

List of Publications and Theses (2007–2019)
Priority Program 1294 of the German Research Foundation
(DFG SPP 1294)

**Atmospheric and Earth System Research
with the Research Aircraft HALO**
(High Altitude and Long Range Research Aircraft)



DLR (CC-BY 3.0)

Coordinators: Univ.-Prof. Dr. Manfred Wendisch Universität Leipzig
 Univ.-Prof. Dr. Joachim Curtius Goethe-Universität, Frankfurt/M.

Contact: Univ.-Prof. Dr. Manfred Wendisch
 Universität Leipzig, Leipziger Institut für Meteorologie (LIM)
 Stephanstraße 3, 04103 Leipzig, Germany
 E-Mail: m.wendisch@uni-leipzig.de; Phone: +49 341 97 32 850/851

Scientific Journal–Publications under Review or Submitted

- Mei, F., Wang, J., Comstock, J. M., Weigel, R., Krämer, M., Mahnke, C., Shilling, J. E., Schneider, J., Long, C. N., Wendisch, M., Machado, L. A. T., Schmid, B., Krisna, T., Pekour, M., Hubbe, J., Giez, A., Weinzierl, B., Zoeger, M., Schulz, C., Pöhlker, M. L., Schlager, H., Cecchini, M. A., Andreae, M. O., Martin, S. T., de Sa, 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. Discuss.*, 2019, 1–53, <https://doi.org/10.5194/amt-2019-17>, under review, 2019.
- Mülmenstädt, J., Gryspieerdt, E., Salzmann, M., Ma, P.-L., Dipu, S., and Quaas, J.: Separating radiative forcing by aerosol–cloud interactions and fast cloud adjustments in the ECHAM-HAMMOZ aerosol–climate model using the method of partial radiative perturbations, *Atmos. Chem. Phys. Discuss.*, 2019, 1–20, <https://doi.org/10.5194/acp-2018-1304>, in press, 2019.
- 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. Discuss.*, 2019, 1–21, <https://www.atmos-chem-phys-discuss.net/acp-2019-474/>, 2019.

Peer–Reviewed 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.
- 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: Night-time formation of free radicals, *Atmos. Chem. Phys.*, 13, 5731–5749, <https://doi.org/10.5194/acp-13-5731-2013>, 2013.
- 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.
- 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.: EUREC4A: 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.*, 118, 1945–1954, <https://doi.org/10.1002/jgre.20155>, 2013.
- Deutschmann, T., Beirle, S., Frieß, U., Grzegorski, M., Kern, C., Kritten, L., Platt, U., Prados-Román, C., Pute, 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. Ra.*, 112, 1119–1137, <https://doi.org/10.1016/j.jqsrt.2010.12.009>, 2011.
- Ebell, K., Orlandi, E., Hünerbein, A., Löhner, U., and Crewell, S.: Combining ground-based with satellite-based measurements in the atmospheric state retrieval: Assessment of the information content, *J. Geophys. Res. - Atmos.*, 118, 6940–6956, <https://doi.org/10.1002/jgrd.50548>, 2013.

- 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.
- Fiedler, V., Arnold, F., Schlager, H., Dörnbrack, A., Pirjola, L., and Stohl, A.: East Asian SO₂ 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 SO₂ 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.
- 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. - Atmos.*, 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.
- 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.
- 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 OCIO evolution in the plume, *J. Volcanol. Geoth. Res.*, 300, 175–186, <https://doi.org/10.1016/j.jvolgeores.2014.05.012>, available online 22 May 2014, 2015.
- 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.
- 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., 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>, first published online 25 Aug 2014, 2015.
- Gruber, S., Blahak, U., Haenel, F., Kottmeier, C., Leisner, T., Muskatell, H., Storelvmo, T., and Vogel, B.: A Process Study on Thinning of Arctic Winter Cirrus Clouds With High-Resolution ICON-ART Sim-

- ulations, *J. Geophys. Res. - Atmos.*, 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, 14351–14370, <https://doi.org/10.5194/acp-18-14351-2018>, 2018.
- 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>, 2019.
- 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.
- 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.
- Herrmann, 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.
- 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., Dumitresan, 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.
- Hollstein, A. and Fischer, J.: Radiative transfer solutions for coupled atmosphere ocean systems using the matrix operator technique, *J. Quant. Spectrosc. Ra.*, 113, 536–548, <https://doi.org/10.1016/j.jqsrt.2012.01.010>, 2012.
- 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 NO₂, *Atmos. Meas. Tech.*, 7, 1245–1257, <https://doi.org/10.5194/amt-7-1245-2014>, 2014.
- Hüneke, T., Aderhold, O.-A., Bounin, J., Dorf, M., Gentry, E., Grossmann, K., Groß, 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.

