm, B. H., Dhaniyala, S., Wagner, T., Caulton, D. R., Fuentes, J. D., and Pratt, K. A.: Observations of bromine monoxide transport in the Arctic sustained on aerosol particles, Atmos. Chem. Phys., 17, 7567–7579, https://doi.org/10.5194/acp-17-7567-2017, 2017.

Peterson, P. K., Pöhler, D., Zielcke, J., General, S., Frieß, U., Platt, U., Simpson, W. R., Nghiem, S. V., Shepson, P. B., Stirm, B. H., and Pratt, K. A.: Springtime Bromine Activation Over Coastal and Inland Arctic Snowpacks, ACS Earth Space Chem., 2, 1075–1086, https://doi.org/10.1021/acsearthspacechem.8b00083, 2018.

Pfreundschuh, S., Fox, S., Eriksson, P., Duncan, D., Buehler, S. A., Brath, M., Cotton, R., and Ewald, F.: Synergistic radar and sub-millimeter radiometer retrievals of ice hydrometeors in mid-latitude frontal cloud systems, Atmos. Meas. Tech., 15, 677–699, https://doi.org/10.5194/amt-15-677-2022, 2022.

Piesch, C., Sartorius, C., Friedl-Vallon, F., Gulde, T., Heger, S., Kretschmer, E., Maucher, G., Nordmeyer, H., Barthel, J., Ebersoldt, A., Graf, F., Hase, F., Kleinert, A., Neubert, T., and Schillings, H. J.: The mechanical and thermal setup of the GLORIA spectrometer, Atmos. Meas. Tech., 8, 1773–1787, https://doi.org/10.5194/amt-8-1773-2015, 2015.

Plesca, E., Buehler, S. A., and Grützun, V.: The Fast Response of the Tropical Circulation to CO2 Forcing, J. Climate, 31, 9903 – 9920, https://doi.org/10.1175/JCLI-D-18-0086.1, 2018a.

Plesca, E., Grützun, V., and Buehler, S. A.: How Robust Is the Weakening of the Pacific Walker Circulation in CMIP5 Idealized Transient Climate Simulations?, J. Climate, 31, 81 – 97, https://doi.org/10.1175/JCLI-D-17-0151.1, 2018b.

Polonik, P., Knote, C., Zinner, T., Ewald, F., Kölling, T., Mayer, B., Andreae, M. O., Jurkat-Witschas, T., Klimach, T., Mahnke, C., Molleker, S., Pöhlker, C., Pöhlker, M. L., Pöschl, U., Rosenfeld, D., Voigt, C., Weigel, R., and Wendisch, M.: The challenge of simulating the sensitivity of the Amazonian clouds microstructure to cloud condensation nuclei number concentrations, Atmos. Chem. Phys., 20, 1591–1605, https://doi.org/10.5194/acp-20-1591-2020, 2020.

Pörtge, V., Kölling, T., Weber, A., Volkmer, L., Emde, C., Zinner, T., Forster, L., and Mayer, B.: High-spatial-resolution retrieval of cloud droplet size distribution from polarized observations of the cloudbow, Atmos. Meas. Tech., 16, 645–667, https://doi.org/10.5194/amt-16-645-2023, 2023.

Poulidis, A. P., Seemann, S.-L., Schlager, H., and Vrekoussis, M.: Chasing parts in quadrillion: applications of dynamical downscaling in atmospheric pollutant transport modelling during field campaigns, Prog. Earth Planet. Sci., 11, 37, https://doi.org/10.1186/s40645-024-00642-x, 2024.

Prange, M., Brath, M., and Buehler, S. A.: Are elevated moist layers a blind spot for hyperspectral infrared sounders? A model study, Atmos. Meas. Tech., 14, 7025–7044, https://doi.org/10.5194/amt-14-7025-2021, 2021.

Prange, M., Buehler, S. A., and Brath, M.: How adequately are elevated moist layers represented in reanalysis and satellite observations?, Atmos. Chem. Phys., 23, 725–741, https://doi.org/10.5194/acp-23-725-2023, 2023.

Quatrevalet, M., Wolferstetter, M., Sprenger, B., Fischer, M., Holzwarth, R., and Fix, A.: In-flight enhancement of the optical frequency accuracy of an integral-path differential absorption lidar thanks to a rugged, airborne self-referenced frequency comb, Opt. Express, 33, 10 165–10 179, https://doi.org/10.1364/OE.546616, 2025.

Quennehen, B., Schwarzenboeck, A., Schmale, J., Schneider, J., Sodemann, H., Stohl, A., Ancellet, G., Crumeyrolle, S., and Law, K. S.: Physical and chemical properties of pollution aerosol particles transported from North America to Greenland as measured during the POLARCAT summer campaign, Atmos. Chem. Phys., 11, 10 947–10 963, https://doi.org/10.5194/acp-11-10947-2011, 2011.

Quinting, J., Grams, C. M., Kirsch, B., Oertel, A., Ramos, A. M., Raveh-Rubin, S., and Schäfler, A.: Dry Intrusion Connects High-Impact Cyclones Eunice and Franklin: Emerging Observational

Targets of NAWDIC, Bull. Amer. Meteorol. Soc., 107, E1302–E1314, https://doi.org/10.1175/BAMS-D-25-0170.1, 2026.

Rapp, M., Kaifler, B., Dörnbrack, A., Gisinger, S., Mixa, T., Reichert, R., Kaifler, N., Knobloch, S., Eckert, R., Wildmann, N., Giez, A., Krasauskas, L., Preusse, P., Geldenhuys, M., Riese, M., Woiwode, W., Friedl-Vallon, F., Sinnhuber, B.-M., de la Torre, A., Alexander, P., Hormaechea, J. L., Janches, D., Garhammer, M., Chau, J. L., Conte, J. F., Hoor, P., and Engel, A.: SOUTHTRAC-GW: An Airborne Field Campaign to Explore Gravity Wave Dynamics at the World's Strongest Hotspot, Bull. Amer. Meteorol. Soc., 102, E871 – E893, https://doi.org/10.1175/BAMS-D-20-0034.1, 2021.

Raupach, S. M.: Stereoscopic 3D visualization of particle fields reconstructed from digital inline holograms, Optik, 121, 1194–1197, https://doi.org/10.1016/j.ijleo.2009.01.012, 2010.

Raupach, S. M. F.: Observation of Interference Patterns in Reconstructed Digital Holograms of Atmospheric Ice Crystals, J. Atmos. Ocean. Tech., 26, 2691 – 2693, https://doi.org/10.1175/2009JTECHA1315.1, 2009.

Reifenberg, S. F., Martin, A., Kohl, M., Bacer, S., Hamryszczak, Z., Tadic, I., Röder, L., Crowley, D. J., Fischer, H., Kaiser, K., Schneider, J., Dörich, R., Crowley, J. N., Tomsche, L., Marsing, A., Voigt, C., Zahn, A., Pöhlker, C., Holanda, B. A., Krüger, O., Pöschl, U., Pöhlker, M., Jöckel, P., Dorf, M., Schumann, U., Williams, J., Bohn, B., Curtius, J., Harder, H., Schlager, H., Lelieveld, J., and Pozzer, A.: Numerical simulation of the impact of COVID-19 lockdown on tropospheric composition and aerosol radiative forcing in Europe, Atmos. Chem. Phys., 22, 10 901–10 917, https://doi.org/10.5194/acp-22-10901-2022, 2022.

Reilly, S., Gesso, S. D., and Neggers, R.: Configuring LES Based on Dropsonde Data in Sparsely Sampled Areas in the Subtropical Atlantic, J. Appl. Meteorol. Clim., 59, 297 – 315, https://doi.org/10.1175/JAMC-D-19-0013.1, 2020.

Ren, Y., Baumann, R., and Schlager, H.: An airborne perfluorocarbon tracer system and its first application for a Lagrangian experiment, Atmos. Meas. Tech., 8, 69–80, https://doi.org/10.5194/amt-8-69-2015, 2015.

Ribaud, J.-F., Machado, L. A. T., and Biscaro, T.: X-band dual-polarization radar-based hydrometeor classification for Brazilian tropical precipitation systems, Atmos. Meas. Tech., 12, 811–837, https://doi.org/10.5194/amt-12-811-2019, 2019.

Riese, M., Oelhaf, H., Preusse, P., Blank, J., Ern, M., Friedl-Vallon, F., Fischer, H., Guggenmoser, T., Höpfner, M., Hoor, P., Kaufmann, M., Orphal, J., Plöger, F., Spang, R., Suminska-Ebersoldt, O., Ungermann, J., Vogel, B., and Woiwode, W.: Gimballed Limb Observer for Radiance Imaging of the Atmosphere (GLORIA) scientific objectives, Atmos. Meas. Tech., 7, 1915–1928, https://doi.org/10.5194/amt-7-1915-2014, 2014.

Riese, M., Hoor, P., Rolf, C., Kunkel, D., Vogel, B., Köllner, F., Pöhlker, M., Ploeger, F., Ungermann, J., Woiwode, W., Johansson, S., Bauer, R., Barmpounis, K., Borrmann, S., Brauner, P., Clemens, J., Dragoneas, A., Ekinci, F., Emig, N., Engel, A., Eppers, O., Fadnavis, S., Friedl-Vallon, F., Geldenhuys, M., Günther, G., Grooß, J., Hegglin, M., Höpfner, M., Jesswein, M., Joppe, P., Kaumanns, J., Kachula, O., Keber, T., Kretschmer, E., Lachnitt, H. C., Lauther, V., Lloyd, P., Molleker, S., Müller, R., Neubert, T., Ort, L., Pöschl, U., Pöhlker, C., Rapp, M., Retzlaff, M., Rhode, S., Schneider, J., Schuck, T., Sinnhuber, B.-M., Spelten, N., Strobel, J., Tomsche, L., Turhal, K., Van Luijt, R., Versick, S., Voigt, C., Volk, M., Von Hobe, M., Weyland, F., Zahn, A., Ziereis, H., and Zlotos, L.: Long-range transport of polluted Asian summer monsoon air to high latitudes during the PHILEAS campaign in the boreal summer 2023, Bull. Amer. Meteorol. Soc., pp. BAMS–D–24–0232.1, https://doi.org/10.1175/BAMS-D-24-0232.1, 2025.

Riese, M., Hoor, P., Rolf, C., Kunkel, D., Vogel, B., Köllner, F., Pöhlker, M., Ploeger, F., Ungermann, J., Woiwode, W., Johansson, S., Bauer, R., Barmpounis, K., Borrmann, S., Brauner, P., Clemens, J., Dragoneas, A., Ekinci, F., Emig, N., Engel, A., Eppers, O., Fadnavis, S., Friedl-Vallon, F., Geldenhuys, M., Günther, G., Grooß, J. U., Hegglin, M. I., Höpfner, M., Jesswein, M., Joppe, P., Kaumanns, J., Kachula, O., Keber, T., Kretschmer, E., Lachnitt, H. C., Lauther, V., Lloyd, P. E., Molleker, S., Müller, R., Neubert, T., Ort, L., Pöschl, U., Pöhlker, C., Rapp, M., Retzlaff, M., Rhode, S., Schneider, J., Schuck, T., Sinnhuber, B.-M., Spelten, N., Strobel, J., Tomsche, L., Turhal, K., van Luijt, R., Versick, S., Voigt, C., Volk, M., von Hobe, M., Weyland, F., Zahn, A., Ziereis, H., and Zlotos, L. O.:

Long-Range Transport of Polluted Asian Summer Monsoon Air to High Latitudes during the PHILEAS Campaign in the Boreal Summer 2023, Bull. Amer. Meteorol. Soc., 107, E1699 – E1722, https://doi.org/10.1175/BAMS-D-24-0232.1, 2026.

Righi, M., Hendricks, J., Lohmann, U., Beer, C. G., Hahn, V., Heinold, B., Heller, R., Krämer, M., Ponater, M., Rolf, C., Tegen, I., and Voigt, C.: Coupling aerosols to (cirrus) clouds in the global EMAC-MADE3 aerosol–climate model, Geosci. Model Dev., 13, 1635–1661, https://doi.org/10.5194/gmd-13-1635-2020, 2020.

Risse, N., Mech, M., Prigent, C., Müller, J. J., and Crewell, S.: Cloud liquid water path detectability and retrieval accuracy from airborne passive microwave observations over Arctic sea ice, Atmos. Meas. Tech., 19, 2197–2223, https://doi.org/10.5194/amt-19-2197-2026, 2026.

Roiger, A., Aufmhoff, H., Stock, P., Arnold, F., and Schlager, H.: An aircraft-borne chemical ionization - ion trap mass spectrometer (CI-ITMS) for fast PAN and PPN measurements, Atmos. Meas. Tech., 4, 173–188, https://doi.org/10.5194/amt-4-173-2011, 2011a.

Roiger, A., Schlager, H., Schäfler, A., Huntrieser, H., Scheibe, M., Aufmhoff, H., Cooper, O. R., Sodemann, H., Stohl, A., Burkhart, J., Lazzara, M., Schiller, C., Law, K. S., and Arnold, F.: In-situ observation of Asian pollution transported into the Arctic lowermost stratosphere, Atmos. Chem. Phys., 11, 10 975–10 994, https://doi.org/10.5194/acp-11-10975-2011, 2011b.

Rolf, C., Afchine, A., Bozem, H., Buchholz, B., Ebert, V., Guggenmoser, T., Hoor, P., Konopka, P., Kretschmer, E., Müller, S., Schlager, H., Spelten, N., Sumińska-Ebersoldt, O., Ungermann, J., Zahn, A., and Krämer, M.: Transport of Antarctic stratospheric strongly dehydrated air into the troposphere observed during the HALO-ESMVal campaign 2012, Atmos. Chem. Phys., 15, 9143–9158, https://doi.org/10.5194/acp-15-9143-2015, 2015.

Rolf, C., Vogel, B., Hoor, P., Afchine, A., Günther, G., Krämer, M., Müller, R., Müller, S., Spelten, N., and Riese, M.: Water vapor increase in the lower stratosphere of the Northern Hemisphere due to the Asian monsoon anticyclone observed during the TACTS/ESMVal campaigns, Atmos. Chem. Phys., 18, 2973–2983, https://doi.org/10.5194/acp-18-2973-2018, 2018.

Rotermund, M. K., Bense, V., Chipperfield, M. P., Engel, A., Grooß, J.-U., Hoor, P., Hüneke, T., Keber, T., Kluge, F., Schreiner, B., Schuck, T., Vogel, B., Zahn, A., and Pfeilsticker, K.: Organic and inorganic bromine measurements around the extratropical tropopause and lowermost stratosphere: Insights into the transport pathways and total bromine, Atmos. Chem. Phys., 21, 15 375–15 407, https://doi.org/10.5194/acp-21-15375-2021, 2021.

Roth, A., Schneider, J., Klimach, T., Mertes, S., van Pinxteren, D., Herrmann, H., and Borrmann, S.: Aerosol properties, source identification, and cloud processing in orographic clouds measured by single particle mass spectrometry on a central European mountain site during HCCT-2010, Atmos. Chem. Phys., 16, 505–524, https://doi.org/10.5194/acp-16-505-2016, 2016.

Röttenbacher, J., Ehrlich, A., Müller, H., Ewald, F., Luebke, A. E., Kirbus, B., Hogan, R. J., and Wendisch, M.: Evaluating the representation of Arctic cirrus solar radiative effects in the Integrated Forecasting System with airborne measurements, Atmos. Chem. Phys., 24, 8085–8104, https://doi.org/10.5194/acp-24-8085-2024, 2024.

Rowlinson, M. J., Carpenter, L. J., Evans, M. J., Lee, J. D., Andersen, S. T., Sherwen, T., Callaghan, A. B., Sommariva, R., Bloss, W., Hou, S., Crilley, L. R., Pfeilsticker, K., Weyland, B., Ryerson, T. B., Veres, P. R., Campuzano-Jost, P., Guo, H., Nault, B. A., Jimenez, J. L., and Fomba, K. W.: A nitrate photolysis source of tropospheric HONO is incompatible with current understanding of atmospheric chemistry, Atmos. Chem. Phys., 25, 16 945–16 968, https://doi.org/10.5194/acp-25-16945-2025, 2025.

Sala, S., Bönisch, H., Keber, T., Oram, D. E., Mills, G., and Engel, A.: Deriving an atmospheric budget of total organic bromine using airborne in situ measurements from the western Pacific area during SHIVA, Atmos. Chem. Phys., 14, 6903–6923, https://doi.org/10.5194/acp-14-6903-2014, 2014.

Saturno, J., Ditas, F., Penning de Vries, M., Holanda, B. A., Pöhlker, M. L., Carbone, S., Walter, D., Bobrowski, N., Brito, J., Chi, X., Gutmann, A., Hrabe de Angelis, I., Machado, L. A. T., Moran-Zuloaga, D., Rüdiger, J., Schneider, J., Schulz, C., Wang, Q., Wendisch, M., Artaxo, P., Wagner, T., Pöschl, U., Andreae, M. O., and Pöhlker, C.: African volcanic emissions influencing atmospheric aerosols

over the Amazon rain forest, Atmos. Chem. Phys., 18, 10 391–10 405, https://doi.org/10.5194/acp-18-10391-2018, 2018.