- 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., 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.
- Jeßberger, P., Voigt, C., Schumann, U., Söhlch, 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.
- 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.
- 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 , HNO_3 , and O_3 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(12), 6440–6449, <https://doi.org/10.1002/2017GL073270>, 2017.
- 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.
- Kaufmann, M., Blank, J., Guggenmoser, T., UngermaNN, J., Engel, A., Ern, M., Friedl-Vallon, F., Gerber, D., Groß, J. U., Guenther, G., Höpfner, M., Kleinert, A., Kretschmer, E., Latzko, T., Maucher, G., Neubert, T., Nordmeyer, H., Oelhaf, H., Olszewski, 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, <https://doi.org/10.1002/2013GL058276>, 2014.
- Kaufmann, S., Voigt, C., Jurkat, T., Thornberry, T., Fahey, D. W., Gao, R.-S., Schrage, R., Schäuble, D., and Zöger, M.: The airborne mass spectrometer AIMS – Part 1: AIMS-H₂O 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.
- 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.
- 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., Olszewski, 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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, 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.
- 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.
- 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. - Atmos., 121, 12,343–12,362, <https://doi.org/10.1002/2016JD024894>, 2016.
- 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., Hitzenberge, 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.
- 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, <https://dx.doi.org/10.1127/metz/2015/0663>, 2015.
- Lennartz, S. T., Krysztofiak, G., Marandino, C. A., Sinnhuber, B.-M., Tegtmeier, S., Ziska, F., Hosaini, 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.
- 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. - Sol. Ea., 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.
- 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.
- Marsig, 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.
- 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, *B. Am. 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.
- 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.
- 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., 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., Ziomba, 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>, 2017.
- 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.

- 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. Meteor. Soc.*, <https://doi.org/10.1175/BAMS-D-18-0181.1>, 2019.
- 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.
- 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.
- 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.
- 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.
- 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.: Gimbaled 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.
- 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., Burkhardt, 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.
- Roth, A., Schneider, J., Klimach, T., Mertes, S., vanPinxteren, 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.
- 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.
- 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. Meteor. Soc.*, 99, 1607–1637, <https://doi.org/10.1175/BAMS-D-17-0003.1>, 2018.
- 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>, advance access publication 03 November 2018, 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.
- 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, <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, J., Wendisch, M., Curtius, J., Scheinert, M., and Sinnhuber, B.-M.: Above the Clouds, *German Research*, 41, <https://doi.org/10.1002/germ.201970207>, 2019.
- 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 atmospheric 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, M., Kaye, P. H., Hirst, E., Ulanowski, Z., and Wagner, R.: Exploring the surface roughness

- of small ice crystals by measuring high resolution angular scattering patterns, Atti d. Acc. Pelo. dei Peri., Phys., Math., and Nat. Sci., 89, <http://dx.doi.org/10.1478/C1V89S1P084>, 2011.
- 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.
- 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.
- 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.
- Sourdeval, O., Gryspeerd, 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/s0024-014-0830-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. Ra.*, 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, *B. Am. 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, *B. Am. Meteorol. Soc.*, 100, 1061–1077, <https://doi.org/10.1175/BAMS-D-18-0198.1>, early online release 18 Januray, 2019.
- 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.
- 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. Ra.*, 162, 77–88, <https://doi.org/10.1016/j.jqsrt.2015.04.006>, 2015.
- 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.
- 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, 13,16613,172, <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., Groß, 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., Groß, 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.
- Voigt, C., Schumann, U., Jurkat, T., Schäuble, D., Schlager, H., Petzold, A., Gayet, J.-F., Krämer, M., Schneider, J., Borrman, 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., Holzapfel, 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/10.1029/2010GL045001>, 2011.

- [org/10.1029/2011GL047189](https://doi.org/10.1029/2011GL047189), 2011.
- Voigt, C., Jeßberger, P., Jurkat, T., Kaufmann, S., Baumann, R., Schlager, H., Bobrowski, N., Guffrida, G., and Salerno, G.: Evolution of CO₂, SO₂, HCl and HNO₃ 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., Groß, 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, *B. Am. Meteorol. Soc.*, 98, 271–288, <https://doi.org/10.1175/BAMS-D-15-00213.1>, final form published online 10 May 2016, 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.
- Weger, M., Heinold, B., Engler, C., Schumann, U., Seifert, A., Föllig, 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., Spichtinger, P., Mahnke, C., Klingebiel, M., Afchine, A., Petzold, A., Krämer, M., Costa, A., Molleker, S., Reutter, P., Szakáll, 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., Araújo, 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, *B. Am. Meteorol. Soc.*, 97, 1885–1908, <https://doi.org/10.1175/BAMS-D-14-00255.1>, 2016.
- 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 HO_x 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., Groß, 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., Ungermaann, 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.
- 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.
- 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.

Related Peer-Reviewed Scientific Journal-Publications

- Amediek, A. and Wirth, M.: Pointing Verification Method for Spaceborne Lidars, *Remote Sens.*, 9, <https://doi.org/10.3390/rs9010056>, 2017.
- Amediek, A., Ehret, G., Fix, A., Wirth, M., Büdenbender, C., Quatrevaelet, M., Kiemle, C., and Gerbig, C.: CHARM-F - a new airborne integrated-path differential-absorption lidar for carbon dioxide and methane observations: measurement performance and quantification of strong point source emissions, *Applied Optics*, 56, 5182–5197, <https://doi.org/10.1364/AO.56.005182>, 2017.
- Baumgardner, D., Brenguier, J. L., Bucholtz, A., Coe, H., DeMott, P., Garrett, T. J., Gayet, J. F., Hermann, M., Heymsfield, A., Korolev, A., Krämer, M., Petzold, A., Strapp, W., Pilewskie, P., Taylor, J., Twohy, C., Wendisch, M., Bachalo, W., and Chuang, P.: Airborne instruments to measure atmospheric aerosol particles, clouds and radiation: A cook's tour of mature and emerging technology, *Atmos. Res.*, 102, 10 – 29, <https://doi.org/10.1016/j.atmosres.2011.06.021>, 2011.
- Baumgardner, D., Avallone, L., Bansemer, A., Borrman, S., Brown, P., Bundke, U., Chuang, P. Y., Cziczo, D., Field, P., Gallagher, M., Gayet, J.-F., Heymsfield, A., Korolev, A., Krämer, M., McFarquhar, G., Mertes, S., Möhler, O., Lance, S., Lawson, P., Petters, M., Pratt, K., Roberts, G., Rogers, D., Stetzer, O., Stith, J., Strapp, W., Twohy, C., and Wendisch, M.: In situ, airborne instrumentation: Addressing and solving measurement problems in ice clouds, *B. Am. Meteorol. Soc.*, 93, ES29–ES34, <https://doi.org/10.1175/BAMS-D-11-00123.1>, 2012.
- Bony, S. and Stevens, B.: Measuring Area-Averaged Vertical Motions with Dropsondes, *J. Atmos. Sci.*, 76, 767–783, <https://doi.org/10.1175/JAS-D-18-0141.1>, 2019.
- Brenguier, J.-L., Bachalo, W., Chuang, P., Esposito, B. M., Fugal, J., Garrett, T., Gayet, J.-F., Gerber, H., Heymsfield, A., Kokhanovsky, A., Korolev, A., Lawson, R., Rogers, D. C., Shaw, R. A., Strapp, W., and Wendisch, M.: Airborne Measurements for Environmental Research: Methods and Instruments, chap. In Situ Measurements of Cloud and Precipitation Particles, pp. 225–301, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, ISBN: 978-3-527-40996-9, 2013.
- Buchholz, B., Böse, N., and Ebert, V.: Absolute validation of a diode laser hygrometer via inter-comparison with the German national primary water vapor standard, *Appl. Phys. B*, 116, 883–899, <https://doi.org/10.1007/s00340-014-5775-4>, 2014.
- Bühl, J., Alexander, S., Crewell, S., Heymsfield, A., Kalesse, H., Khain, A., Maahn, M., Tricht, K. V., and Wendisch, M.: Ice Formation and Evolution in Clouds and Precipitation: Measurement and Modeling Challenges. Chapter 10: Remote Sensing., *Meteorol. Mon.*, 58, 10.1–10.21, <https://doi.org/10.1175/AMSMONOGRAPHS-D-16-0015.1>, 2017.
- Bundke, U., Nillius, B., Jaenicke, R., Wetter, T., Klein, H., and Bingemer, H.: The Fast Ice Nucleus Chamber FINCH, *Atmos. Res.*, 90, 180–186, <https://doi.org/10.1016/j.atmosres.2008.02.008>, 2008.
- Cecchini, M. A., Machado, L. A. T., Comstock, J. M., Mei, F., Wang, J., Fan, J., Tomlinson, J. M., Schmid, B., Albrecht, R., Martin, S. T., and Artaxo, P.: Impacts of the Manaus pollution plume on the microphysical properties of Amazonian warm-phase clouds in the wet season, *Atmos. Chem. Phys.*, 16, 7029–7041, <https://doi.org/10.5194/acp-16-7029-2016>, 2016.
- Custard, K. D., Thompson, C. R., Pratt, K. A., Shepson, P. B., Liao, J., Huey, L. G., Orlando, J. J.,