Schäfer, M., Wolf, K., Ehrlich, A., Hallbauer, C., Jäkel, E., Jansen, F., Luebke, A. E., Müller, J., Thoböll, J., Röschenthaler, T., Stevens, B., and Wendisch, M.: VELOX - a new thermal infrared imager for airborne remote sensing of cloud and surface properties, Atmos. Meas. Tech., 15, 1491–1509, https://doi.org/10.5194/amt-15-1491-2022, 2022.

Schäfler, A., Craig, G., Wernli, H., Arbogast, P., Doyle, J. D., McTaggart-Cowan, R., Methven, J., Rivière, G., Ament, F., Boettcher, M., Bramberger, M., Cazenave, Q., Cotton, R., Crewell, S., Delanoë, J., Dörnbrack, A., Ehrlich, A., Ewald, F., Fix, A., Grams, C. M., Gray, S. L., Grob, H., Groß, S., Hagen, M., Harvey, B., Hirsch, L., Jacob, M., Kölling, T., Konow, H., Lemmerz, C., Lux, O., Magnusson, L., Mayer, B., Mech, M., Moore, R., Pelon, J., Quinting, J., Rahm, S., Rapp, M., Rautenhaus, M., Reitebuch, O., Reynolds, C. A., Sodemann, H., Spengler, T., Vaughan, G., Wendisch, M., Wirth, M., Witschas, B., Wolf, K., and Zinner, T.: The North Atlantic Waveguide and Downstream Impact Experiment, Bull. Amer. Meteorol. Soc., 99, 1607–1637, https://doi.org/10.1175/BAMS-D-17-0003.1, 2018.

Schäfler, A., Harvey, B., Methven, J., Doyle, J. D., Rahm, S., Reitebuch, O., Weiler, F., and Witschas, B.: Observation of Jet Stream Winds during NAWDEX and Characterization of Systematic Meteorological Analysis Errors, Mon. Wea. Rev., 148, 2889–2907, https://doi.org/10.1175/MWR-D-19-0229.1, 2020.

Schäfler, A., Fix, A., and Wirth, M.: Mixing at the extratropical tropopause as characterized by collocated airborne H_2O and O_3 lidar observations, Atmos. Chem. Phys., 21, 5217–5234, https://doi.org/10.5194/acp-21-5217-2021, 2021.

Schäfler, A., Sprenger, M., Wernli, H., Fix, A., and Wirth, M.: Case study on the influence of synoptic-scale processes on the paired H_2O–O_3 distribution in the UTLS across a North Atlantic jet stream, Atmos. Chem. Phys., 23, 999–1018, https://doi.org/10.5194/acp-23-999-2023, 2023.

Schaller, T., Scheinert, M., Förste, C., and Barthelmes, F.: Inversion of GEOHALO aerogravimetry to infer ocean bottom topography: application to the Tyrrhenian, Ionian and Adriatic seas, Geophys. J. Intern., 216, 840–850, https://dx.doi.org/10.1093/gji/ggy456, 2019.

Schäuble, D., Voigt, C., Kärcher, B., Stock, P., Schlager, H., Krämer, M., Schiller, C., Bauer, R., Spelten, N., de Reus, M., Szakáll, M., Borrmann, S., Weers, U., and Peter, T.: Airborne measurements of the nitric acid partitioning in persistent contrails, Atmos. Chem. Phys., 9, 8189–8197, https://doi.org/10.5194/acp-9-8189-2009, 2009.

Schindler, M., Weissmann, M., Schäfler, A., and Radnoti, G.: The impact of dropsonde and extra radiosonde observations during NAWDEX in autumn 2016, Mon. Wea. Rev., 148, https://doi.org/10.1175/MWR-D-19-0126.1, 2020.

Schlenczek, O., Fugal, J. P., Lloyd, G., Bower, K. N., Choularton, T. W., Flynn, M., Crosier, J., and Borrmann, S.: Microphysical Properties of Ice Crystal Precipitation and Surface-Generated Ice Crystals in a High Alpine Environment in Switzerland, J. Appl. Meteorol. Climatol., 56, 433–453, https://doi.org/10.1175/JAMC-D-16-0060.1, 2017.

Schmale, J., Schneider, J., Jurkat, T., Voigt, C., Kalesse, H., Rautenhaus, M., Lichtenstern, M., Schlager, H., Ancellet, G., Arnold, F., Gerding, M., Mattis, I., Wendisch, M., and Borrmann, S.: Aerosol layers from the 2008 eruptions of Mount Okmok and Mount Kasatochi: In situ upper troposphere and lower stratosphere measurements of sulfate and organics over Europe, J. Geophys. Res., 115, D00L07, https://doi.org/10.1029/2009JD013628, 2010.

Schmale, J., Schneider, J., Ancellet, G., Quennehen, B., Stohl, A., Sodemann, H., Burkhart, J., Hamburger, T., Arnold, S. R., Schwarzenboeck, A., Borrmann, S., and Law, K. S.: Source identification and airborne chemical characterisation of aerosol pollution from long-range transport over Greenland during POLARCAT summer campaign 2008, Atmos. Chem. Phys., 11, 10 097–10 123, https://doi.org/10.5194/acp-11-10097-2011, 2011.

Schmidt, S., Schneider, J., Klimach, T., Mertes, S., Schenk, L. P., Kupiszewski, P., Curtius, J., and Borrmann, S.: Online single particle analysis of ice particle residuals from mountain-top mixed-phase clouds using laboratory derived particle type assignment, Atmos. Chem. Phys., 17, 575–594, https://doi.org/10.5194/acp-17-575-2017, 2017.

Schmitt, C. G., Heymsfield, A. J., Connolly, P., Järvinen, E., and Schnaiter, M.: A global view of at-

mospheric ice particle complexity, Geophys. Res. Lett., 43, 11 913–11 920, https://doi.org/10.1002/2016GL071267, 2016a.

Schmitt, C. G., Schnaiter, M., Heymsfield, A. J., Yang, P., Hirst, E., and Bansemer, A.: The Microphysical Properties of Small Ice Particles Measured by the Small Ice Detector-3 Probe during the MACPEX Field Campaign, J. Atmos. Sci., 73, 4775–4791, https://doi.org/10.1175/JAS-D-16-0126.1, 2016b.

Schnaiter, F. M. and Järvinen, E.: Evidence for sub-wavelength-scale ice crystal surface roughness from single-particle light-scattering measurements, J. Quant. Spectrosc. Radiat. Transfer, 359, 109 935, https://doi.org/10.1016/j.jqsrt.2026.109935, 2026.

Schnaiter, M., Büttner, S., Möhler, O., Skrotzki, J., Vragel, M., and Wagner, R.: Influence of particle size and shape on the backscattering linear depolarization ratio of small ice crystals – cloud chamber measurements in the context of contrail and cirrus microphysics, Atmos. Chem. Phys., 12, 10 465–10 484, https://doi.org/10.5194/acp-12-10465-2012, 2012.

Schnaiter, M., Järvinen, E., Vochezer, P., Abdelmonem, A., Wagner, R., Jourdan, O., Mioche, G., Shcherbakov, V. N., Schmitt, C. G., Tricoli, U., Ulanowski, Z., and Heymsfield, A. J.: Cloud chamber experiments on the origin of ice crystal complexity in cirrus clouds, Atmos. Chem. Phys., 16, 5091–5110, https://doi.org/10.5194/acp-16-5091-2016, 2016.

Schnaiter, M., Järvinen, E., Abdelmonem, A., and Leisner, T.: PHIPS-HALO: the airborne particle habit imaging and polar scattering probe – Part 2: Characterization and first results, Atmos. Meas. Tech., 11, 341–357, https://doi.org/10.5194/amt-11-341-2018, 2018.

Schneider, J., Mertes, S., van Pinxteren, D., Herrmann, H., and Borrmann, S.: Uptake of nitric acid, ammonia, and organics in orographic clouds: mass spectrometric analyses of droplet residual and interstitial aerosol particles, Atmos. Chem. Phys., 17, 1571–1593, https://doi.org/10.5194/acp-17-1571-2017, 2017.

Schneider, J., Höhler, K., Wagner, R., Saathoff, H., Schnaiter, M., Schorr, T., Steinke, I., Benz, S., Baumgartner, M., Rolf, C., Krämer, M., Leisner, T., and Möhler, O.: High homogeneous freezing onsets of sulfuric acid aerosol at cirrus temperatures, Atmos. Chem. Phys., 21, 14 403–14 425, https://doi.org/10.5194/acp-21-14403-2021, 2021a.

Schneider, J., Weigel, R., Klimach, T., Dragoneas, A., Appel, O., Hünig, A., Molleker, S., Köllner, F., Clemen, H.-C., Eppers, O., Hoppe, P., Hoor, P., Mahnke, C., Krämer, M., Rolf, C., Grooß, J.-U., Zahn, A., Obersteiner, F., Ravegnani, F., Ulanovsky, A., Schlager, H., Scheibe, M., Diskin, G. S., DiGangi, J. P., Nowak, J. B., Zöger, M., and Borrmann, S.: Aircraft-based observation of meteoric material in lower-stratospheric aerosol particles between 15 and 68°N, Atmos. Chem. Phys., 21, 989–1013, https://doi.org/10.5194/acp-21-989-2021, 2021b.

Schnitt, S., Orlandi, E., Mech, M., Ehrlich, A., and Crewell, S.: Characterization of Water Vapor and Clouds During the Next-Generation Aircraft Remote Sensing for Validation (NARVAL) South Studies, IEEE J. Sel. Topics Appl. Earth Observ. Remote Sens., 10, 3114–3124, https://doi.org/10.1109/JSTARS.2017.2687943, 2017.

Schön, R., Schnaiter, M., Ulanowski, Z., Schmitt, C., Benz, S., Möhler, O., Vogt, S., Wagner, R., and Schurath, U.: Particle habit imaging using incoherent light: A first step toward a novel instrument for cloud microphysics, J. Atmos. Ocean. Tech., 28, 493–512, https://doi.org/10.1175/2011JTECHA1445.1, 2011.

Schulz, C., Schneider, J., Amorim Holanda, B., Appel, O., Costa, A., de Sá, S. S., Dreiling, V., Fütterer, D., Jurkat-Witschas, T., Klimach, T., Knote, C., Krämer, M., Martin, S. T., Mertes, S., Pöhlker, M. L., Sauer, D., Voigt, C., Walser, A., Weinzierl, B., Ziereis, H., Zöger, M., Andreae, M. O., Artaxo, P., Machado, L. A. T., Pöschl, U., Wendisch, M., and Borrmann, S.: Aircraft-based observations of isoprene-epoxydiol-derived secondary organic aerosol (IEPOX-SOA) in the tropical upper troposphere over the Amazon region, Atmos. Chem. Phys., 18, 14 979–15 001, https://doi.org/10.5194/acp-18-14979-2018, 2018.

Schumann, U., Jeßberger, P., and Voigt, C.: Contrail ice particles in aircraft wakes and their climatic importance, Geophys. Res. Lett., 40, 2867–2872, https://doi.org/10.1002/grl.50539, 2013.

Schumann, U., Bugliaro, L., Dörnbrack, A., Baumann, R., and Voigt, C.: Aviation Contrail Cirrus and Radiative Forcing Over Europe During 6 Months of COVID-19, Geophys. Res. Lett., 48,

e2021GL092 771, https://doi.org/10.1029/2021GL092771, 2021.

Seguel, R. J., Opazo, C., Cohen, Y., Cooper, O. R., Gallardo, L., Sinnhuber, B.-M., Obersteiner, F., Zahn, A., Hoor, P., Rohs, S., and Marsing, A.: Hemispheric differences in ozone across the stratosphere–troposphere exchange region, Atmos. Chem. Phys., 25, 8553–8573, https://doi.org/10.5194/acp-25-8553-2025, 2025.

Selz, T., Fischer, L., and Craig, G. C.: Structure Function Analysis of Water Vapor Simulated with a Convection-Permitting Model and Comparison to Airborne Lidar Observations, J. Atmos. Sci., 74, 1201 – 1210, https://doi.org/10.1175/JAS-D-16-0160.1, 2017.

Shcherbakov, V., Jourdan, O., Voigt, C., Gayet, J.-F., Chauvigne, A., Schwarzenboeck, A., Minikin, A., Klingebiel, M., Weigel, R., Borrmann, S., Jurkat, T., Kaufmann, S., Schlage, R., Gourbeyre, C., Febvre, G., Lapyonok, T., Frey, W., Molleker, S., and Weinzierl, B.: Porous aerosol in degassing plumes of Mt. Etna and Mt. Stromboli, Atmos. Chem. Phys., 16, 11 883–11 897, https://doi.org/10.5194/acp-16-11883-2016, 2016.

Shrivastava, M., Rasool, Q., Zhao, B., Octaviani, M., Zaveri, R., Zelenyuk, A., Gaudet, B., Liu, Y., Shilling, J., Schneider, J., Schulz, C., Zoeger, M., Martin, S., Ye, J., Guenther, A., Souza, R., Wendisch, M., and Pöschl, U.: Tight Coupling of Surface and In-Plant Biochemistry and Convection Governs Key Fine Particulate Components over the Amazon Rainforest, ACS Earth Space Chem., https://doi.org/10.1021/acsearthspacechem.1c00356, 2022.

Shrivastava, M., Fan, J., Zhang, Y., Rasool, Q. Z., Zhao, B., Shen, J., Pierce, J. R., Jathar, S. H., Akherati, A., Zhang, J., Zaveri, R. A., Gaudet, B., Liu, Y., Andreae, M. O., Pohlker, M. L., Donahue, N. M., Wang, Y., and Seinfeld, J. H.: Intense formation of secondary ultrafine particles from Amazonian vegetation fires and their invigoration of deep clouds and precipitation, One Earth, 7, https://doi.org/10.1016/j.oneear.2024.05.015, 2024.

Smoydzin, L. and Hoor, P.: Contribution of Asian emissions to upper tropospheric CO over the remote Pacific, Atmos. Chem. Phys., 22, 7193–7206, https://doi.org/10.5194/acp-22-7193-2022, 2022.

Smoydzin, L., Bense, V., Bozem, H., Joppe, P., Kunkel, D., Lachnitt, H.-C., Tost, H., Zahn, A., Ziereis, H., Riese, M., and Hoor, P.: Impact of South American biomass burning emissions on elevated South Atlantic upper tropospheric ozone, Atmos. Chem. Phys., 26, 11 857–11 874, https://doi.org/10.5194/acp-26-11857-2026, 2026.

Soloff, C., Ajayi, T., Choi, Y., Crosbie, E. C., DiGangi, J. P., Diskin, G. S., Fenn, M. A., Ferrare, R. A., Gallo, F., Hair, J. W., Hilario, M. R. A., Kirschler, S., Moore, R. H., Shingler, T. J., Shook, M. A., Thornhill, K. L., Voigt, C., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Bridging gas and aerosol properties between the northeastern US and Bermuda: analysis of eight transit flights, Atmos. Chem. Phys., 24, 10 385–10 408, https://doi.org/10.5194/acp-24-10385-2024, 2024.

Soloff, C., Crosbie, E. C., Diskin, G. S., Gao, L., Kirschler, S., Lenhardt, E. D., Moore, R. H., Redemann, J., Shook, M. A., Tang, S., Thornhill, K. L., Voigt, C., Wang, H., Winstead, E. L., Ziemba, L. D., and Sorooshian, A.: Cloud Condensation Nuclei Behavior and Closure Assessment for the Northwest Atlantic Ocean, ACS ES&T AIR, 2, 2388–2400, https://doi.org/10.1021/acsestair.5c00151, 2025.

Sommer, E., Almeida, J. a., Yu, W., Simon, M., Möller, F., Xenofontos, C., Pozzer, A., Zheng, Z., Bhattacharyya, N., Alfaouri, D., Atabakhsh, S., Baalbaki, R., Beckmann, H., Berntheusel, M., Bogert, P., Busato, M., Canagaratna, M., Caudillo-Plath, L., Chassaing, A., Cruz-Simbron, R., Dada, L., DeVivo, J., Duplissy, J., Gordon, H., Granzin, M., Schute, L. G., Hartl, H. G., Hirvensalo, E., Jacobshagen, A., Judmaier, B., Sebastian, M. K., Klebach, H., Koemets, P., Kohl, M., Konrat, R., Krüger, T., Kunkler, F., Kürten, A., Leiminger, M., Lietzke, C. J., Liu, L., Mauldin, R., Mentler, B., Morawiec, A., Müller, M., Petäjä, T., Pignatelli, A., Rato, P., Reinecke, T., Richter, S., Rörup, B., Ruhl, S., Russell, D. M., Scholz, W., Shen, J., Stinchfield, A., Thakur, R. C., Tong, Y., Top, J., Umo, N. S., Weissbacher, J., Yang, B., Zauner-Wieczorek, M., Zhang, J., Amorim, A., Baltensberger, U., Christoudias, T., Curtius, J., Donahue, N. M., El Haddad, I., Flagan, R. C., Hansel, A., Harder, H., He, X.-C., Junninen, H., Kulmala, M., Lehtipalo, K., Lelieveld, J., Möhler, O., Schobesberger, S., Tomé, A., Volkamer, R., Worsnop, D. R., Onnela, A., Winkler, P. M., and Kirkby, J.: Nucleation of α-pinene oxidation products with sulfuric acid, Environ. Sci.: Atmos., http://dx.doi.org/10.1039/D6EA00046K, 2026.

Sorooshian, A., Alexandrov, M. D., Bell, A. D., Bennett, R., Betito, G., Burton, S. P., Buzanowicz, M. E., Cairns, B., Chemyakin, E. V., Chen, G., Choi, Y., Collister, B. L., Cook, A. L., Corral, A. F., Crosbie, E. C., van Diedenhoven, B., DiGangi, J. P., Diskin, G. S., Dmitrovic, S., Edwards, E.-L., Fenn, M. A., Ferrare, R. A., van Gilst, D., Hair, J. W., Harper, D. B., Hilario, M. R. A., Hostetler, C. A., Jester, N., Jones, M., Kirschler, S., Kleb, M. M., Kusterer, J. M., Leavor, S., Lee, J. W., Liu, H., McCauley, K., Moore, R. H., Nied, J., Notari, A., Nowak, J. B., Painemal, D., Phillips, K. E., Robinson, C. E., Scarino, A. J., Schlosser, J. S., Seaman, S. T., Seethala, C., Shingler, T. J., Shook, M. A., Sinclair, K. A., Smith Jr, W. L., Spangenberg, D. A., Stamnes, S. A., Thornhill, K. L., Voigt, C., Voemel, H., Wasilewski, A. P., Wang, H., Winstead, E. L., Zeider, K., Zeng, X., Zhang, B., Ziemba, L. D., and Zuidema, P.: Spatially coordinated airborne data and complementary products for aerosol,gas, cloud, and meteorological studies: the NASA ACTIVATE dataset, Earth Syst. Sci. Data, 15, 3419–3472, https://doi.org/10.5194/essd-15-3419-2023, 2023.

Sorooshian, A., Siu, L. W., Butler, K., Brunke, M. A., Cairns, B., Chellappan, S., Chen, J., Choi, Y., Crosbie, E. C., Cutler, L., DiGangi, J. P., Diskin, G. S., Ferrare, R. A., Hair, J. W., Hostetler, C. A., Kirschler, S., Kleb, M. M., Li, X.-Y., Liu, H., McComiskey, A., Namdari, S., Painemal, D., Schlosser, J. S., Shingler, T., Shook, M. A., Silva, S., Sinclair, K., Smith, Jr., W. L., Soloff, C., Stamnes, S., Tang, S., Thornhill, K. L., Tornow, F., Tselioudis, G., Van Diedenhoven, B., Voigt, C., Voemel, H., Wang, H., Winstead, E. L., Xu, Y., Zeng, X., Zhang, B., Ziemba, L., and Zuidema, P.: The NASA ACTIVATE Mission, Bull. Amer. Meteorol. Soc., 106, E1517–E1538, https://doi.org/10.1175/BAMS-D-24-0136.s1, 2025.

Sourdeval, O., Gryspeerdt, E., Krämer, M., Goren, T., Delanoë, J., Afchine, A., Hemmer, F., and Quaas, J.: Ice crystal number concentration estimates from lidar–radar satellite remote sensing – Part 1: Method and evaluation, Atmos. Chem. Phys., 18, 14 327–14 350, https://doi.org/10.5194/acp-18-14327-2018, 2018.

Spiegel, J. K., Buchmann, N., Mayol-Bracero, O. L., Cuadra Rodríguez, L. A., Valle Díaz, C. J., Prather, K. A., Mertes, S., and Eugster, W.: Do cloud properties in a Puerto Rican tropical montane cloud forest depend on occurrence of long-range transported African dust?, Pure Appl. Geophys., 171, 2443–2459, https://doi.org/10.1007/s00024-014-0830-y, 2014.

Stegmann, P., Tropea, C., Järvinen, E., and Schnaiter, M.: Comparison of measured and computed phase functions of individual tropospheric ice crystals, J. Quant. Spectrosc. Radiat. Transf., 178, 379–389, https://doi.org/10.1016/j.jqsrt.2015.12.019, 2016.

Stevens, B., Farrell, D., Hirsch, L., Jansen, F., Nuijens, L., Serikov, I., Brügmann, B., Forde, M., Linne, H., Lonitz, K., and Prospero, J. M.: The Barbados Cloud Observatory: Anchoring Investigations of Clouds and Circulation on the Edge of the ITCZ, Bull. Amer. Meteorol. Soc., 97, 787–801, https://doi.org/10.1175/BAMS-D-14-00247.1, 2016.

Stevens, B., Brogniez, H., Kiemle, C., Lacour, J. L., Crevoisier, C., and Kiliani, J.: Structure and dynamical influence of water vapor in the lower tropical troposphere., Surv. Geophys., 38, 1371–1397, https://doi.org/10.1007/s10712-017-9420-8, 2017.

Stevens, B., Ament, F., Bony, S., Crewell, S., Ewald, F., Gross, S., Hansen, A., Hirsch, L., Jacob, M., Kölling, T., Konow, H., Mayer, B., Wendisch, M., Wirth, M., Wolf, K., Bakan, S., Bauer-Pfundstein, M., Brueck, M., Delanoë, J., Ehrlich, A., Farrell, D., Forde, M., Gödde, F., Grob, H., Hagen, M., Jäkel, E., Jansen, F., Klepp, C., Klingebiel, M., Mech, M., Peters, G., Rapp, M., Wing, A. A., and Zinner, T.: A High-Altitude Long-Range Aircraft Configured as a Cloud Observatory: The NARVAL Expeditions, Bull. Amer. Meteorol. Soc., 100, 1061–1077, https://doi.org/10.1175/BAMS-D-18-0198.1, 2019.

Stevens, B., Bony, S., Farrell, D., Ament, F., Blyth, A., Fairall, C., Karstensen, J., Quinn, P. K., Speich, S., Acquistapace, C., Aemisegger, F., Albright, A. L., Bellenger, H., Bodenschatz, E., Caesar, K.-A., Chewitt-Lucas, R., de Boer, G., Delanoë, J., Denby, L., Ewald, F., Fildier, B., Forde, M., George, G., Gross, S., Hagen, M., Hausold, A., Heywood, K. J., Hirsch, L., Jacob, M., Jansen, F., Kinne, S., Klocke, D., Kölling, T., Konow, H., Lothon, M., Mohr, W., Naumann, A. K., Nuijens, L., Olivier, L., Pincus, R., Pöhlker, M., Reverdin, G., Roberts, G., Schnitt, S., Schulz, H., Siebesma, A. P., Stephan, C. C., Sullivan, P., Touzé-Peiffer, L., Vial, J., Vogel, R., Zuidema, P., Alexander, N., Alves, L., Arixi, S., Asmath, H., Bagheri, G., Baier, K., Bailey, A., Baranowski, D., Baron, A., Barrau, S., Barrett,

P. A., Batier, F., Behrendt, A., Bendinger, A., Beucher, F., Bigorre, S., Blades, E., Blossey, P., Bock, O., Böing, S., Bosser, P., Bourras, D., Bouruet-Aubertot, P., Bower, K., Branellec, P., Branger, H., Brennek, M., Brewer, A., Brilouet, P.-E., Brügmann, B., Buehler, S. A., Burke, E., Burton, R., Calmer, R., Canonici, J.-C., Carton, X., Cato Jr., G., Charles, J. A., Chazette, P., Chen, Y., Chilinski, M. T., Choularton, T., Chuang, P., Clarke, S., Coe, H., Cornet, C., Coutris, P., Couvreux, F., Crewell, S., Cronin, T., Cui, Z., Cuypers, Y., Daley, A., Damerell, G. M., Dauhut, T., Deneke, H., Desbios, J.-P., Dörner, S., Donner, S., Douet, V., Drushka, K., Dütsch, M., Ehrlich, A., Emanuel, K., Emmanouilidis, A., Etienne, J.-C., Etienne-Leblanc, S., Faure, G., Feingold, G., Ferrero, L., Fix, A., Flamant, C., Flatau, P. J., Foltz, G. R., Forster, L., Furtuna, I., Gadian, A., Galewsky, J., Gallagher, M., Gallimore, P., Gaston, C., Gentemann, C., Geyskens, N., Giez, A., Gollop, J., Gouirand, I., Gourbeyre, C., de Graaf, D., de Groot, G. E., Grosz, R., Güttler, J., Gutleben, M., Hall, K., Harris, G., Helfer, K. C., Henze, D., Herbert, C., Holanda, B., Ibanez-Landeta, A., Intrieri, J., Iyer, S., Julien, F., Kalesse, H., Kazil, J., Kellman, A., Kidane, A. T., Kirchner, U., Klingebiel, M., Körner, M., Kremper, L. A., Kretzschmar, J., Krüger, O., Kumala, W., Kurz, A., L'Hégaret, P., Labaste, M., Lachlan-Cope, T., Laing, A., Landschützer, P., Lang, T., Lange, D., Lange, I., Laplace, C., Lavik, G., Laxenaire, R., Le Bihan, C., Leandro, M., Lefevre, N., Lena, M., Lenschow, D., Li, Q., Lloyd, G., Los, S., Losi, N., Lovell, O., Luneau, C., Makuch, P., Malinowski, S., Manta, G., Marinou, E., Marsden, N., Masson, S., Maury, N., Mayer, B., Mayers-Als, M., Mazel, C., McGeary, W., McWilliams, J. C., Mech, M., Mehlmann, M., Meroni, A. N., Mieslinger, T., Minikin, A., Minnett, P., Möller, G., Morfa Avalos, Y., Muller, C., Musat, I., Napoli, A., Neuberger, A., Noisel, C., Noone, D., Nordsiek, F., Nowak, J. L., Oswald, L., Parker, D. J., Peck, C., Person, R., Philippi, M., Plueddemann, A., Pöhlker, C., Pörtge, V., Pöschl, U., Pologne, L., Posyniak, M., Prange, M., Quiñones Meléndez, E., Radtke, J., Ramage, K., Reimann, J., Renault, L., Reus, K., Reyes, A., Ribbe, J., Ringel, M., Ritschel, M., Rocha, C. B., Rochetin, N., Röttenbacher, J., Rollo, C., Royer, H., Sadoulet, P., Saffin, L., Sandiford, S., Sandu, I., Schäfer, M., Schemann, V., Schirmacher, I., Schlenczek, O., Schmidt, J., Schröder, M., Schwarzenboeck, A., Sealy, A., Senff, C. J., Serikov, I., Shohan, S., Siddle, E., Smirnov, A., Späth, F., Spooner, B., Stolla, M. K., Szkółka, W., de Szoeke, S. P., Tarot, S., Tetoni, E., Thompson, E., Thomson, J., Tomassini, L., Totems, J., Ubele, A. A., Villiger, L., von Arx, J., Wagner, T., Walther, A., Webber, B., Wendisch, M., Whitehall, S., Wiltshire, A., Wing, A. A., Wirth, M., Wiskandt, J., Wolf, K., Worbes, L., Wright, E., Wulfmeyer, V., Young, S., Zhang, C., Zhang, D., Ziemen, F., Zinner, T., and Zöger, M.: EUREC^{4}A, Earth Syst. Sci. Data, 13, 4067–4119, https://doi.org/10.5194/essd-13-4067-2021, 2021.

Stevens, B., Bony, S., Gross, S., Klocke, D., Windmiller, J. M., Wing, A. A., von Bismarck, J., Brito, E., David, R. O., Delanoë, J., Farrell, D., and Wu, Y.: ORCESTRA: Organized Convection and Earth-CARE Studies over the Tropical Atlantic, Tellus, 79, 35–52, https://doi.org/10.16993/tellus.4123, 2026.

Swolkień, J., Fix, A., and Gałkowski, M.: Factors influencing the temporal variability of atmospheric methane emissions from Upper Silesia coal mines: a case study from the CoMet mission, Atmos. Chem. Phys., 22, 16 031–16 052, https://doi.org/10.5194/acp-22-16031-2022, 2022.

Tang, S., Wang, H., Li, X.-Y., Chen, J., Sorooshian, A., Zeng, X., Crosbie, E., Thornhill, K. L., Ziemba, L. D., and Voigt, C.: Understanding aerosol–cloud interactions using a single-column model for a cold-air outbreak case during the ACTIVATE campaign, Atmos. Chem. Phys., 24, 10 073–10 092, https://doi.org/10.5194/acp-24-10073-2024, 2024.

Teoh, R., Schumann, U., Voigt, C., Schripp, T., Shapiro, M., Engberg, Z., Molloy, J., Koudis, G., and Stettler, M. E. J.: Targeted Use of Sustainable Aviation Fuel to Maximize Climate Benefits, Environ. Sci. Technol., 56, 17 246–17 255, https://doi.org/10.1021/acs.est.2c05781, pMID: 36394538, 2022.

Tilgner, A., Schöne, L., Bräuer, P., van Pinxteren, D., Hoffmann, E., Spindler, G., Styler, S. A., Mertes, S., Birmili, W., Otto, R., Merkel, M., Weinhold, K., Wiedensohler, A., Deneke, H., Schrödner, R., Wolke, R., Schneider, J., Haunold, W., Engel, A., Wéber, A., and Herrmann, H.: Comprehensive assessment of meteorological conditions and airflow connectivity during HCCT-2010, Atmos. Chem. Phys., 14, 9105–9128, https://doi.org/10.5194/acp-14-9105-2014, 2014.

Tomsche, L., Marsing, A., Jurkat-Witschas, T., Lucke, J., Kaufmann, S., Kaiser, K., Schneider, J., Scheibe, M., Schlager, H., Röder, L., Fischer, H., Obersteiner, F., Zahn, A., Zöger, M., Lelieveld,

J., and Voigt, C.: Enhanced sulfur in the upper troposphere and lower stratosphere in spring 2020, Atmos. Chem. Phys., 22, 15 135–15 151, https://doi.org/10.5194/acp-22-15135-2022, 2022.

Tornow, F., Ackerman, A. S., Fridlind, A. M., Cairns, B., Crosbie, E. C., Kirschler, S., Moore, R. H., Painemal, D., Robinson, C. E., Seethala, C., Shook, M. A., Voigt, C., Winstead, E. L., Ziemba, L. D., Zuidema, P., and Sorooshian, A.: Dilution of Boundary Layer Cloud Condensation Nucleus Concentrations by Free Tropospheric Entrainment During Marine Cold Air Outbreaks, Geophys. Res. Lett., 49, e2022GL098 444, https://doi.org/10.1029/2022GL098444, 2022.

Tornow, F., Crosbie, E. C., Fridlind, A. M., Ackerman, A. S., Ziemba, L. D., Elsaesser, G., Cairns, B., Painemal, D., Chellappan, S., Zuidema, P., Voigt, C., Kirschler, S., and Sorooshian, A.: High Accumulation Mode Aerosol Concentration and Moderate Aerosol Hygroscopicity Limit Impacts of Recent Particle Formation on Northwest Atlantic Post-Frontal Clouds, Geophys. Res. Lett., 52, https://doi.org/10.1029/2025GL116020, 2025a.

Tornow, F., Fridlind, A., Tselioudis, G., Cairns, B., Ackerman, A., Chellappan, S., Painemal, D., Zuidema, P., Voigt, C., Kirschler, S., and Sorooshian, A.: Measurement report: A survey of meteorological and cloud properties during ACTIVATE's postfrontal flights and their suitability for Lagrangian case studies, Atmos. Chem. Phys., 25, 5053–5074, https://doi.org/10.5194/acp-25-5053-2025, 2025b.

Tricoli, U., Vochezer, P., and Pfeilsticker, K.: Transition operator calculation with the Green's dyadic technique for electromagnetic scattering: A numerical approach using the Dyson equation, J. Quant. Spectrosc. Radiat. Transf., 162, 77–88, https://doi.org/10.1016/j.jqsrt.2015.04.006, 2015.

Tripathi, N., Krumm, B. E., Edtbauer, A., Ringsdorf, A., Wang, N., Kohl, M., Vella, R., Machado, L. A. T., Pozzer, A., Lelieveld, J., and Williams, J.: Impacts of convection, chemistry, and forest clearing on biogenic volatile organic compounds over the Amazon, Nat. Commun., 16, https://doi.org/10.1038/s41467-025-59953-2, 2025.

Umbarkar, M., Kunkel, D., Miltenberger, A., Lachnitt, H.-C., Kaluza, T., Schwenk, C., and Hoor, P.: Evidence of gravity wave contribution to vertical shear and mixing in the lower stratosphere, Atmos. Chem. Phys., 26, 12 067–12 096, https://doi.org/10.5194/acp-26-12067-2026, 2026.

Ungermann, J.: Improving retrieval quality for airborne limb sounders by horizontal regularisation, Atmos. Meas. Tech., 6, 15–32, https://doi.org/10.5194/amt-6-15-2013, 2013.

Ungermann, J., Blank, J., Dick, M., Ebersoldt, A., Friedl-Vallon, F., Giez, A., Guggenmoser, T., Höpfner, M., Jurkat, T., Kaufmann, M., Kaufmann, S., Kleinert, A., Krämer, M., Latzko, T., Oelhaf, H., Olchewski, F., Preusse, P., Rolf, C., Schillings, J., Suminska-Ebersoldt, O., Tan, V., Thomas, N., Voigt, C., Zahn, A., Zöger, M., and Riese, M.: Level 2 processing for the imaging Fourier transform spectrometer GLORIA: derivation and validation of temperature and trace gas volume mixing ratios from calibrated dynamics mode spectra, Atmos. Meas. Tech., 8, 2473–2489, https://doi.org/10.5194/amt-8-2473-2015, 2015.