- Weinheimer, A. J., Apel, E., Hall, S. R., Flocke, F., Mauldin, L., Hornbrook, R. S., Pöhler, D., General, S., Zielcke, J., Simpson, W. R., Platt, U., Fried, A., Weibring, P., Sive, B. C., Ullmann, K., Cantrell, C., Knapp, D. J., and Montzka, D. D.: The NO_x dependence of bromine chemistry in the Arctic atmospheric boundary layer, *Atmos. Chem. Phys.*, 15, 10 799–10 809, <https://doi.org/10.5194/acp-15-10799-2015>, 2015.
- Ewald, F., Kölling, T., Baumgartner, A., Zinner, T., and Mayer, B.: Design and characterization of specMACS, a multipurpose hyperspectral cloud and sky imager, *Atmos. Meas. Tech.*, 9, 2015–2042, <https://doi.org/10.5194/amt-9-2015-2016>, 2016.
- Friedl-Vallon, F., Gulde, T., Hase, F., Kleinert, A., Kulessa, T., Maucher, G., Neubert, T., Olszewski, 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.
- Giez, A., Mallaun, C., Zöger, M., Dörnbrack, A., and Schumann, U.: Static Pressure from Aircraft Trailing-Cone Measurements and Numerical Weather-Prediction Analysis, *J. Aircraft*, 54, 1728–1737, <https://doi.org/10.2514/1.C034084>, American Institute of Aeronautics and Astronautics (AIAA), 2017.
- Greve, V., Dahlmann, K., Flink, J., Frömming, C., Ghosh, R., Gierens, K. M., Heller, R., Hendricks, J., Jöckel, P., Kaufmann, S., Kölker, K., Linke, F., Luchkova, T., Lührs, B., van Manen, J., Matthes, S., Minikin, A., Niklaß, M., Plohr, M., Righi, M., Rosanka, S., Schmitt, A. R., Schumann, U., Terekhov, I., Unterstrasser, S., Vázquez-Navarro, M., Voigt, C., Wicke, K., Yamashita, H., Zahn, A., and Ziereis, H.: Mitigating the Climate Impact from Aviation: Achievements and Results of the DLR WeCare Project, *Aerospace*, 4 (3), 1–50, <https://doi.org/10.3390/aerospace4030034>, 2017.
- Guggenmoser, T., Blank, J., Kleinert, A., Latzko, T., Ungermann, J., Friedl-Vallon, F., Höpfner, M., Kaufmann, M., Kretschmer, E., Maucher, G., Neubert, T., Oelhaf, H., Preusse, P., Riese, M., Rongen, H., Sha, M. K., Sumińska-Ebersoldt, O., and Tan, V.: New calibration noise suppression techniques for the GLORIA limb imager, *Atmos. Meas. Tech.*, 8, 3147–3161, <https://doi.org/10.5194/amt-8-3147-2015>, 2015.
- He, K., Xu, T., Förste, C., Petrovic, S., Barthelmes, F., Jiang, N., and Flechtner, F.: GNSS Precise Kinematic Positioning for Multiple Kinematic Stations Based on A Priori Distance Constraints, *Sensors*, 16, 470, <https://doi.org/10.3390/s16040470>, 2016.
- 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.
- Kiemle, C., Schäfler, A., Wirth, M., Fix, A., and Rahm, S.: Detection and Analysis of Water Vapor Transport by Airborne Lidars, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 6, 1189–1193, <https://doi.org/10.1109/JSTARS.2013.2239609>, 2013.
- Klocke, D., Brueck, M., Hohenegger, C., and Stevens, B.: Rediscovery of the doldrums in storm-resolving simulations over the tropical Atlantic, *Nature Geoscience*, 10, 891–896, <https://doi.org/10.1038/s41561-017-0005-4>, 2017.
- Korolev, A., McFarquhar, G., Field, P. R., Franklin, C., Lawson, P., Wang, Z., Williams, E., Abel, S. J., Axisa, D., Borrmann, S., Crosier, J., Fugal, J., Krämer, M., Lohmann, U., Schlenczek, O., and Wendisch, M.: Ice Formation and Evolution in Clouds and Precipitation: Measurement and Modeling Challenges. Chapter 5: Mixed-phase clouds: progress and challenges., *Meteorol. Mon.*, 58, 5.1–5.50, <https://doi.org/10.1175/AMSMONOGRAPHSD-17-0001.1>, 2017.
- Krämer, M., Twohy, C., Hermann, M., Afchine, A., Dhaniyala, S., and Korolev, A.: Airborne Measurements for Environmental Research: Methods and Instruments, chap. Aerosol and Cloud Particle Sampling, pp. 303–341, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, ISBN: 978-3-