Ungermann, J., Bartolome, I., Grießbach, S., Spang, R., Rolf, C., Krämer, M., Höpfner, M., and Riese, M.: Cirrus cloud shape detection by tomographic extinction retrievals from infrared limb emission sounder measurements, Atmos. Meas. Tech., 13, 7025–7045, https://doi.org/10.5194/amt-13-7025-2020, 2020.

Ungermann, J., Kleinert, A., Maucher, G., Bartolomé, I., Friedl-Vallon, F., Johansson, S., Krasauskas, L., and Neubert, T.: Quantification and mitigation of the instrument effects and uncertainties of the airborne limb imaging FTIR GLORIA, Atmos. Meas. Tech., 15, 2503–2530, https://doi.org/10.5194/amt-15-2503-2022, 2022.

Urbanek, B., Groß, S., Schäfler, A., and Wirth, M.: Determining stages of cirrus evolution: a cloud classification scheme, Atmos. Meas. Tech., 10, 1653–1664, https://doi.org/10.5194/amt-10-1653-2017, 2017.

Urbanek, B., Groß, S., Wirth, M., Rolf, C., Krämer, M., and Voigt, C.: High Depolarization Ratios of Naturally Occurring Cirrus Clouds Near Air Traffic Regions Over Europe, Geophys. Res. Lett., 45, 13 166—-13 172, https://doi.org/10.1029/2018GL079345, 2018.

van Pinxteren, D., Fomba, K. W., Mertes, S., Müller, K., Spindler, G., Schneider, J., Lee, T., Collett, J. L., and Herrmann, H.: Cloud water composition during HCCT-2010: Scavenging efficiencies, solute concentrations, and droplet size dependence of inorganic ions and dissolved organic carbon, Atmos. Chem. Phys., 16, 3185–3205, https://doi.org/10.5194/acp-16-3185-2016, 2016.

Vochezer, P., Järvinen, E., Wagner, R., Kupiszewski, P., Leisner, T., and Schnaiter, M.: In situ characterization of mixed phase clouds using the Small Ice Detector and the Particle Phase Discriminator, Atmos. Meas. Tech., 9, 159–177, https://doi.org/10.5194/amt-9-159-2016, 2016.

Vogel, B., Günther, G., Müller, R., Grooß, J.-U., Hoor, P., Krämer, M., Müller, S., Zahn, A., and Riese, M.: Fast transport from Southeast Asia boundary layer sources to northern Europe: rapid uplift in typhoons and eastward eddy shedding of the Asian monsoon anticyclone, Atmos. Chem. Phys., 14, 12 745–12 762, https://doi.org/10.5194/acp-14-12745-2014, 2014.

Vogel, B., Günther, G., Müller, R., Grooß, J.-U., and Riese, M.: Impact of different Asian source regions on the composition of the Asian monsoon anticyclone and of the extratropical lowermost stratosphere, Atmos. Chem. Phys., 15, 13 699–13 716, https://doi.org/10.5194/acp-15-13699-2015, 2015.

Vogel, B., Günther, G., Müller, R., Grooß, J.-U., Afchine, A., Bozem, H., Hoor, P., Krämer, M., Müller, S., Riese, M., Rolf, C., Spelten, N., Stiller, G. P., Ungermann, J., and Zahn, A.: Long-range transport pathways of tropospheric source gases originating in Asia into the northern lower stratosphere during the Asian monsoon season 2012, Atmos. Chem. Phys., 16, 15 301–15 325, https://doi.org/10.5194/acp-16-15301-2016, 2016.

Vogel, B., Müller, R., Günther, G., Spang, R., Hanumanthu, S., Li, D., Riese, M., and Stiller, G. P.: Lagrangian simulations of the transport of young air masses to the top of the Asian monsoon anticyclone and into the tropical pipe, Atmos. Chem. Phys., 19, 6007–6034, https://doi.org/10.5194/acp-19-6007-2019, 2019.

Vogel, B., Lauther, V., Köllner, F., Ekinci, F., Rolf, C., Strobel, J., van Luijt, R., Volk, C. M., Borrmann, S., Dragoneas, A., Eppers, O., Molleker, S., Hoor, P., Ort, L., Weyland, F., Zahn, A., Clemens, J., Günther, G., Kachula, O., Müller, R., Ploeger, F., and Riese, M.: Continental and marine source regions contributing to the outflow of the Asian summer monsoon anticyclone during the PHILEAS campaign in summer 2023, Atmos. Chem. Phys., 26, 6283–6319, https://acp.copernicus.org/articles/26/6283/2026/, 2026.

Vogel, R., Konow, H., Schulz, H., and Zuidema, P.: A climatology of trade-wind cumulus cold pools and their link to mesoscale cloud organization, Atmos. Chem. Phys., 21, 16 609–16 630, https://doi.org/10.5194/acp-21-16609-2021, 2021.

Voigt, C., Schumann, U., Jurkat, T., Schäuble, D., Schlager, H., Petzold, A., Gayet, J.-F., Krämer, M., Schneider, J., Borrmann, S., Schmale, J., Jessberger, P., Hamburger, T., Lichtenstern, M., Scheibe, M., Gourbeyre, C., Meyer, J., Kübbeler, M., Frey, W., Kalesse, H., Butler, T., Lawrence, M. G., Holzäpfel, F., Arnold, F., Wendisch, M., Döpelheuer, A., Gottschaldt, K., Baumann, R., Zöger, M., Sölch, I., Rautenhaus, M., and Dörnbrack, A.: In-situ observations of young contrails - Overview and selected case studies from the CONCERT campaign, Atmos. Chem. Phys., 10, 9039–9056, https://doi.org/10.5194/acp-10-9039-2010, 2010.

Voigt, C., Schumann, U., Jessberger, P., Jurkat, T., Petzold, A., Gayet, J.-F., Krämer, M., Thornberry, T., and Fahey, D.: Extinction and optical depth of contrails, Geophys. Res. Lett., 38, https://doi.org/10.1029/2011GL047189, 2011.

Voigt, C., Jeßberger, P., Jurkat, T., Kaufmann, S., Baumann, R., Schlager, H., Bobrowski, N., Guffirda, G., and Salerno, G.: Evolution of CO_2, SO_2, HCl and HNO_3 in the volcanic plumes from Etna, Geophys. Res. Lett., 41, 2196–2203, https://doi.org/10.1002/2013GL058974, 2014.

Voigt, C., Schumann, U., Minikin, A., Abdelmonem, A., Afchine, A., Borrmann, S., Boettcher, M., Buchholz, B., Bugliaro, L., Costa, A., Curtius, J., Dollner, M., Dörnbrack, A., Dreiling, V., Ebert, V., Ehrlich, A., Fix, A., Forster, L., Frank, F., Fütterer, D., Giez, A., Graf, K., Grooß, J.-U., Groß, S., Heinold, B., Hüneke, T., Järvinen, E., Jurkat, T., Kaufmann, S., Kenntner, M., Klingebiel, M., Klimach, T., Kohl, R., Krämer, M., Krisna, T. C., Luebke, A., Mayer, B., Mertes, S., Molleker, S., Petzold, A., Pfeilsticker, K., Port, M., Rapp, M., Reutter, P., Rolf, C., Rose, D., Sauer, D., Schäfler, A., Schlage, R., Schnaiter, M., Schneider, J., Spelten, N., Spichtinger, P., Stock, P., Weigel, R., Weinzierl, B., Wendisch, M., Werner, F., Wernli, H., Wirth, M., Zahn, A., Ziereis, H., and Zöger, M.: ML-CIRRUS: The Airborne Experiment on Natural Cirrus and Contrail Cirrus with the High-Altitude Long-Range Research Aircraft HALO, Bull. Amer. Meteorol. Soc., 98, 271–288, https://doi.org/10.1175/BAMS-D-15-00213.1, 2017.

Voigt, C., Dörnbrack, A., Wirth, M., Groß, S. M., Pitts, M. C., Poole, L. R., Baumann, R., Ehard, B., Sinnhuber, B.-M., Woiwode, W., and Oelhaf, H.: Widespread polar stratospheric ice clouds in the

2015–2016 Arctic winter – implications for ice nucleation, Atmos. Chem. Phys., 18, 15 623–15 641, https://doi.org/10.5194/acp-18-15623-2018, 2018.

Voigt, C., Kleine, J., Sauer, D., Moore, R. H., Bräuer, T., Clercq, P. L., Kaufmann, S., Scheibe, M., Jurkat-Witschas, T., Aigner, M., Bauder, U., Boose, Y., Borrmann, S., Crosbie, E., Diskin, G. S., DiGangi, J., Hahn, V., Heckl, C., Huber, F., Nowak, J. B., Rapp, M., Rauch, B., Robinson, C., Schripp, T., Shook, M., Winstead, E., Ziemba, L., Schlager, H., and Anderson, B. E.: Cleaner burning aviation fuels can reduce contrail cloudiness, Nat. Commun. Earth Environ., https://doi.org/10.1038/s43247-021-00174-y, 2021.

Voigt, C., Lelieveld, J., Schlager, H., Schneider, J., Curtius, J., Meerkötter, R., Sauer, D., Bugliaro, L., Bohn, B., Crowley, J. N., Erbertseder, T., Groß, S., Hahn, V., Li, Q., Mertens, M., Pöhlker, M. L., Pozzer, A., Schumann, U., Tomsche, L., Williams, J., Zahn, A., Andreae, M., Borrmann, S., Bräuer, T., Dörich, R., Dörnbrack, A., Edtbauer, A., Ernle, L., Fischer, H., Giez, A., Granzin, M., Grewe, V., Harder, H., Heinritzi, M., Holanda, B. A., Jöckel, P., Kaiser, K., Krüger, O. O., Lucke, J., Marsing, A., Martin, A., Matthes, S., Pöhlker, C., Pöschl, U., Reifenberg, S., Ringsdorf, A., Scheibe, M., Tadic, I., Zauner-Wieczorek, M., Henke, R., and Rapp, M.: Cleaner Skies during the COVID-19 Lockdown, Bull. Amer. Meteorol. Soc., 103, E1796 – E1827, https://doi.org/10.1175/BAMS-D-21-0012.1, 2022.

Voigt, C., Märkl, R., Sauer, D., Dischl, R., Renard, C., Seeliger, K., Yu, F., Kaufmann, S., Bräuer, T., Jurkat-Witschas, T., Chenadec, G. L., Moreau, J., Requena-Esteban, E., Bonne, N., Vals, M., Roche, A., Zelina, J., Dörnbrack, A., Eirenschmalz, L., Heckl, C., Horst, E., Lichtenstern, M., Marsing, A., Neumann, G., Roiger, A., Scheibe, M., Stock, P., Giez, A., Eckel, G., and Le Clercq, P.: Substantial aircraft contrail formation atlow soot emission levels, Nature, 652, 112–118, https://doi.org/10.1038/s41586-026-10286-0, 2026.

Volkmer, L., Kölling, T., Zinner, T., and Mayer, B.: Consideration of the cloud motion for aircraft-based stereographically derived cloud geometry and cloud top heights, Atmos. Meas. Tech., 17, 6807–6817, https://doi.org/10.5194/amt-17-6807-2024, 2024a.

Volkmer, L., Pörtge, V., Jakub, F., and Mayer, B.: Model-based evaluation of cloud geometry and droplet size retrievals from two-dimensional polarized measurements of specMACS, Atmos. Meas. Tech., 17, 1703–1719, https://doi.org/10.5194/amt-17-1703-2024, 2024b.

Voss, K., Vogel, B., Diederich, T., Engel, A., Grooß, J.-U., Keber, T., Kluge, F., Rotermund, M. K., Schuck, T., Weyland, B., Butz, A., and Pfeilsticker, K.: Tropical Cyclones Drive Enhanced Inorganic Iodine in the Mid-Latitude Upper Troposphere, Geophys. Res. Lett., 53, e2025GL120 749, https://doi.org/10.1029/2025GL120749, e2025GL120749 2025GL120749, 2026.

Wagenhäuser, T., Jesswein, M., Keber, T., Schuck, T., and Engel, A.: Mean age from observations in the lowermost stratosphere: an improved method and interhemispheric differences, Atmos. Chem. Phys., 23, 3887–3903, https://doi.org/10.5194/acp-23-3887-2023, 2023.

Waitz, F., Schnaiter, M., Leisner, T., and Järvinen, E.: In situ observation of riming in mixed-phase clouds using the PHIPS probe, Atmos. Chem. Phys., 22, 7087–7103, https://doi.org/10.5194/acp-22-7087-2022, 2022.

Walbröl, A., Michaelis, J., Becker, S., Dorff, H., Ebell, K., Gorodetskaya, I., Heinold, B., Kirbus, B., Lauer, M., Maherndl, N., Maturilli, M., Mayer, J., Müller, H., Neggers, R. A. J., Paulus, F. M., Röttenbacher, J., Rückert, J. E., Schirmacher, I., Slättberg, N., Ehrlich, A., Wendisch, M., and Crewell, S.: Contrasting extremely warm and long-lasting cold air anomalies in the North Atlantic sector of the Arctic during the HALO-$(\mathcal{AC})^3$ campaign, Atmos. Chem. Phys., 24, 8007–8029, https://doi.org/10.5194/acp-24-8007-2024, 2024.

Wang, Z., Bugliaro, L., Jurkat-Witschas, T., Heller, R., Burkhardt, U., Ziereis, H., Dekoutsidis, G., Wirth, M., Groß, S., Kirschler, S., Kaufmann, S., and Voigt, C.: Observations of microphysical properties and radiative effects of a contrail cirrus outbreak over the North Atlantic, Atmos. Chem. Phys., 23, 1941–1961, https://doi.org/10.5194/acp-23-1941-2023, 2023.

Wang, Z., Bugliaro, L., Gierens, K., Hegglin, M. I., Rohs, S., Petzold, A., Kaufmann, S., and Voigt, C.: Machine learning for improvement of upper-tropospheric relative humidity in ERA5 weather model data, Atmos. Chem. Phys., 25, 2845–2861, https://doi.org/10.5194/acp-25-2845-2025, 2025.

Weber, A., Kölling, T., Pörtge, V., Baumgartner, A., Rammeloo, C., Zinner, T., and Mayer, B.: Polar-

ization upgrade of specMACS: calibration and characterization of the 2D RGB polarization-resolving cameras, Atmos. Meas. Tech., 17, 1419–1439, https://doi.org/10.5194/amt-17-1419-2024, 2024.

Weber, A., Köcher, G., and Mayer, B.: Parameterization of 3D cloud geometry and a neural-network-based fast forward operator for polarized radiative transfer, Atmos. Meas. Tech., 18, 5805–5821, https://doi.org/10.5194/amt-18-5805-2025, 2025a.

Weber, A., Pörtge, V., Emde, C., and Mayer, B.: Retrieval of cloud thermodynamic phase partitioning from multi-angle polarimetric imaging of Arctic mixed-phase clouds, Atmos. Meas. Tech., 18, 7581–7601, https://doi.org/10.5194/amt-18-7581-2025, 2025b.

Weber, A., Hoffmann, F., and Mayer, B.: Quasi-Lagrangian observations of cloud transitions during the initial phase of marine cold air outbreaks in the Arctic – Part 2: Vertical cloud structure, Atmos. Chem. Phys., 26, 8001–8020, https://doi.org/10.5194/acp-26-8001-2026, 2026a.

Weber, A., Kirbus, B., Wendisch, M., and Mayer, B.: Quasi-Lagrangian observations of cloud transitions during the initial phase of marine cold air outbreaks in the Arctic – Part 1: Temporal and spatial evolution, Atmos. Chem. Phys., 26, 3521–3540, https://doi.org/10.5194/acp-26-3521-2026, 2026b.

Weger, M., Heinold, B., Engler, C., Schumann, U., Seifert, A., Fößig, R., Voigt, C., Baars, H., Blahak, U., Borrmann, S., Hoose, C., Kaufmann, S., Krämer, M., Seifert, P., Senf, F., Schneider, J., and Tegen, I.: The impact of mineral dust on cloud formation during the Saharan dust event in April 2014 over Europe, Atmos. Chem. Phys., 18, 17 545–17 572, https://doi.org/10.5194/acp-18-17545-2018, 2018.

Weigel, R., Volk, C. M., Kandler, K., Hösen, E., Günther, G., Vogel, B., Grooß, J.-U., Khaykin, S., Belyaev, G. V., and Borrmann, S.: Enhancements of the refractory submicron aerosol fraction in the Arctic polar vortex: feature or exception?, Atmos. Chem. Phys., 14, 12 319–12 342, https://doi.org/10.5194/acp-14-12319-2014, 2014.

Weigel, R., Spichtinger, P., Mahnke, C., Klingebiel, M., Afchine, A., Petzold, A., Krämer, M., Costa, A., Molleker, S., Reutter, P., Szakäll, M., Port, M., Grulich, L., Jurkat, T., Minikin, A., and Borrmann, S.: Thermodynamic correction of particle concentrations measured by underwing probes on fast-flying aircraft, Atmos. Meas. Tech., 9, 5135–5162, https://doi.org/10.5194/amt-9-5135-2016, 2016.

Wendisch, M., Pöschl, U., Andreae, M. O., Machado, L. A. T., Albrecht, R., Schlager, H., Rosenfeld, D., Martin, S. T., Abdelmonem, A., Afchine, A., Araùjo, A. C., Artaxo, P., Aufmhoff, H., Barbosa, H. M. J., Borrmann, S., Braga, R., Buchholz, B., Cecchini, M. A., Costa, A., Curtius, J., Dollner, M., Dorf, M., Dreiling, V., Ebert, V., Ehrlich, A., Ewald, F., Fisch, G., Fix, A., Frank, F., Fütterer, D., Heckl, C., Heidelberg, F., Hüneke, T., Jäkel, E., Järvinen, E., Jurkat, T., Kanter, S., Kästner, U., Kenntner, M., Kesselmeier, J., Klimach, T., Knecht, M., Kohl, R., Kölling, T., Krämer, M., Krüger, M., Krisna, T. C., Lavric, J. V., Longo, K., Mahnke, C., Manzi, A. O., Mayer, B., Mertes, S., Minikin, S., Molleker, S., Münch, S., Nillius, B., Pfeilsticker, K., Pöhlker, C., Roiger, A., Rose, D., Rosenow, D., Sauer, D., Schnaiter, M., Schneider, J., Schulz, C., de Souza, R. A. F., Spanu, A., Stock, P., Vila, D., Voigt, C., Walser, A., Walter, D., Weigel, R., Weinzierl, B., Werner, F., Yamasoe, M. A., Ziereis, H., Zinner, T., and Zöger, M.: ACRIDICON-CHUVA Campaign: Studying Tropical Deep Convective Clouds and Precipitation over Amazonia Using the New German Research Aircraft HALO, Bull. Amer. Meteorol. Soc., 97, 1885–1908, https://doi.org/10.1175/BAMS-D-14-00255.1, 2016.

Wendisch, M., Handorf, D., Tegen, I., Neggers, A. J. R., and Spreen, G.: Glimpsing the ins and outs of the Arctic atmospheric cauldron, EOS, 102, https://doi.org/10.1029/2021EO155959, 2021.

Wendisch, M., Brückner, M., Crewell, S., Ehrlich, A., Notholt, J., Lüpkes, C., Macke, A., Burrows, J. P., Rinke, A., Quaas, J., Maturilli, M., Schemann, V., Shupe, M. D., Akansu, E. F., Barrientos-Velasco, C., Bärfuss, K., Blechschmidt, A.-M., Block, K., Bougoudis, I., Bozem, H., Böckmann, C., Bracher, A., Bresson, H., Bretschneider, L., Buschmann, M., Chechin, D. G., Chylik, J., Dahlke, S., Deneke, H., Dethloff, K., Donth, T., Dorn, W., Dupuy, R., Ebell, K., Egerer, U., Engelmann, R., Eppers, O., Gerdes, R., Gierens, R., Gorodetskaya, I. V., Gottschalk, M., Griesche, H., Gryanik, V. M., Handorf, D., Harm-Altstädter, B., Hartmann, J., Hartmann, M., Heinold, B., Herber, A., Herrmann, H., Heygster, G., Höschel, I., Hofmann, Z., Hölemann, J., Hünerbein, A., Jafariserajehlou, S., Jäkel, E., Jacobi, C., Janout, M., Jansen, F., Jourdan, O., Jurányi, Z., Kalesse-Los, H., Kanzow, T., Käthner, R., Kliesch,

L. L., Klingebiel, M., Knudsen, E. M., Kovács, T., Körtke, W., Krampe, D., Kretzschmar, J., Kreyling, D., Kulla, B., Kunkel, D., Lampert, A., Lauer, M., Lelli, L., von Lerber, A., Linke, O., Löhnert, U., Lonardi, M., Losa, S. N., Losch, M., Maahn, M., Mech, M., Mei, L., Mertes, S., Metzner, E., Mewes, D., Michaelis, J., Mioche, G., Moser, M., Nakoudi, K., Neggers, R., Neuber, R., Nomokonova, T., Oelker, J., Papakonstantinou-Presvelou, I., Pätzold, F., Pefanis, V., Pohl, C., van Pinxteren, M., Radovan, A., Rhein, M., Rex, M., Richter, A., Risse, N., Ritter, C., Rostosky, P., Rozanov, V. V., Donoso, E. R., Garfias, P. S., Salzmann, M., Schacht, J., Schäfer, M., Schneider, J., Schnierstein, N., Seifert, P., Seo, S., Siebert, H., Soppa, M. A., Spreen, G., Stachlewska, I. S., Stapf, J., Stratmann, F., Tegen, I., Viceto, C., Voigt, C., Vountas, M., Walbröl, A., Walter, M., Wehner, B., Wex, H., Willmes, S., Zanatta, M., and Zeppenfeld, S.: Atmospheric and Surface Processes, and Feedback Mechanisms Determining Arctic Amplification: A Review of First Results and Prospects of the (AC)3 Project, Bull. Amer. Meteorol. Soc., 104, E208 – E242, https://doi.org/10.1175/BAMS-D-21-0218.1, 2023.

Wendisch, M., Crewell, S., Ehrlich, A., Herber, A., Kirbus, B., Lüpkes, C., Mech, M., Abel, S. J., Akansu, E. F., Ament, F., Aubry, C., Becker, S., Borrmann, S., Bozem, H., Brückner, M., Clemen, H.-C., Dahlke, S., Dekoutsidis, G., Delanoë, J., De La Torre Castro, E., Dorff, H., Dupuy, R., Eppers, O., Ewald, F., George, G., Gorodetskaya, I. V., Grawe, S., Groß, S., Hartmann, J., Henning, S., Hirsch, L., Jäkel, E., Joppe, P., Jourdan, O., Jurányi, Z., Karalis, M., Kellermann, M., Klingebiel, M., Lonardi, M., Lucke, J., Luebke, A. E., Maahn, M., Maherndl, N., Maturilli, M., Mayer, B., Mayer, J., Mertes, S., Michaelis, J., Michalkov, M., Mioche, G., Moser, M., Müller, H., Neggers, R., Ori, D., Paul, D., Paulus, F. M., Pilz, C., Pithan, F., Pöhlker, M., Pörtge, V., Ringel, M., Risse, N., Roberts, G. C., Rosenburg, S., Röttenbacher, J., Rückert, J., Schäfer, M., Schaefer, J., Schemann, V., Schirmacher, I., Schmidt, J., Schmidt, S., Schneider, J., Schnitt, S., Schwarz, A., Siebert, H., Sodemann, H., Sperzel, T., Spreen, G., Stevens, B., Stratmann, F., Svensson, G., Tatzelt, C., Tuch, T., Vihma, T., Voigt, C., Volkmer, L., Walbröl, A., Weber, A., Wehner, B., Wetzel, B., Wirth, M., and Zinner, T.: Overview: quasi-Lagrangian observations of Arctic air mass transformations – introduction and initial results of the HALO–$(\mathcal{AC})^3$ aircraft campaign, Atmos. Chem. Phys., 24, 8865–8892, https://doi.org/10.5194/acp-24-8865-2024, 2024.

Wendisch, M., Kirbus, B., Ori, D., Shupe, M. D., Crewell, S., Sodemann, H., and Schemann, V.: Observed and modeled Arctic airmass transformations during warm air intrusions and cold air outbreaks, Atmos. Chem. Phys., 25, 15 047–15 076, https://doi.org/10.5194/acp-25-15047-2025, 2025.

Werner, B., Stutz, J., Spolaor, M., Scalone, L., Raecke, R., Festa, J., Colosimo, S. F., Cheung, R., Tsai, C., Hossaini, R., Chipperfield, M. P., Taverna, G. S., Feng, W., Elkins, J. W., Fahey, D. W., Gao, R.-S., Hintsa, E. J., Thornberry, T. D., Moore, F. L., Navarro, M. A., Atlas, E., Daube, B. C., Pittman, J., Wofsy, S., and Pfeilsticker, K.: Probing the subtropical lowermost stratosphere and the tropical upper troposphere and tropopause layer for inorganic bromine, Atmos. Chem. Phys., 17, 1161–1186, https://doi.org/10.5194/acp-17-1161-2017, 2017.

Wetzel, G., Friedl-Vallon, F., Glatthor, N., Grooß, J.-U., Gulde, T., Höpfner, M., Johansson, S., Khosrawi, F., Kirner, O., Kleinert, A., Kretschmer, E., Maucher, G., Nordmeyer, H., Oelhaf, H., Orphal, J., Piesch, C., Sinnhuber, B.-M., Ungermann, J., and Vogel, B.: Pollution trace gases C_2H_6, C_2H_2, HCOOH, and PAN in the North Atlantic UTLS: observations and simulations, Atmos. Chem. Phys., 21, 8213–8232, https://doi.org/10.5194/acp-21-8213-2021, 2021.

Weyland, B., Rosanka, S., Taraborrelli, D., Bohn, B., Zahn, A., Obersteiner, F., Förster, E., Mertens, M., Jöckel, P., Ziereis, H., Kaiser, K., Fischer, H., Crowley, J. N., Wang, N., Edtbauer, A., Williams, J., Andrés Hernández, M. D., Burrows, J. P., Kluge, F., Rotermund, M. K., Butz, A., and Pfeilsticker, K.: Airborne remote sensing of nitrous acid in the troposphere: potential sources of excess HONO, Atmos. Chem. Phys., 26, 6825–6856, https://doi.org/10.5194/acp-26-6825-2026, 2026.

Weyland, F., Hoor, P., Kunkel, D., Birner, T., Plöger, F., and Turhal, K.: Long-term changes in the thermodynamic structure of the lowermost stratosphere inferred from reanalysis data, Atmos. Chem. Phys., 25, 1227–1252, https://doi.org/10.5194/acp-25-1227-2025, 2025.

Whalley, L. K., Stone, D., George, I. J., Mertes, S., van Pinxteren, D., Tilgner, A., Herrmann, H., Evans, M. J., and Heard, D. E.: The influence of clouds on radical concentrations: Observations and modelling studies of HOx during the Hill Cap Cloud Thuringia (HCCT) campaign in 2010, Atmos. Chem. Phys., 15, 3289–3301, https://doi.org/10.5194/acp-15-3289-2015, 2015.

Woiwode, W., Sumińska-Ebersoldt, O., Oelhaf, H., Höpfner, M., Belyaev, G. V., Ebersoldt, A., Friedl-Vallon, F., Grooß, J.-U., Gulde, T., Kaufmann, M., Kleinert, A., Krämer, M., Kretschmer, E., Kulessa, T., Maucher, G., Neubert, T., Piesch, C., Preusse, P., Riese, M., Rongen, H., Sartorius, C., Schardt, G., Schönfeld, A., Schuettemeyer, D., Sha, M. K., Stroh, F., Ungermann, J., Volk, C. M., and Orphal, J.: Validation of first chemistry mode retrieval results from the new limb-imaging FTS GLORIA with correlative MIPAS-STR observations, Atmos. Meas. Tech., 8, 2509–2520, https://doi.org/10.5194/amt-8-2509-2015, 2015.

Woiwode, W., Dörnbrack, A., Bramberger, M., Friedl-Vallon, F., Haenel, F., Höpfner, M., Johansson, S., Kretschmer, E., Krisch, I., Latzko, T., Oelhaf, H., Orphal, J., Preusse, P., Sinnhuber, B.-M., and Ungermann, J.: Mesoscale fine structure of a tropopause fold over mountains, Atmos. Chem. Phys., 18, 15 643–15 667, https://doi.org/10.5194/acp-18-15643-2018, 2018.

Woiwode, W., Dörnbrack, A., Polichtchouk, I., Johansson, S., Harvey, B., Höpfner, M., Ungermann, J., and Friedl-Vallon, F.: Technical note: Lowermost-stratosphere moist bias in ECMWF IFS model diagnosed from airborne GLORIA observations during winter–spring 2016, Atmos. Chem. Phys., 20, 15 379–15 387, https://doi.org/10.5194/acp-20-15379-2020, 2020.

Woiwode, W., Dörnbrack, A., Geldenhuys, M., Friedl-Vallon, F., Giez, A., Gulde, T., Höpfner, M., Johansson, S., Kaifler, B., Kleinert, A., Krasauskas, L., Kretschmer, E., Maucher, G., Neubert, T., Nordmeyer, H., Piesch, C., Preusse, P., Rapp, M., Riese, M., Schumann, U., and Ungermann, J.: Non-Orographic Gravity Waves and Turbulence Caused by Merging Jet Streams, J. Geophys. Res.: Atmos., 128, e2022JD038 097, https://doi.org/10.1029/2022JD038097, 2023.

Wolf, K., Ehrlich, A., Hüneke, T., Pfeilsticker, K., Werner, F., Wirth, M., and Wendisch, M.: Potential of remote sensing of cirrus optical thickness by airborne spectral radiance measurements at different sideward viewing angles, Atmos. Chem. Phys., 17, 4283–4303, https://doi.org/10.5194/acp-17-4283-2017, 2017.

Wolf, K., Ehrlich, A., Jacob, M., Crewell, S., Wirth, M., and Wendisch, M.: Improvement of airborne retrievals of cloud droplet number concentration of trade wind cumulus using a synergetic approach, Atmos. Meas. Tech., 12, 1635–1658, https://doi.org/10.5194/amt-12-1635-2019, 2019.

Wolf, K., Ehrlich, A., Mech, M., Hogan, R. J., and Wendisch, M.: Evaluation of ECMWF Radiation Scheme Using Aircraft Observations of Spectral Irradiance above Clouds, J. Atmos. Sci., 77, 2665–2685, https://doi.org/10.1175/JAS-D-19-0333.1, 2020.

Wolff, S., Ehret, G., Kiemle, C., Amediek, A., Quatrevalet, M., Wirth, M., and Fix, A.: Determination of the emission rates of CO_2 point sources with airborne lidar, Atmos. Meas. Tech., 14, 2717–2736, https://doi.org/10.5194/amt-14-2717-2021, 2021.

Yu, L., Leng, G., Yao, L., Tang, Q., Wendisch, M., Qiu, J., Huang, S., Liao, X., and Peng, J.: Machine-learning emergent constraints on surface albedo feedback over Arctic land regions, Nat. Commun., 17, 5041, https://doi.org/10.1038/s41467-026-71779-0, 2026a.

Yu, W., Baalbaki, R., Shen, J., DeVivo, J., Caudillo-Plath, L., Sommer, E., Heitto, A., Klebach, H., Russell, D. M., Amorim, A., Beckmann, H., Bhattacharyya, N., Blankenship, V., Chassaing, A., Cruz-Simbron, R., Dada, L., Jacobshagen, A., Judmaier, B., Kaniyodical Sebastian, M., Konrat, R., Krüger, T., Kunkler, F., Lietzke, C. J., Liu, L., Mauldin, R., Mentler, B., Morawiec, A., Rato, P., Rörup, B., Ruhl, S., Scholz, W., Simon, M., Stinchfield, A., Tomé, A., Tong, Y., Top, J., Umo, N. S., Unfer, G. R., Vettikkat, L., Weissbacher, J., Xenofontos, C., Yang, B., Zauner-Wieczorek, M., Zhang, J., Zheng, Z., Christoudias, T., Curtius, J., El Haddad, I., Flagan, R., Hansel, A., Harder, H., Kürten, A., Möhler, O., Petäjä, T., Volkamer, R., Winkler, P. M., Worsnop, D. R., Kulmala, M., Donahue, N. M., Kirkby, J., Yli-Juuti, T., Riipinen, I., He, X.-C., and Lehtipalo, K.: Impact of humidity on aerosol growth from methanesulfonic acid, Environ. Sci.: Atmos., https://doi.org/10.1039/d5ea00123d, 2026b.

Zeider, K., McCauley, K., Dmitrovic, S., Siu, L. W., Choi, Y., Crosbie, E. C., DiGangi, J. P., Diskin, G. S., Kirschler, S., Nowak, J. B., Shook, M. A., Thornhill, K. L., Voigt, C., Winstead, E. L., Ziemba, L. D., Zuidema, P., and Sorooshian, A.: Sensitivity of aerosol and cloud properties to coupling strength of marine boundary layer clouds over the northwest Atlantic, Atmos. Chem. Phys., 25, 2407–2422, https://doi.org/10.5194/acp-25-2407-2025, 2025.

Zhao, B., Shrivastava, M., Donahue, N. M., Gordon, H., Schervish, M., Shilling, J. E., Zaveri, R. A., Wang, J., Andreae, M. O., Zhao, C., et al.: High concentration of ultrafine particles in the Amazon

free troposphere produced by organic new particle formation, PNAS, https://doi.org/10.1073/pnas.2006716117, 2020.

Zhao, B., Fast, J., Shrivastava, M., Donahue, N. M. M., Gao, Y., Shilling, J. E. E., Liu, Y., Zaveri, R. A. A., Gaudet, B., Wang, S., Wang, J., Li, Z., and Fan, J.: Formation Process of Particles and Cloud Condensation Nuclei Over the Amazon Rainforest: The Role of Local and Remote New-Particle Formation, Geophys. Res. Lett., 49, https://doi.org/10.1029/2022GL100940, 2022.