- 527-40996-9, 2013.
- Krisch, I., Preusse, P., UngermaNN, J., Dörnbrack, A., Eckermann, S. D., Ern, M., Friedl-Vallon, F., Kaufmann, M., Oelhaf, H., Rapp, M., Strube, C., and Riese, M.: First tomographic observations of gravity waves by the infrared limb imager GLORIA, *Atmos. Chem. Phys.*, 17, 14 937–14 953, <https://doi.org/10.5194/acp-17-14937-2017>, 2017.
- Kritten, L., Butz, A., Dorf, M., Deutschmann, T., Kühl, S., Prados-Roman, C., Pute, J., Rozanov, A., Schofield, R., and Pfeilsticker, K.: Time dependent profile retrieval of UV/vis absorbing radicals from balloon-borne limb measurements a case study on NO₂ and O₃, *Atmos. Meas. Tech.*, 3, 933–946, <https://doi.org/10.5194/amt-3-933-2010>, 2010.
- Lelieveld, J., Bourtsoukidis, E., Brühl, C., Fischer, H., Fuchs, H., Harder, H., Hofzumahaus, A., Holland, F., Marno, D., Neumaier, M., Pozzer, A., Schläger, H., Williams, J., Zahn, A., and Ziereis, H.: The South Asian monsoon — pollution pump and purifier, *Science*, 361, 270–273, <https://doi.org/10.1126/science.aar2501>, 2018.
- Meyer, J., Rolf, C., Schiller, C., Rohs, S., Spelten, N., Afchine, A., Zöger, M., Sitnikov, N., Thornberry, T. D., Rollins, A. W., Bozóki, Z., Tátrai, D., Ebert, V., Kühnreich, B., Mackrodt, P., Möhler, O., Saathoff, H., Rosenlof, K. H., and Krämer, M.: Two decades of water vapor measurements with the FISH fluorescence hygrometer: a review, *Atmos. Chem. Phys.*, 15, 8521–8538, <https://doi.org/10.5194/acp-15-8521-2015>, 2015.
- Monte, C., Gutschwager, B., Adibekyan, A., Kehrt, M., Ebersoldt, A., Olschewski, F., and Hollandt, J.: Radiometric calibration of the in-flight blackbody calibration system of the GLORIA interferometer, *Atmos. Meas. Tech.*, 7, 13–27, <https://doi.org/10.5194/amt-7-13-2014>, 2014.
- Olschewski, F., Ebersold, A., Friedl-Vallon, F., Gutschwager, B., Hollandt, J., Kleinert, A., Monte, C., Piesch, C., Preusse, P., Rolf, C., Steffens, P., and Koppmann, R.: The in-flight blackbody calibration system for the GLORIA interferometer on board an airborne research platform, *Atmos. Meas. Tech.*, 6, 3067–3082, <https://doi.org/10.5194/amt-6-3067-2013>, 2013.
- Peterson, P. K., Simpson, W. R., Pratt, K. A., Shepson, P. B., Frieß, U., Zielcke, J., Platt, U., Walsh, S. J., and Nghiêm, S. V.: Dependence of the vertical distribution of bromine monoxide in the lower troposphere on meteorological factors such as wind speed and stability, *Atmos. Chem. Phys.*, 15, 2119–2137, <https://doi.org/10.5194/acp-15-2119-2015>, 2015.
- Pratt, K. A., Custard, K. D., Shepson, P. B., Douglas, T. A., Pöhler, D., General, S., Zielcke, J., Simpson, W. R., Platt, U., Tanner, D. J., Gregory Huey, L., Carlsen, M., and Stirm, B. H.: Photochemical production of molecular bromine in Arctic surface snowpacks, *Nature Geoscience*, 6, 351–356, <https://doi.org/10.1038/ngeo1779>, 2013.
- Rautenhaus, M., Bauer, G., and Dörnbrack, A.: A web service based tool to plan atmospheric research flights, *Geosci. Model Dev.*, 5, 55–71, <https://doi.org/10.5194/gmd-5-55-2012>, 2012.
- Rautenhaus, M., Grams, C. M., Schäfler, A., and Westermann, R.: Three-dimensional visualization of ensemble weather forecasts – Part 2: Forecasting warm conveyor belt situations for aircraft-based field campaigns, *Geosci. Model Dev.*, 8, 2355–2377, <https://doi.org/10.5194/gmd-8-2355-2015>, 2015a.
- Rautenhaus, M., Kern, M., Schäfler, A., and Westermann, R.: Three-dimensional visualization of ensemble weather forecasts – Part 1: The visualization tool Met.3D (version 1.0), *Geosci. Model Dev.*, 8, 2329–2353, <https://doi.org/10.5194/gmd-8-2329-2015>, 2015b.
- 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. Top. Appl.*, 10, 3114 – 3124, <https://doi.org/10.1109/JSTARS.2017.2687943>, 2017.
- Schumann, U. and Heymsfield, A. J.: On the Life Cycle of Individual Contrails and Contrail Cirrus, *Meteorol. Mon.*, 58, 3.1–3.24, <https://doi.org/10.1175/AMSMONographs-D-16-0005.1>, 2017.
- Schumann, U., Fahey, D. W., Wendisch, M., and Brenguier, J.-L.: Airborne Measurements for Environmental Research: Methods and instruments, chap. Introduction to airborne measurements of the earth atmosphere and surface, pp. 1–6, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, ISBN: 978-3-527-40996-9, 2013.
- Schumann, U., Baumann, R., Baumgardner, D., Bedka, S. T., Duda, D. P., Freudenthaler, V., Gayet,