Ziereis, H., Hoor, P., Grooß, J.-U., Zahn, A., Stratmann, G., Stock, P., Lichtenstern, M., Krause, J., Bense, V., Afchine, A., Rolf, C., Woiwode, W., Braun, M., Ungermann, J., Marsing, A., Voigt, C., Engel, A., Sinnhuber, B.-M., and Oelhaf, H.: Redistribution of total reactive nitrogen in the lowermost Arctic stratosphere during the cold winter 2015/2016, Atmos. Chem. Phys., 22, 3631–3654, https://doi.org/10.5194/acp-22-3631-2022, 2022.

Zinner, T., Schwarz, U., Kölling, T., Ewald, F., Jäkel, E., Mayer, B., and Wendisch, M.: Cloud geometry from oxygen-A-band observations through an aircraft side window, Atmos. Meas. Tech., 12, 1167–1181, https://doi.org/10.5194/amt-12-1167-2019, 2019.

HALO SPP 1294 Theses

Aderhold, O.-A. F.: Auswertung flugzeuggetragener DOAS-Messungen mit der Skalierungsmethode: Fallbeispiel anhand von NO_2 in Luftmassen des südasiatischen Monsuns, M.Sc. thesis, University of Heidelberg, 2016.

Albern, N.: Wolken über dem Nordatlantik: Vergleich von flugzeuggetragenen Messungen eines Lidars, Wolkenradars und Mikrowellenradiometers während NARVAL-Nord, B.Sc. thesis, Universität Hamburg, 2014.

Bartolome Garcia, I.: Cirrus clouds in the extratropical tropopause and lowermost stratosphere region, Ph.D. thesis, Bergische Universität Wuppertal, 2021.

Beckert, T.: Charakterisierung des GC/ECD-Moduls des Messgerätes HAGAR-V im Rahmen der Flugzeugmesskampagne WISE, M.Sc. thesis, Universität Wuppertal, 2019.

Bernlochner, S.: Determination of Cloud Droplet size Distributions Using the Rainbow Fourier Transformation and Application to specMACS Measurements, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2023.

Blumenroth, J.: ExTL-Definition über Ethan-Messdaten der Kampagne PHILEAS, B.Sc. thesis, Physics Department, JGU Mainz, 2025.

Bogert, P.: Ice-nucleating particles in the free troposphere: long-term observation and first measurements at cirrus formation temperatures using the novel Portable Ice Nucleation Experiment PINEair, Ph.D. thesis, KIT Faculty of Physics of the Karlsruhe Institute of Technology (KIT), https://doi.org/10.5445/IR/1000174265, 2024.

Bounin, J.: Investigation of the temperature-dependent characteristics of the HALO mini-DOAS spectrometer and improvement of the spectral imaging properties, B.Sc. thesis, University of Heidelberg, 2015.

Bracher, N.: Vertikale Säulendichten von Stickstoffdioxid und Ozon mittels flugzeuggetragener Nadir-Messungen des miniDOAS während der Forschungskampagne CoMet, B.Sc. thesis, University of Heidelberg, 2018.

Brand, R.: Bispectral Retrievals in Mixed-Phase Clouds, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2025.

Brands, M.: Aufbau eines flugzeuggetragenen Einzelpartikel-Aerosolmassenspektrometers, Ph.D. thesis, Universität Mainz, 2009.

Braun, M.: Untersuchung von De- und Nitrifizierung in der untersten Stratosphäre und oberen Troposphäre mittels GLORIA-Messungen im arktischen Winter 2015/16, Masterarbeit, Karlsruhe Institute of Technology, 2017.

Brauner, P.: Charakterisierung des Eiskeimzählers FINCH und Feldmessungen mit FINCH, Masterarbeit, Goethe-Universität Frankfurt am Main, 2018.

Broch, S.: Ein neues LIF-Instrument für Flugzeug- und bodengebundene Messungen von OH- und HO_2-Radikalen in der Troposphäre, Ph.D. thesis, Universität Wuppertal, 2011.

Buchholz, B.: Entwicklung, Primärvalidierung und Feldeinsatz neuartiger, kalibrierungsfreier Laser-Hygrometer für Forschungsflugzeuge, Ph.D. thesis, Technische Universität Darmstadt, 2014.

Buhren, C.: Case study of a Polar Low during the HALO–$(\mathcal{AC})^3$ campaign, M.Sc. thesis, University of Cologne, 2024.

Bünning, M.: Flugzeug- und satellitengestützte passive Fernerkundung des Effektivradius von Wolkentröpfchen im Rahmen der EUREC4A-Kampagne, B.Sc. thesis, Ludwig-Maximilians-Universität

München, 2021.
Busch, P. F.: Bestimmung des Bedeckungsgrades und der räumlich horizontalen Inhomogenität arktischer Bewölkung aus flugzeuggetragenen Messungen einer abbildenden Infrarotkamera, B.Sc. thesis, Leipzig University, 2024.
Büttner, M.: Empirische Korrekturanalyse von troposphärischen N2O-Zeitreihen aus Infrarot-Absorptionsspektroskopie, B.Sc. thesis, Johannes Gutenberg-Universität Mainz, 2020.
Cazenave, Q.: Development and evaluation of multisensor methods for EarthCare mission based on A-Train and airborne measurements, Ph.D. thesis, Université de Versailles Saint-Quentin-en-Yvelines / Université Paris-Saclay, France, 2018.
Cecchini, M. A.: Aerosol and thermodynamic effects on the formation and evolution of Amazonian clouds observed by aircraft measurement, Ph.D. thesis, Instituto Nacional de Pesquisas Espaciais, São José dos Campos, Brasil, 2017.
Chrobry, A.: Development and laboratory characterization of a sampling system for airborne measurements of peroxy radicals using chemical amplification, Ph.D. thesis, Universität Bremen, 2013.
Civale, C.: Transport and transformation of polluted air masses over the Po Valley during the EMeRGe campaign in July 2017, M.Sc. thesis, University of Bremen, 2022.
Damböck, B.: Quantifying Turbulence around Cloud Edges from Stereographically Derived Wind Fields, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2024.
De La Torre Castro, E.: Microphysical properties and interplay of natural cirrus, contrail cirrus and aerosol at different latitudes, Ph.D. thesis, Delft University of Technology, http://resolver.tudelft.nl/uuid:1daa70eb-e8ac-4ee7-ad53-3bd87c2de258, 2024.
Dekoutsidis, G.: Characterizing the distribution of relative humidity in ice-clouds depending on location, evolution and meteorological conditions, Ph.D. thesis, LMU München: Fakultät für Physik, https://doi.org/10.5282/edoc.34752, 2024.
Deutschmann, T.: Atmospheric radiative transfer modelling with Monte Carlo methods, Diploma thesis, University of Heidelberg, 2009.
Deutschmann, T.: On modeling elastic and inelastic polarized radiation transport in the Earth atmosphere with Monte Carlo methods, Ph.D. thesis, Universität Leipzig, 2015.
Doppler, L.: Radiative transfer code development. Applications to the estimation of the radiative impact of aerosols, Ph.D. thesis, Université Pierre et Marie Curie, Paris and Freie Universität Berlin, 2013.
Dörfer, L.: Retrieval of Multimodal Droplet Size Distributions from Polarimetric Cloudbow Observations, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2025.
Dorff, H.: Cloud Geometry of Trade Wind Cumuli from Aircraft Observations, M.Sc. thesis, Universität Hamburg, 2020.
Dorff, H.: Moisture Budget in Arctic Atmospheric Rivers from an Airborne Perspective, Ph.D. thesis, Universität Hamburg, 2024.
Duscha, C.: Impact of Cloud Particle Habit on Cloud Radar Retrieval, M.Sc. thesis, Universität Hamburg, Fachbereich Geowissenschaften, Meteorologisches Institut, 2018.
Eirenschmalz, L.: Flugzeuggetragene Messungen von Ameisensäure und Schwefeldioxid in Emissionsfahnen urbaner Ballungsräume in Europa und Asien, Ph.D. thesis, Ludwig-Maximilians-Universität München, 2021.
Emig, N.: Messung von OCS-Mischungsverhältnissen in der unteren Stratosphäre der südlichen Hemisphäre, M.Sc. thesis, Johannes Gutenberg-Universität Mainz, 2021.
Erdmann, F.: Properties of satellite observed North Atlantic cloud regimes evaluated by cloud radar measurements aboard the HALO research aircraft, B.Sc. thesis, Universität Hamburg, 2014.
Erdtmann, D.: Remote sensing of arctic cirrus microphysics using hyperspectral reflectivity measurements and polarized imaging, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2023.
Ewald, F.: Retrieval of vertical profiles of cloud droplet effective radius using solar reflectance from cloud sides, Ph.D. thesis, Ludwig-Maximilians-Universität München, https://edoc.ub.uni-muenchen.de/20532/, 2016.
Fischer, L.: Statistical characterisation of water vapour variability in the troposphere, a height-resolved analysis using airborne lidar observations and COSMO-DE model simulations, Ph.D. thesis, Ludwig-Maximilian-Universität München, https://d-nb.info/104390655X/34, 2013.

Frank, F.: Charakterisierung des Eiskeimzählers FINCH, Ph.D. thesis, Johann Wolfgang Goethe-Universität Frankfurt am Main, 2017.

General, S.: Development of the Heidelberg Airborne Imaging DOAS Instrument (HAIDI), A novel remote sensing device for the investigation of two and three-dimensional trace gas distributions in the troposphere, Ph.D. thesis, University of Heidelberg, 2014.

George, G.: Observations of Meso-scale Circulation and itsRelationship with Cloudiness in the Tropics, Ph.D. thesis, Max-Planck-Institut für Meteorologie, The International Max Planck Research School on Earth System Modelling(IMPRS-ESM), https://ediss.sub.uni-hamburg.de/bitstream/ediss/9181/1/Reduced_size_thesis_document.pdf, 2021.

George, M.: Airborne measurement and interpretation of peroxy radical concentrations with a focus on the oxidation mechanisms in the Asian free troposphere, Ph.D. thesis, University of Bremen, 2022.

Gerhardt, E.: Adaption eines CO2-Analysators für automatisierte flugzeuggestützte Messungen, B.Sc. thesis, Universität Wuppertal, 2014.

Gerhardt, E.: Charakterisierung des CO2-Analysators in HAGAR-V und Auswertung der CO2-Messungen während der Flugzeugmesskampagne POLSTRACC, M.Sc. thesis, Universität Wuppertal, 2017.

Glaschke, S.: Detektion der Schmelzschicht und Bestimmung ihrer Höhe anhand flugzeuggestützter Radar-Daten, B.Sc. thesis, Universität Hamburg, 2019.

Gödde, F.: Detecting Clouds in the Presence of Sunglint: An Approach Using Spectral Water Vapor Absorption, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2018.

Gomm, S.: Luftgestützte Messung von HO_x-Radikalkonzentrationen mittels Laser-induzierter Fluoreszenz auf einem Zeppelin NT: Untersuchung der atmosphärischen Oxidationsstärke der unteren Troposphäre, Ph.D. thesis, Universität Wuppertal, 2014.

Großmann, K.: Reactive halogen species in the western Pacific, Diploma thesis, University of Heidelberg, 2010.

Großmann, K.: Aircraft–borne DOAS limb observations of UV/visible absorbing trace gas species over Borneo: Implications for the photochemistry of iodine, volatile organic oxide degradation, and lightning-produced radicals, Ph.D. thesis, University of Heidelberg, 2014.

Gruber, E. K.: The radiative effect of Arctic cirrus clouds over highly reflecting surfaces and low level clouds, B.Sc. thesis, Leipzig University, 2024.

Gunz, J.: Effiziente Implementierung der Regenbogen Fourier Transformation zur operationellen Auswertung von specMACS Daten, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2024.

Gutleben, M.: Nature and Extent of Shallow Marine Convection in Subtropical Regions, Analysis of airborne and spaceborne LIDAR-Data over the North Atlatic Ocean, M.Sc. thesis, University of Innsbruck, Austria, 2016.

Gutleben, M.: Long-range-transported Saharan air layers and their radiative effects determined by airborne lidar measurements, Ph.D. thesis, Ludwig-Maximilians-Universität München, 2020.

Hader, F.: Auswertung der Messungen langlebiger Tracer während der Flugzeugmesskampagne POLSTRACC im Winter 2016, B.Sc. thesis, Universität Wuppertal, 2017.

Hader, F.: Auswertung von CO_2-Messungen während der Flugzeugmesskampagne SouthTRAC, M.Sc. thesis, Universität Wuppertal, 2021.

Hafermann, S.: Entwicklung und Anwendung von Messinstrumenten für spezifische Hydroperoxid-Messungen in der Troposphäre, Ph.D. thesis, Universität Mainz, 2016.

Hans, I.: Entwicklung eines Verfahrens zur Charakterisierung eines multispektralen Polarimeters, M.Sc. thesis, Freie Universität Berlin, 2012.

He, K.: GNSS kinematic position and velocity determination for airborne gravimetry, Ph.D. thesis, Technische Universität Berlin, http://dx.doi.org/10.14279/depositonce-4372, 2015.

Henkel, P.: Meereshöhenbestimmung und Ableitung der mittleren Meeresoberflächentopographie mittels Laseraltimetrie der GEOHALO-Mission, M.Sc. thesis, TU Dresden (Institut für Planetare Geodäsie), 2014.

Hollstein, A.: Entwicklung und Aufbau eines Flugzeug gestützten multispektralen Polarimeters zur Fernerkundung des Atmosphäre, M.Sc. thesis, Freie Universität Berlin, 2008.

Hollstein, A.: Vector radiative transfer and its application to the remote sensing of aerosols and hy-

drosols, Ph.D. thesis, Freie Universität Berlin, 2012.
Hottmann, B.: Der Peroxid-Monitor HYPHOP: Charakterisierung und Anwendung bei OMO-Asia, Diploma thesis, Universität Mainz, 2016.
Hüneke, T.: Aufbau und Charakterisierung eines sechsfach-miniDOAS-Spektrographen für das Forschungsflugzeug DLR-HALO, Diploma thesis, University of Heidelberg, 2011.
Hüneke, T.: The scaling method applied to HALO measurements: Inferring absolute trace gas concentrations from airborne limb spectroscopy under all sky conditions, Ph.D. thesis, University of Heidelberg, 2016.
Jacob, M.: Characterizing maritime trade-wind convection using HALO Microwave Package (HAMP), Ph.D. thesis, Institute of Geophysics and Meteorology, University of Cologne, 2020.
Jäger, J.: Airborne VOC measurements on board the Zeppelin NT during the PEGASOS campaigns in 2012 deploying the improved Fast-GC-MSD System, Ph.D. thesis, Universität zu Köln, 2014.
Javed, U.: The sensitivity of the photostationary state of NO_x and its implication for the oxidation capacity in a semi-rural and boreal forest region, Ph.D. thesis, Universität Mainz, 2015.
Jeßberger, P.: In situ Messungen von HONO und Eispartikeln im Nachlauf von Flugzeugen – Charakterisierung des Flugzeug–Effektes, Ph.D. thesis, Universität Mainz, 2013.
Johansson, S.: Analysis of the unusually cold Arctic winter 2015/16 lowermost stratosphere by airborne and satellite observations and atmospheric models, Ph.D. thesis, Karlsruhe Institute of Technology, 2019.
Joppe, P.: Charakterisierung eines QCL-Absorptionsspektrometers für den Einsatz auf HALO, B.Sc. thesis, Johannes Gutenberg-Universität Mainz, 2019.
Joppe, P.: Analyse zur Ausdehnung und Saisonalität der ExTL während WISE und SouthTRAC, M.Sc. thesis, Johannes Gutenberg-Universität Mainz, 2021.
Kaiser, K.: Chemical composition and transformation of submicron aerosol particles in the outflow of major population centres, Ph.D. thesis, Johannes Gutenberg Universität Mainz, 2023.
Kaluza, T.: Impact of upper tropospheric jet-front systems on the mesoscale structure of the tropopause inversion layer and cross-tropopause transport, Ph.D. thesis, Johannes Gutenberg-Universität Mainz, 2021.
Kanzler, L.: Investigation of CH4 emissions from boreal wetlands by remote sensing during the airborne CoMet 2.0 campaign, M.Sc. thesis, Universität Innsbruck, https://www.uibk.ac.at/en/acinn/news/2025/msc-defensio-leah-kanzler/, 2025.
Kartal, D.: Characterization and optimization of a dual channel PERCA for the investigation of the chemistry of peroxy radicals in the upper troposphere, Ph.D. thesis, Universität Bremen, 2009.
Kenntner, M.: A Novel Limb and Nadir DOAS Optical Spectrometer for the German research aircraft HALO - Feasibility and Validation, Diploma thesis, University of Heidelberg, 2013.
Kirbus, B.: Lagrangian Studies of Arctic Air Mass Transformations During Warm Air Intrusions and Cold Air Outbreaks, Ph.D. thesis, Leipzig University, https://nbn-resolving.org/urn:nbn:de:bsz:15-qucosa2-951326, 2024.
Klein, J.: Ableitungen atmosphärischer Parameter für die Mikrowellenradiometer des HAMP, Diplomarbeit, Universität zu Köln, 2014.
Klostermann, T.: Entwicklung und Erprobung des 'Hygrometer for Atmospheric Investigations' (HAI), Ph.D. thesis, Universität Wuppertal, Schriften des Forschungszentrums Jülich, Reihe Energie und Umwelt/Energy and Environment, Vol. 113, ISBN: 978-3-89336-723-8, 2011.
Kluge, F.: Auswertung flugzeuggetragener DOAS Messungen von $C_2H_2O_2$, CH_2O, NO_2, O_3 und O_4 über dem Amazonas-Regenwald während der ACRIDICON-CHUVA Messkampagne, M.Sc. thesis, Universität Heidelberg, 2018.
Kluge, F.: Airborne glyoxal measurements in different regions of the globe: Its atmospheric fate, comparison with TROPOMI observations and EMAC simulations, and inferred biomass burning emission factors for glyoxal and methylglyoxal, Ph.D. thesis, University of Heidelberg, https://archiv.ub.uni-heidelberg.de/volltextserver/32874/, https://archiv.ub.uni-heidelberg.de/volltextserver/32874/, 2022.
Knapp, M.: Optische und Elektronische Charakterisierung des HALO mini-DOAS Instruments sowie eine Analyse der Unsicherheit in der Blickrichtung für die Skalierungsmethode, B.Sc. thesis, University of

Heidelberg, 2016.
Knecht, M.: Simulation of radiative field modification due to tropical clouds, M.Sc. thesis, University of Heidelberg, 2015.
Kobak, R.: Kalibrierung des optischen Partikelzählers in FINCH, Bachelorarbeit, Goethe-Universität Frankfurt am Main, 2015.
Kohl, R.: Flugzeugmesskampagne ML-Cirrus: Untersuchung von eisnukleierenden Eigenschaften von Aerosolpartikeln in Zirrusbewölkung, Masterarbeit, Johann Wolfgang Goethe-Universität Frankfurt am Main, 2015.
Kölling, T.: Characterization, calibration and operation of a hyperspectral sky imager, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2015.
Kölling, T.: Cloud geometry for passive remote sensing, Ph.D. thesis, Ludwig-Maximilians-Universität München, https://edoc.ub.uni-muenchen.de/26161/, 2020.
Koppenhofer, S.: Spectral and Radiometric Calibration of the Polarization Cameras of specMACS, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2022.
Koppenhofer, S.: Validation of specMACS microphysical products with independent aircraft and satellite observations, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2024.
Kretschmer, E.: Modelling of the Instrument Spectral Response of Conventional and Imaging Fourier Transform Spectrometers, Ph.D. thesis, Université Laval, Québec, Canada, 2014.
Kreycy, S.: Investigation of the stratospheric bromine chemistry by balloon-borne spectroscopic observations and photochemical modelling: A case study of J($BrONO_2$) / k[BrO][NO_2], Ph.D. thesis, University of Heidelberg, 2012.
Krisch, I.: Tomographic observations of gravity waves with the infrared limb imager GLORIA, Ph.D. thesis, Bergische Universität Wuppertal, 2018.
Krisna, T. C.: Airborne Passive Remote Sensing of Optical Thickness and Particle Effective Radius of Cirrus and Deep Convective Clouds, Ph.D. thesis, University of Leipzig, 2019.
Kritten, L.: Time dependent profiling of UV/vis absorbing radicals by balloon-borne spectroscopic Limb measurements and implications for stratospheric photochemistry, Ph.D. thesis, University of Heidelberg, 2009.
Künstler, C.: Measurements of Atmospheric OH and HO2 Radicals by Laser-Induced Fluorescence on the HALO Aircraft during the OMO-ASIA 2015 Campaign, Ph.D. thesis, Universität zu Köln, https://juser.fz-juelich.de/record/878229, 2020.
Kunze, P.: Klimatische Einordnung der meteorologischen Bedingungen ausgewählter Flüge während der CIRRUS-HL Kampagne, B.Sc. thesis, Leipzig University, 2022.
Lachnitt, H.-C.: Untersuchung von Spurengasaustausch an Transportbarrieren mit flugzeuggetragenen Messungen in der unteren Stratosphäre, Ph.D. thesis, Johannes Gutenberg Universität Mainz, 2022.
Lang, T.: Die tropische Zirkulation: Momentaufnahme einer Subsidenzzone, B.Sc. thesis, Universität Hamburg, Fachbereich Geowissenschaften, Meteorologisches Institut, 2016.
Lauther, V.: Entwicklung und Charakterisierung einer Messmethode zur Detektion ausgewählter VOC mittels GC/MS, M.Sc. thesis, Universität Wuppertal, 2015.
Lauther, V.: Airborne in situ measurements of short-lived chlorocarbons and investigation of their pathways from northern hemispheric source regions into the lowermost stratosphere, Ph.D. thesis, Bergische Universität Wuppertal, 2020.
Linke, C.: Entwicklung und Anwendung von Analysemethoden und Auswertealgorithmen zur Untersuchung von Verhältnissen stabiler Kohlenstoffisotope in atmosphärischen leichtflüchtigen organischen Verbindungen, Ph.D. thesis, Bergische Universität Wuppertal, 2012.
Liu, Y.: Investigation of the amplification efficiency of gases other than CO for the measurement of atmospheric peroxy radicals by chemical amplification, M.Sc. thesis, University of Bremen, 2016.
Liu, Y.: Applications of Cavity Ring-Down Spectroscopy in Environmental Physics: Rayleigh Scattering Cross-sections and Airborne Measurements of Peroxy Radicals, Ph.D. thesis, University of Bremen, 2024.
Lloyd, P.: An Interpretation of Vertical Aerosol Profiles in the Amazon Basin From the CAFE-Brazil Campaign, B.Sc. thesis, Leipzig University, 2024.
Löbel, S.: Ableitung der Meeresoberflächentemperatur aus flugzeuggetragenen Messungen mit einem

Infrarot Strahlungspyrometer, B.Sc. thesis, University of Leipzig, 2020.
Loh, A.: Faraday-Rotationsspektroskopie zum Nachweis vom Hydroperoxylradikal mittels eines neuartigen Infrarotlasers, M.Sc. thesis, Universität Bremen, 2014.
Lohse, I.: Spektrale aktinische Flussdichten und Photolysefrequenzen - Untersuchungen in der atmosphärischen Grenzschicht und der freien Troposphäre, Ph.D. thesis, Universität zu Köln, 2015.
Lörks, D.: Airborne spectroscopic measurements of BrO, OClO, and NO2 in the lowermost stratosphere during the Arctic winter 2015/2016: Implications for total bromine and the loss in ozone by the interhalogen reaction BrO + ClO, Diploma thesis, University of Heidelberg, 2018.
Ma, Z.: Cloud detection based on polarimetric specMACS observations over ocean and land, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2022.
Marsing, A.: Chlorine partitioning in the lowermost Arctic stratosphere during winter - an aircraft in situ measurement perspective, Ph.D. thesis, Johannes Gutenberg-Universität Mainz, 2021.
Mayer, A.: Transport und statische Stabilität in der UTLS - Datenanalyse zu flugzeuggetragenen Messkampagnen, M.Sc. thesis, Johannes Gutenberg Universität Mainz, 2018.
Meyer, J.: Ice Crystal Measurements with the New Particle Spectrometer NIXE–CAPS, Ph.D. thesis, Schriften des Forschungszentrums Jülich, Reihe Energie und Umwelt/Energy and Environment, Vol. 160, ISBN: 978-3-89336-840-2, 2012.
Molleker, S.: Charakterisierung von optischen Partikelspektrometern und in-situ Messungen zur Mikrophysik der polaren Stratosphärenwolken, Ph.D. thesis, Universität Mainz, 2014.
Mönch, F.: Konzeption, Durchführung und Auswertung der photogrammetrischen Vermessung eines Flugzeugs, Diploma thesis, TU Dresden (Institut für Photogrammetrie und Fernerkundung und Institut für Planetare Geodäsie), 2012.
Müller, J.: Bestimmung der Wolkenoberkantenhöhe von niedrigen Cumuluswolken mit der hochauflösenden thermischen Infrarot-Kamera VELOX, B.Sc. thesis, University of Leipzig, 2021.
Müller, J.: Classification of Arctic surface types and surface temperature retrieval based on airborne thermal-infrared imaging, M.Sc. thesis, Leipzig University, 2024.
Müller, S.: Untersuchung von Mischungs- und Transportprozessen in der oberen Troposphäre / unteren Stratosphäre basierend auf in-situ Spurengasmessungen, Ph.D. thesis, Johannes-Gutenberg Universität Mainz, 2015.
Münch, S.: Flugzeuggestütze Messungen von eisbildenden Partikeln über dem Regenwald des Amazonas mit FINCH, Masterarbeit, Johann Wolfgang Goethe-Universität Frankfurt am Main, 2015.
Müsse, J.: Approaches to forecasting postfrontal precipitation events over the North Atlantic, M.Sc. thesis, Universität Hamburg, 2012.
Necker, M.-L.: Remote Sensing of Cloud Droplet Number Concentration with a Consistent Vertical Adiabaticity Profile, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2024.
Nenakhov, V.: Optische Rückkopplung eines Resonators hoher Güte auf 409 nm Diodenlaser, M.Sc. thesis, Universität Bremen, 2010.
Nenakhov, V.: Entwicklung und Optimierung einer NO_2-CRDS-Messmethode für den Flugeinsatz vom PeRCEAS (Peroxy Radical Chemical Enhancement and Absorption Spectroscopy) Instrument., Ph.D. thesis, University of Bremen, 2018.
O'Brien, K.: Application of a novel air-borne mini-DOAS instrument for UV/visible limb observations during the POLARCAT GRACE 2008 research campaign, Diploma thesis, University of Heidelberg, 2010.
Ockenfuß, P.: Retrieval of cloud droplet size profiles from a combination of spectral and angular radiance observations, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2020.
Papke Chica, M.: Airborne in-situ Measurements of Microphysical Properties of Supercooled and Mixed-Phase Clouds, B.Sc. thesis, Universität Greifswald, 2021.
Pavicic, S.: Der Wolkenbedeckungsgrad während der Messkampagne NARVAL-2, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2018.
Polonik, P.: The Influence of Biomass Burning in the Amazon on Cloud Microphysical Properties - Interpretation of Observations with a Numerical Model, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2017.
Pörtge, F.: Cloud Droplet Size Distributions from Observations of Glory and Cloudbow, M.Sc. thesis,

Ludwig-Maximilians-Universität München, 2020.
Pörtge, V.: Understanding cloud droplet size distributions from multi-angle polarimetric observations, Ph.D. thesis, Ludwig-Maximilians-Universität München, 2024.
Prados-Roman, C.: Aircraft-borne spectroscopic limb measurements of trace gases absorbing in the UV-A spectral range: investigations of bromine monoxide in the Arctic troposphere, Ph.D. thesis, University of Heidelberg, 2010.
Prange, M.: Elevated Moist Layers: Exploring a Blindspot in the Global Satellite Observing System, Ph.D. thesis, Universität Hamburg, https://pure.mpg.de/rest/items/item_3501979/component/file_3505637/content, 2022.
Raecke, R.: Charakterisierung des Heidelberger mini-DOAS-Spektrographen auf dem Forschungsflugzeug DLR-HALO, B.Sc. thesis, University of Heidelberg, 2010.
Reichert, M.: Messung und Charakterisierung von Nahinfrarot-Spektren mit dem Instrument 'HALO mini-DOAS' und Vergleich mit Strahlungstransportsimulationen unter Berücksichtigung von Flüssigwasser und Eis, Diplomarbeit, Universität Heidelberg, 2014.
Reilly, S. C.: Fast Response of Boundary LayerClouds to Climate Change, Ph.D. thesis, Universität zu Köln, https://kups.ub.uni-koeln.de/36198/, 2020.
Roiger, A.: Biomass burning pollution in the summer time Arctic atmosphere: development and deployment of a novel airborne CI-ITMS instrument for PAN detection, Ph.D. thesis, University of Heidelberg, 2011.
Rotermund, M.: Organic, inorganic and total bromine in the extratropical tropopause and lowermost stratosphere in fall 2017: Origins, transport pathways and consequences for ozone, Ph.D. thesis, Universität Heidelberg, 2021.
Roth, A.: Untersuchungen von Aerosolpartikeln und Wolkenresidualpartikeln mittels Einzelpartikel-Massenspektrometrie und optischen Methoden, Ph.D. thesis, Universität Mainz, 2014.
Röttenbacher, J.: Impact of Arctic Cirrus on the Radiative Energy Budget: Observations and Representation in the Integrated Forecasting System, Ph.D. thesis, Leipzig University, 2025.
Ruhtz, T.: Beiträge zur Messung des in der Atmosphäre gestreuten Sonnenlichtes, Ph.D. thesis, Freie Universität Berlin, 2009.
Sadykov, A.: Statistics of Water Vapor Variability in the Tropics from Airborne Lidar, M.Sc. thesis, Technische Universität München, 2019.
Safadi, L.: Efficiency of the Chemical Amplification Technique for the Measurement and Speciation of Different Mixtures of Peroxy Radicals, M.Sc. thesis, Universität Bremen, 2013.
Sauter, C.: A case study of frontal cloud microphysics in model and observations, M.Sc. thesis, Universität Hamburg, Fachbereich Geowissenschaften, Meteorologisches Institut, 2019.
Scalone, L.: Retrieval of Cirrus Optical Properties in the near-IR spectral range within the NASA ATTREX Project, Ph.D. thesis, University of Heidelberg, 2017.
Schabel, J.: Differences in Microphysics of High Latitude Cirrus from Mid- or High Latitude Air Masses, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2023.
Schaefer, J.: Investigation of stratospheric ice nucleating particle concentrations for background conditions and in a biomass burning plume, M.Sc. thesis, Leipzig University, 2022.
Schirmacher, I.: Liquid water content from airborne radar and radiometer measurements, B.Sc. thesis, University Hamburg, https://www.mi.uni-hamburg.de/arbeitsgruppen/atmosphaerenmessungen/bachelormasterarbeiten/bsc2019schirmacher.pdf, 2019.
Schirmacher, I.: Characterization of Arctic low-level clouds and precipitation over the Fram Strait by airborne radar observations, Ph.D. thesis, Universität zu Köln, https://kups.ub.uni-koeln.de/75348/, 2024.
Schlickenrieder, P.: Absolute In-Flug Kalibrierung zweier polarisationsauflösender Kameras in Zuge der Kampagne PERCUSION, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2025.
Schmale, J.: Aircraft-based in-situ aerosol mass spectrometry: Chemical characterization and source identification of submicron particulate matter in the free and upper troposphere and lower stratosphere, Ph.D. thesis, Universität Mainz, 2011.
Schnitt, S.: Aufbau und Kalibrierung eines abbildenden Spektrometers, B.Sc. thesis, Freie Universität Berlin, 2013.