- J.-F., Heymsfield, A. J., Minnis, P., Quante, M., Raschke, E., Schlager, H., Vázquez-Navarro, M., Voigt, C., and Wang, Z.: Properties of individual contrails: A compilation of observations and some comparisons, *Atmos. Chem. Phys.*, 17, 403–438, <https://doi.org/10.5194/acp-17-403-2017>, 2017.
- Semmling, A., Beckheinrich, J., Wickert, J., Beyerle, G., Schön, S., Fabra, F., Pflug, H., He, K., Schwabe, J., and Scheinert, M.: Sea surface topography retrieved from GNSS reflectometry phase data of the GEOHALO flight mission, *Geophys. Res. Lett.*, 41, 954–960, <https://doi.org/10.1002/2013GL058725>, 2014.
- Tadic, I., Parchatka, U., Königstedt, R., and Fischer, H.: In-flight stability of quantum cascade laser-based infrared absorption spectroscopy measurements of atmospheric carbon monoxide, *Appl. Phys. B-Laser O.*, 123, 146, <https://doi.org/10.1007/s00340-017-6721-z>, 2017.
- Wendisch, M., Pilewskie, P., Bohn, B., Bucholtz, A., Crewell, S., Harlow, C., Jäkel, E., Schmidt, K. S., Shetter, R., Taylor, J., Turner, D. D., and Zöger, M.: Airborne Measurements for Environmental Research: Methods and Instruments, chap. Atmospheric Radiation Measurements, pp. 343–411, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, 2013.

Theses

- Aderhold, O.-A. F.: Auswertung flugzeuggetragener DOAS-Messungen mit der Skalierungsmethode: Fallbeispiel anhand von NO₂ in Luftmassen des südasiatischen Monsuns, Master thesis, University of Heidelberg, Heidelberg, Germany, 2016.
- Albern, N.: Wolken über dem Nordatlantik: Vergleich von flugzeuggetragenen Messungen eines Liders, Wolkenradars und Mikrowellenradiometers während NARVAL-Nord, Bachelor thesis, Universität Hamburg, 2014.
- Bounin, J.: Investigation of the temperature-dependent characteristics of the HALO mini-DOAS spectrometer and improvement of the spectral imaging properties, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 2015.
- 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, Karlsruhe, Germany, 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 HO₂-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.
- 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.
- Deutschmann, T.: Atmospheric radiative transfer modelling with Monte Carlo methods, Diploma thesis, University of Heidelberg, Heidelberg, Germany, 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.
- Duscha, C.: Impact of Cloud Particle Habit on Cloud Radar Retrieval, Master's thesis, Universität Hamburg, Fachbereich Geowissenschaften, Meteorologisches Institut, 2018.
- Erdmann, F.: Properties of satellite observed North Atlantic cloud regimes evaluated by cloud radar measurements aboard the HALO research aircraft, Bachelor thesis, Universität Hamburg, 2014.
- 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, 2013.
- Frank, F.: Charakterisierung des Eiskeimzählers FINCH, Promotion, 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, Heidelberg, Germany, 2014.
- Gödde, F.: Detecting Clouds in the Presence of Sunglint: An Approach Using Spectral Water Vapor Absorption, Master's 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, Heidelberg, Germany, 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, Heidelberg, Germany, 2014.
- Gutleben, M.: Nature and Extent of Shallow Marine Convection in Subtropical Regions, Analysis of airborne and spaceborne LIDAR-Data over the North Atlantic Ocean, Master's thesis, University of Innsbruck, Austria, 2016.
- 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, Master's 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, Master's thesis, TU Dresden (Institut für Planetare Geodäsie), 2014.
- Hollstein, A.: Entwicklung und Aufbau eines Flugzeug gestützten multispektralen Polarimeters zur Fernerkundung des Atmosphären, Master's thesis, Freie Universität Berlin, 2008.
- Hollstein, A.: Vector radiative transfer and its application to the remote sensing of aerosols and hydrosols, 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, Heidelberg, Germany, 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, Heidelberg, Germany, 2016.
- 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, Karlsruhe, Germany, 2019.
- 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, Heidelberg, Germany,