Schnitt, S.: Evaluation of tradewind cloud properties using a passive airborne microwave radiometer during the NARVAL campaign, M.Sc. thesis, Physics Department, University of Cologne, 2016.
Schreiner, B.: Aircraft-borne measurements of nitrogen dioxide, formaldehyde, and nitrous acid in the lower and middle troposphere during the EMeRGe-EU campaign, M.Sc. thesis, Universität Heidelberg, 2018.
Schröder, T.: Charakterisierung und Optimierung eines GC/ECD-Systems für flugzeuggestützte Spurengasmessungen, B.Sc. thesis, Universität Wuppertal, 2015.
Schubert, T.: Auswertung von optischen Polarisationsmessungen während der SoRPiC Flugmesskampagne zur Identifikation der Wolkenphase, M.Sc. thesis, Freie Universität Berlin, 2014.
Schulte, I.: Electronic characterisation of the airborne HALO mini-DOAS instrument and recording and simulation of reference spectra, B.Sc. thesis, University of Heidelberg, 2013.
Schulz, C.: Secondary organic aerosol in the pristine Amazonian atmosphere: Chemical properties, formation pathways, and interactions with clouds, Ph.D. thesis, Johannes Gutenberg University Mainz, 2019.
Schwab, F.: NO2-Messungen mit dem HALO mini-DOAS während der OMO-Kampagne: Vergleich mit HORUS und dem photolytischen Gleichgewicht, B.Sc. thesis, University of Heidelberg, 2017.
Schwarz, U.: Derivation of cloud geometry with imaging spectral and geometric measurements, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2016.
Sha, M. K.: Characterization and Optimization of the new Imaging Fourier Transform Spectrometer GLORIA, Ph.D. thesis, Karlsruhe Institute of Technology, https://publikationen.bibliothek.kit.edu/1000038372, 2013.
Spahn, H.: Untersuchungen der Verhältnisse stabiler Kohlenstoffisotope in atmosphärisch relevanten VOC in Simulations- und Feldexperimenten, Ph.D. thesis, Bergische Universität Wuppertal, 2009.
Sreekumar, S.: Retrieval of NO2 Column Amounts and Vertical Profiles from Air-borne Limb and Nadir Spectroscopic Measurements During the HALO CoMet Mission in May 2018, Including Aerosol Corrections, M.Sc. thesis, University of Heidelberg, 2020.
Stammer, P.: Water Vapor Retrieval in the Upper Troposphere and Lower Stratosphere Using Airborne Measurements of Spectral Solar Irradiance, M.Sc. thesis, University of Leipzig, http://home.uni-leipzig.de/strahlen/web/publications/theses/Mthesis_Stammer_2018.pdf, 2018.
Starache, M.: Addition of a Near-Infrared Radiometer to a Visible Spectrum Sun Photometer for Aerosol Remote Sensing, M.Sc. thesis, Freie Universität Berlin, 2012.
Stecher, L.: Höhenprofile des Tröpfchenradius während der ACRIDICON-CHUVA Kampagne 2014 - Vergleich von MODIS und specMACS Daten, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2016.
Tadic, I.: Flugzeuggetragenen Spurengasmessungen während OMO-EU, B.Sc. thesis, Universität Mainz, 2015.
Testorp, S.: Calibration and Characterization of the Airborne Multi-Spectral Sunphoto- & Polarimeter AMSSP, M.Sc. thesis, Freie Universität Berlin, 2014.
Thürkow, M.: Sonnenstandsberechnung, Vergleich verschiedener Berechnungen des Sonnenstandes in Abhängigkeit von Position und Zeit, M.Sc. thesis, Freie Universität Berlin, 2009.
Tricoli, T.: Electromagnetic scattering with the GDT-matrix method: An application to irregular ice particles in cirrus, Ph.D. thesis, University of Heidelberg, 2015.
Urbanek, B.: Characterization of midlatitude cirrus clouds with airborne lidar-Investigating an indirect aviation effect, Ph.D. thesis, Ludwig-Maximilians-Universität München, 2019.
Volkmer, L.: Evaluation of cloud height and cloud fraction from aircraft-based stereographic reconstruction, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2020.
Volkmer, L.: Validation of Cloud Top Height and Droplet Size Retrievals Using Simulated Observations of Polarized Radiance, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2023.
vom Scheidt, M.: Entwicklung einer Messmethode zur Detektion von perfluorierten Kohlenwasserstoffen mittels GC-M, M.Sc. thesis, Universität Wuppertal, 2009.
vom Scheidt, M.: Charakterisierung und Einsatz eines flugzeuggetragenen Messinstruments zur Messung von CO_2, M.Sc. thesis, Universität Wuppertal, 2010.
vom Scheidt, M.: Entwicklung und Charakterisierung eines GC/MS-Systems für zeitlich hochaufgelöste

Flugzeugmessungen, Ph.D. thesis, Universität Wuppertal, 2013.
vom Scheidt, M.: Charakterisierung und Einsatz des Luftprobensammlers MIRAH zur Untersuchung von Verhältnissen stabiler Kohenstoffisotope in atmosphärischen flüchtigen organischen Verbindungen, Ph.D. thesis, Universität Wuppertal, 2014.
von Bismarck, J.: Entwicklung und Aufbau eines flugzeuggestützten Radiometers zum Messen der Zenitstrahldichte für die Fernerkundung atmosphärischer Aerosole, M.Sc. thesis, Freie Universität Berlin, 2009.
Walbröl, A.: Benefit of microwave remote sensing for analysing the thermodynamic structure of Atmospheric Rivers, M.Sc. thesis, Institute of Geophysics and Meteorology, University of Cologne, 2020.
Walbröl, A.: Assessing water vapour from state-of-the-art observations and models in the central Arctic and the impact of inversions on downwelling longwave radiation, Ph.D. thesis, Universität zu Köln, https://kups.ub.uni-koeln.de/75237/, 2025.
Waldmann, P.: Development and First Deployment of an Innovative Airborne $\delta_{13}C(CH_4)$ In Situ Measurement Setup, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2023.
Weber, A.: Retrieval of cloud droplet size distribution from polarised aircraft observations of the cloudbow, B.Sc. thesis, Ludwig-Maximilians-Universität München, 2019.
Weber, A.: Fernerkundung der Orientierung von Eiskristallen mittels polarimetrischer Beobachtungen des Cloudglints, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2022.
Weber, L.: Messung der IO-Volumenmischungsverhältnisse über dem Nordatlantik mithilfe der flugzeugbasierten DOAS-Methode, B.Sc. thesis, Universität Heidelberg, 2021.
Weimar, J.: Detection characteristics of VIS spectrometers of the airborne HALO mini-DOAS instrument and their influence on the retrieval of trace gas abundances, B.Sc. thesis, University of Heidelberg, 2014.
Wenk, A.-K.: Optimierung und Anwendung eines schnellen GC-MS-Systems für mobile Messungen flüchtiger organischer Substanzen, Ph.D. thesis, Universität zu Köln, https://juser.fz-juelich.de/record/809471, 2016.
Werner, B.: Spectroscopic UV/vis limb measurements from aboard the NASA Global Hawk: Implications for the photochemistry and budget of bromine in the tropical tropopause layer, Ph.D. thesis, University of Heidelberg, 2015.
Weyland, B.: Detection of nitrous acid in the lower, middle, and upper troposphere: potential formation meachanisms of excess HONO, Ph.D. thesis, University of Heidelberg, https://archiv.ub.uni-heidelberg.de/volltextserver/34321/, 2024.
Wintel, J.: Charakterisierung eines GC-IRMS, M.Sc. thesis, Bergische Universität Wuppertal, 2009.
Wolf, J.: Charakterisierung von Verschmutzungsaerosolen bezüglich der mikrophysikalischen Eigenschaften in Europa und Asien während der EMeRGe-Kampagne, Ph.D. thesis, Ludwig-Maximilians-Universität München, https://edoc.ub.uni-muenchen.de/31292/, 2023.
Wolf, K.: Flugzeuggetragene Fernerkundung von Cirren mittels zweier unabhängiger Spektrometersysteme, M.Sc. thesis, Universität Leipzig, 2015.
Wolf, K.: Evaluation of the Radiation Scheme of a Numerical Weather Prediction Model by Airborne Measurements of Spectral Irradiance above Clouds., Ph.D. thesis, University of Leipzig, https://nbn-resolving.org/urn:nbn:de:bsz:15-qucosa2-708751, 2020.
Wolff, S.: Bestimmung der Emissionsraten von CH_4- und CO_2-Punktquellen mit flugzeuggetragenem Lidar, M.Sc. thesis, Ludwig-Maximilians-Universität München, 2018.
Wolff, S.: Estimating point source emissions using CO2 and CH4 lidar observations, Ph.D. thesis, Ludwig-Maximilians-Universität München, https://doi.org/10.5282/edoc.36449, 2025.
Zauner-Wieczorek, M.: Airborne measurements of gaseous sulfuric acid, atmospheric ions, and air pollutants in the troposphere and lower stratosphere above Europe, Ph.D. thesis, Johann Wolfgang Goethe-Universität Frankfurt, Universitätsbibliothek Johann Christian Senckenberg, https://publikationen.ub.uni-frankfurt.de/frontdoor/index/index/year/2023/docId/74281, 2023.
Zielke, J.: Polar Tropospheric Halogens, Ph.D. thesis, University of Heidelberg, 2015.

HALO SPP 1294 Data sets

Bohn, B.: Replication data for “Optical receiver characterizations and corrections for ground-based and airborne measurements of spectral actinic flux densities”, https://doi.org/10.26165/JUELICH-DATA/8INBXK, 2022.

Curtius, J., Heinritzi, M., Beck, L. J., Pöhlker, M. L., Tripathi, N., Krumm, B. E., Holzbeck, P., Nussbaumer, C. M., Hernández Pardo, L., Klimach, T., Barmpounis, K., Andersen, S. T., Bardakov, R., Bohn, B., Cecchini, M. A., Chaboureau, J.-P., Dauhut, T., Dienhart, D., Dörich, R., Edtbauer, A., Giez, A., Hartmann, A., Holanda, B. A., Joppe, P., Kaiser, K., Keber, T., Klebach, H., Krüger, O. O., Kürten, A., Mallaun, C., Marno, D., Martinez, M., Monteiro, C., Nelson, C., Ort, L., Raj, S. S., Richter, S., Ringsdorf, A., Rocha, F., Simon, M., Sreekumar, S., Tsokankunku, A., Unfer, G. R., Valenti, I. D., Wang, N., Zahn, A., Zauner-Wieczorek, M., Albrecht, R. I., Andreae, M. O., Artaxo, P., Crowley, J. N., Fischer, H., Harder, H., Herdies, D. L., Machado, L. A., Pöhlker, C., Pöschl, U., Possner, A., Pozzer, A., Schneider, J., Williams, J., and Lelieveld, J.: Isoprene nitrates drive new particle formation in Amazon’s upper troposphere, https://doi.org/10.5281/zenodo.12527358, zenodo, 2024.

De La Torre Castro, E., Beer, C., Sauer, D., Wernli, H., Ziereis, H., and Zöger, M.: CIRRUS-HL campaign data - Data accompanying dissertation, https://doi.org/10.4121/f3be3819-cf24-44ea-97a9-27dcc9f53585.v1, 2024a.

De La Torre Castro, E., Lucke, J., Kirschler, S., and Märkl, R.: CIRRUS-HL campaign codes - Codes accompanying dissertation, https://data.4tu.nl/datasets/34ee4130-d189-42ec-aa64-9a310ea2912b/1, software, 2024b.

Ehrlich, A.: Measurements of spectral, solar downward Irradiance with the Spectral Modular Airborne Radiation measurement sysTem (SMART) during the EUREC4A Field Campaign, https://dx.doi.org/10.25326/157, Aeris, 2021.

Ehrlich, A., Wolf, K., Luebke, A., Zoeger, M., and Giez, A.: Broadband solar and terrestrial, upward and downward irradiance measured by BACARDI on HALO during the EUREC4A Field Campaign., https://dx.doi.org/10.25326/160, Aeris, 2021.

Fildier, B., Touzé-Peiffer, L., and Schulz, H.: bfildier/EUREC4A_movies: v1.0.0, https://dx.doi.org/10.5281/zenodo.4777954, zenodo, 2021.

Jacob, M.: Cloud mask derived from airborne HAMP Microwave Radiometer measurements during the EUREC4A field campaign, https://dx.doi.org/10.25326/223, Aeris, 2021a.

Jacob, M.: Cloud mask derived from airborne HAMP Cloud Radar measurements during the EUREC4A field campaign, https://dx.doi.org/10.25326/222, Aeris, 2021b.

Jacob, M.: Liquid water path and integrated water vapor derived from airborne HAMP on HALO during the EUREC4A Field Campaign, https://doi.org/10.25326/247, Aeris, 2021c.

Jacob, M., Ament, F., Gutleben, M., Konow, H., Mech, M., Wirth, M., and Crewell, S.: Liquid water path and integrated water vapor over the tropical Atlantic during NARVAL2, https://doi.org/10.26050/WDCC/HALO_measurements_6, World Data Center for Climate (WDCC) at DKRZ, 2019a.

Jacob, M., Ament, F., Gutleben, M., Konow, H., Mech, M., Wirth, M., and Crewell, S.: Liquid water path and integrated water vapor over the tropical Atlantic during NARVAL-South, https://doi.org/10.26050/WDCC/HALO_measurements_5, World Data Center for Climate (WDCC) at DKRZ, 2019b.

Klingebiel, M.: Position and altitude data from the DLR BAHAMAS instrument during the EUREC4A Field Campaign, https://dx.doi.org/10.25326/161, Aeris, 2021.

Konow, H., Jacob, M., Ament, F., Crewell, S., Ewald, F., Hagen, M., Hirsch, L., Jansen, F., Mech, M., and

Stevens, B.: HALO Microwave Package measurements during North Atlantic Waveguide and Downstream impact EXperiment (NAWDEX), https://doi.org/10.1594/WDCC/HALO_measurements_4, World Data Center for Climate (WDCC) at DKRZ, 2018a.

Konow, H., Jacob, M., Ament, F., Crewell, S., Ewald, F., Hagen, M., Hirsch, L., Jansen, F., Mech, M., and Stevens, B.: HALO Microwave Package measurements during Next-generation Remote sensing for VALidation Studies - South (NARVAL-South), https://doi.org/10.1594/WDCC/HALO_measurements_2, World Data Center for Climate (WDCC) at DKRZ, 2018b.

Konow, H., Jacob, M., Ament, F., Crewell, S., Ewald, F., Hagen, M., Hirsch, L., Jansen, F., Mech, M., and Stevens, B.: HALO Microwave Package measurements during Next-generation Remote sensing for VALidation Studies 2 (NARVAL2), https://doi.org/10.1594/WDCC/HALO_measurements_3, World Data Center for Climate (WDCC) at DKRZ, 2018c.

Konow, H., Ament, F., Bony, S., Forster, L., George, G., Groß, S., Jacob, M., Kölling, T., Mayer, B., Mech, M., Schnitt, S., Stevens, B., Vial, J., Vogel, R., and Wendisch, M.: Photographs taken from the HALO aircraft during the EUREC4A field campaign [Data set], https://dx.doi.org/10.25326/229, Aeris, 2021.

Kölling, T., Ament, F., Bony, S., Ehrlich, A., Ewald, F., George, G., Giez, A., Hirsch, L., Jacob, M., Konow, H., Mayer, B., Pörtge, V., Schäfer, M., Stevens, B., Wendisch, M., Wirth, M., Wolf, K., and Zinner, T.: Instruments on HALO during EUREC4A, references and contact points, https://dx.doi.org/10.25326/232, Aeris, 2021.

Pörtge, V., Gödde, F., Kölling, T., Zinner, T., Forster, L., and Mayer, B.: Cloud mask and cloud fraction derived from solar reflectivity measurements of the imaging spectrometer specMACS on HALO during the EUREC4A field campaign, https://dx.doi.org/10.25326/166, Aeris, 2021.

Pörtge, V., Kölling, T., Zinner, T., Mayer, B., Weber, A., Forster, L., Emde, C., and Volkmer, L.: Cloud droplet size distribution from 2-D polarization measurements of specMACS during EUREC4A, https://doi.org/10.25326/549, Aeris, 2023.

Prange, M., Ringel, M., George, G., Hirsch, L., Kölling, T., Konow, H., Lang, T., and Mieslinger, T.: EUREC4A: HALO flight phase separation: Awesome Albatross, https://doi.org/10.5281/zenodo.3906507, zenodo, 2020.

Prange, M., Ringel, M., George, G., Hirsch, L., Kölling, T., Konow, H., Lang, T., Mieslinger, T., Pincus, R., and Saffin, L.: EUREC4A: HALO flight phase separation: Beautiful Budgie, https://doi.org/10.5281/zenodo.4900003, zenodo, 2021.

Schäfer, M., Ehrlich, A., Luebke, A., Thoböll, J., Wolf, K., and Wendisch, M.: Cloud mask derived from airborne KT19 measurements during the EUREC4A field campaign., https://dx.doi.org/10.25326/162, Aeris, 2021a.

Schäfer, M., Ehrlich, A., Luebke, A., Thoböll, J., Wolf, K., and Wendisch, M.: Two-dimensional cloud mask and cloud fraction with 1 Hz temporal resolution derived from VELOX during the EUREC4A field campaign., https://dx.doi.org/10.25326/163, Aeris, 2021b.

Schäfer, M., Rosenburg, S., Ehrlich, A., Röttenbacher, J., and Wendisch, M.: Two-dimensional cloud-top and surface brightness temperature with 1 Hz temporal resolution derived at flight altitude from VELOX during the HALO-(AC)^3 field campaign, https://doi.org/10.1594/PANGAEA.963401, 2023.

Schäfer, M., Rosenburg, S., Ehrlich, A., Röttenbacher, J., and Wendisch, M.: One-dimensional cloud-top or surface brightness temperature with 20 Hz temporal resolution derived at flight altitude from VELOX-KT19 during the HALO-(AC)^3 field campaign, https://doi.org/10.1594/PANGAEA.967378, 2024.

Schneider, J.: Meteoric particles in the lower stratosphere: Data set, https://dx.doi.org/10.17617/3.38, Max Planck Society, 2019.

Schulz, H., Touzé-Peiffer, L., and Fildier, B.: EUREC4A GOES-16 ABI overview movies (VIS+IR), https://dx.doi.org/10.25326/225, Aeris, 2021.

Volkmer, L., Kölling, T., Zinner, T., and Mayer, B.: 3-D cloud geometry from 2-D radiance measurements of specMACS during EUREC4A using a stereographic approach, https://doi.org/10.25326/508, Aeris, 2023.

Weber, A., Pörtge, V., Volkmer, L., Zinner, T., and Mayer, B.: Polarization measurements with the hyperspectral and polarized imaging system specMACS during the HALO-(AC)3 field campaign,

https://doi.org/10.1594/PANGAEA.965546, PANGAEA, 2024a.

Weber, A., Pörtge, V., Zinner, T., and Mayer, B.: Spectral radiance measurements with the hyperspectral and polarized imaging system specMACS during the HALO-(AC)3 field campaign, https://doi.org/10.1594/PANGAEA.966992, PANGAEA, 2024b.

Wirth, M.: Cloud top height derived from airborne measurements with the WALES lidar during the EUREC4A field campaign, https://dx.doi.org/10.25326/216, Aeris, 2021.