- 2013.
- 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 C₂H₂O₂, CH₂O, NO₂, O₃ und O₄ über dem Amazonas-Regenwald während der ACRIDICON-CHUVA Messkampagne, Master thesis, Universität Heidelberg, Heidelberg, 2018.
- Knapp, M.: Optische und Elektronische Charakterisierung des HALO mini-DOAS Instruments sowie eine Analyse der Unsicherheit in der Blickrichtung für die Skalierungsmethode, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 2016.
- Knecht, M.: Simulation of radiative field modification due to tropical clouds, Master thesis, University of Heidelberg, Heidelberg, Germany, 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, Master's thesis, Ludwig-Maximilians-Universität München, 2015.
- 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(BrONO₂) / k[BrO][NO₂], Ph.D. thesis, University of Heidelberg, Heidelberg, Germany, 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, Leipzig, Germany, 2019.
- Lang, T.: Die tropische Zirkulation: Momentaufnahme einer Subsidenzzone, Bachelor thesis, Universität Hamburg, Fachbereich Geowissenschaften, Meteorologisches Institut, 2016.
- 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, Master thesis, University of Bremen, 2016.
- Loh, A.: Faraday-Rotationsspektroskopie zum Nachweis vom Hydroperoxyradikal mittels eines neuartigen Infrarotlasers, Master's 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.
- Mayer, A.: Transport und statische Stabilität in der UTLS - Datenanalyse zu flugzeuggetragenen Messkampagnen, Master 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 theses, TU Dresden (Institut für Photogrammetrie und Fernerkundung und Institut für Planetare Geodäsie), 2012.
- 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, Mainz, 2015.
- Münch, S.: Flugzeuggestützte 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, Master's thesis, Universität Hamburg, 2012.
- Nenakhov, V.: Optische Rückkopplung eines Resonators hoher Güte auf 409nm Diodenlaser, Master's thesis, Universität Bremen, 2010.
- Nenakhov, V.: Entwicklung und Optimierung einer NO₂-CRDS-Messmethode für den Flugeinsatz vom PeRCEAS (Peroxy Radical Chemical Enhancement and Absorption Spectroscopy) Instrument., Ph.D. thesis, University of Bremen, to be submitted, 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, Heidelberg, Germany, 2010.
- Pavicic, S.: Der Wolkenbedeckungsgrad während der Messkampagne NARVAL-2, Bachelor 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, Master's thesis, Ludwig-Maximilians-Universität München, 2017.
- 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, Phd thesis, University of Heidelberg, Heidelberg, Germany, 2010.
- Raecke, R.: Charakterisierung des Heidelberger mini-DOAS-Spektrographen auf dem Forschungsflugzeug DLR-HALO, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 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.
- 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, Heidelberg, Germany, 2011.
- Roth, A.: Untersuchungen von Aerosolpartikeln und Wolkenresidualpartikeln mittels Einzelpartikel-Massenspektrometrie und optischen Methoden, Ph.D. thesis, Universität Mainz, 2014.
- Ruhtz, T.: Beiträge zur Messung des in der Atmosphäre gestreuten Sonnenlichtes, Ph.D. thesis, Freie Universität Berlin, 2009.
- Safadi, L.: Efficiency of the Chemical Amplification Technique for the Measurement and Speciation of Different Mixtures of Peroxy Radicals, Master's thesis, Universität Bremen, 2013.
- Sauter, C.: A case study of frontal cloud microphysics in model and observations, Master's 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, Phd thesis, University of Heidelberg, Heidelberg, Germany, 2017.
- 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, Bachelor thesis, Freie Universität Berlin, 2013.
- Schnitt, S.: Evaluation of tradewind cloud properties using a passive airborne microwave radiometer during the NARVAL campaign, Master thesis, Universität Köln, 2016.
- Schreiner, B.: Aircraft-borne measurements of nitrogen dioxide, formaldehyde, and nitrous acid in the lower and middle troposphere during the EMeRGe-EU campaign, Master's thesis, Universität Heidelberg, Heidelberg, 2018.
- Schubert, T.: Auswertung von optischen Polarisationsmessungen während der SoRPiC Flugmesskampagne zur Identifikation der Wolkenphase, Master's thesis, Freie Universität Berlin, 2014.
- Schulte, I.: Electronic characterisation of the airborne HALO mini-DOAS instrument and recording and simulation of reference spectra, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 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,

- Mainz, Germany, 2019.
- Schwab, F.: NO₂-Messungen mit dem HALO mini-DOAS während der OMO-Kampagne: Vergleich mit HORUS und dem photolytischen Gleichgewicht, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 2017.
- Schwarz, U.: Derivation of cloud geometry with imaging spectral and geometric measurements, Master's thesis, Ludwig-Maximilians-Universität München, 2016.
- Sha, M. K.: Characterization and Optimization of the new Imaging Fourier Transform Spectrometer GLO-RIA, Ph.D. thesis, Karlsruhe Institute of Technology, Karlsruhe, Germany, <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.
- Stammer, P.: Water Vapor Retrieval in the Upper Troposphere and Lower Stratosphere Using Airborne Measurements of Spectral Solar Irradiance, Master's 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, Master's thesis, Freie Universität Berlin, 2012.
- Stecher, L.: Höhenprofile des Tröpfchenradius während der ACRIDICON-CHUVA Kampagne 2014 - Vergleich von MODIS und specMACS Daten, Bachelor thesis, Ludwig-Maximilians-Universität München, 2016.
- Tadic, I.: Flugzeuggetragenen Spurengasmessungen während OMO-EU, Bachelor thesis, Universität Mainz, 2015.
- Testorp, S.: Calibration and Characterization of the Airborne Multi-Spectral Sunphoto- & Polarimeter AMSSP, Master's thesis, Freie Universität Berlin, 2014.
- Thürkow, M.: Sonnenstandsberechnung, Vergleich verschiedener Berechnungen des Sonnenstandes in Abhängigkeit von Position und Zeit, Master's 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, Heidelberg, Germany, 2015.
- vom Scheidt, M.: Entwicklung einer Messmethode zur Detektion von perfluorierten Kohlenwasserstoffen mittels GC-M, Master's thesis, Universität Wuppertal, 2009.
- vom Scheidt, M.: Charakterisierung und Einsatz eines flugzeuggetragenen Messinstruments zur Messung von CO₂, Master's thesis, Universität Wuppertal, 2010.
- vom Scheidt, M.: Entwicklung und Charakterisierung eines GC/MS-Systems für zeitlich hochauflöste Flugzeugmessungen, Ph.D. thesis, Universität Wuppertal, 2013.
- vom Scheidt, M.: Charakterisierung und Einsatz des Luftprobensammlers MIRAH zur Untersuchung von Verhältnissen stabiler Kohlenstoffisotope 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, Master's thesis, Freie Universität Berlin, 2009.
- Weber, A.: Retrieval of cloud droplet size distribution from polarised aircraft observations of the cloudbow, Bachelor thesis, Ludwig-Maximilians-Universität München, 2019.
- Weimar, J.: Detection characteristics of VIS spectrometers of the airborne HALO mini-DOAS instrument and their influence on the retrieval of trace gas abundances, Bachelor thesis, University of Heidelberg, Heidelberg, Germany, 2014.
- 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, Heidelberg, Germany, 2015.
- Wintel, J.: Charakterisierung eines GC-IRMS, Master's thesis, Bergische Universität Wuppertal, 2009.
- Wolf, K.: Flugzeuggetragene Fernerkundung von Cirren mittels zweier unabhängiger Spektrometersysteme, Master's thesis, Universität Leipzig, 2015.
- Wolff, S.: Bestimmung der Emissionsraten von CH₄- und CO₂-Punktquellen mit flugzeuggetragenem Lidar, Master's thesis, Ludwig-Maximilians-Universität München, 2018.
- Zielke, J.: Polar Tropospheric Halogens, Ph.D. thesis, University of Heidelberg, Heidelberg, Germany,

2015.