

Literaturverzeichnis

- Aimedieu, W. A., W. A. Matthews, W. Attmanspacher, R. Hartmanngreber, J. Cisneros, W. D. Komhyr und D. E. Robbins, Comparison of in situ stratospheric ozone measurements obtained during the MAP/GLOBUS 1983 Campaign, *Planet. Space Sci.*, 35, 563-585, 1987.
- Andrews, D., J. Holton und C. Leovy, Middle Atmosphere Dynamics, Academic Press, Orlando, 10, 1987.
- Arnold, F., K. Gollinger und S. Spreng, Balloon-based mass spectrometric measurements of stratospheric nitric acid in middle latitudes and in the late winter arctic vortex, in: Proc. of the third European workshop on polar stratospheric ozone, Schliersee, 1995.
- Atkinson, R., D. I. Baulch, R. A. Cox, R. F. Hampson, J. A. Kerr und J. Troe, Evaluated kinetic and photochemical data for atmospheric chemistry-Supplement IV, IUPAC Subcommittee on Gas Kinetic Data Evaluation for Atmospheric Chemistry, *J. Phys. Chem. Ref. Data*, 21, 1125, 1992.
- Bates, D. R. und M. Nicolet, The photochemistry of atmospheric water vapor, *J. Geophys. Res.*, 55, 301, 1950.
- Becker, G., R. Müller, D. S. McKenna und M. Rex, Modelled ozone loss rates compared to results of the Match experiment 1991/92, Fourth European Symposium on Stratospheric Ozone Research, Schliersee, eingereicht, 1997.
- Beekmann, M., G. Ancellet, G. Mégie, H. G. J. Smit und D. Kley, Intercomparison campaign of vertical ozone profiles including electrochemical sondes of ECC and Brewer-Mast type and a ground based UV-differential absorption lidar, *J. Atmos. Chem.*, 19, 259-288, 1994.
- Beyerle, G., Untersuchungen stratosphärischer Aerosole vulkanischen Ursprungs und polarer stratosphärischer Wolken mit einem Mehrwellen-Lidar auf Spitzbergen (79°N, 12°E), Dissertation, Universität Bremen, Berichte zur Polarforschung, Alfred-Wegener-Institut für Polar- und Meeresforschung (Hrsg.), 138, 1994.
- Braathen, G. O., M. Rummukainen, E. Kyrö, H. Gernandt, I. S. Mikkelsen und M. Gil, Ozone trends and PSC incidence in the Arctic vortex during the seven winters from 1988-89 to 1994-95, *J. Atmos. Chem.*, eingereicht, 1996.
- Brasseur, G. P. und S. Solomon, Aeronomy of the Middle Atmosphere, Reidel, Dordrecht, 1986.
- Brasseur, G. P., X. X. Tie, P. J. Rasch, F. Lefèvre, A three-dimensional simulation of the Antarctic ozone hole: Impact of anthropogenic chlorine on the lower stratosphere and upper troposphere, *J. Geophys. Res.*, 102, 8909-8930, 1997.
- Browell, E.V., C. F. Butler, M. A. Fenn, W. B. Grant, S. Ismail, M. R. Schoeberl, O. B. Toon, M. Loewenstein, J. R. Podolske, Ozone and aerosol changes during the 1991-1992 Airborne Arctic Stratospheric Expedition, *Science*, 261, 1155-1158, 1993.

- Burrows, J. P. und R. A. Cox, Kinetics of chlorine oxide radical reactions using modulated photolysis, Part 4, - The reactions of $\text{Cl} + \text{Cl}_2\text{O} \rightarrow \text{Cl}_2 + \text{ClO}$ and $\text{ClO} + \text{H}_2\text{O}$ - products studied at 1 atm and 300 K, *J. Chem. Soc. Faraday Trans. I*, 77, 2465, 1981.
- Chance, K., W. A. Traub, D. G. Johnson, K. W. Jucks, P. Ciarpallini, R. A. Stachnik, R. J. Salawitch und H. A. Michelson, Simultaneous measurements of stratospheric HO_x , NO_x , and Cl_x : comparison with a photochemical model, *J. Geophys. Res.*, 101, 9031-9043, 1996.
- Chapman, S., A theory of upper atmospheric ozone, *Mem. R. Soc.*, 103, 1930.
- Chipperfield, M., D. Cariolle, P. Simon, R. Ramaroson und D. J. Lary, A three-dimensional modelling study of trace species in the Arctic lower stratosphere during winter 1989-90, *J. Geophys. Res.*, 98, 7199-7218, 1993.
- Chipperfield, M. P., M. L. Santee, L. Froidevaux, G. L. Manney, W. G. Read, J. W. Waters, A. E. Roche, J. M. Russell, Analysis of UARS data in the southern polar vortex in September 1992 using a chemical transport model, *J. Geophys. Res.*, 101, 18861-18881, 1996a.
- Chipperfield, M. P., A. M. Lee und J. A. Pyle, Model calculations of ozone depletion in the Arctic polar vortex for 1991/92 to 1994/95, *Geophys. Res. Lett.*, 23, 559-562, 1996b.
- Chipperfield, M. P., P. Good, A. M. Lee, J. A. Pyle, J. Sessler, C. E. Blom, J. Burrows, A. Engel, B. Galle, F. Goutail, H. Oelhaf, M. Pirre, J. B. Renard, D. W. Toohey, G. Vaughan, J. W. Waters, G. Wetzel und J. Wohlgemuth, Comparison of SESAME data with 3D Chemical Transport Model, *J. Atmos. Chem.*, eingereicht, 1996c.
- Chubachi, S., A special ozone observation at Syowa station, Antarctica, from Feb. 1982 to Jan 1983, in: C. S. Zerefos und A. Ghazi, Atmospheric Ozone, D. Reidel Publ. Comp., Dordrecht, 285, 1984.
- Chubarova, N. Y., Ozone influence upon UV radiation and possible compensation of its impact by other atmospheric factors, in: Proc. of the First SPARC General Assembly, Melbourne, eingereicht, 1996.
- Coblentz, W. W. und R. Stair, Distribution of ozone in the stratosphere, *J. of Research*, 22, 573, 1939.
- Cox, R. A., A. R. MacKenzie, R. H. Müller, T. Peter und P. J. Crutzen, Activation of stratospheric chlorine by reactions in liquid sulphuric acid, *Geophys. Res. Lett.*, 21, 1439-1442, 1994.
- Crutzen, P. J., The influence of nitrogen oxides on the atmospheric ozone content, *Q. J. R. Meteorol. Soc.*, 96, 320-325, 1970.
- Crutzen, P. J., Ozone production rates in an oxygen-hydrogen-nitrogen oxide atmosphere, *J. Geophys. Res.*, 76, 7311-7327, 1971.
- Crutzen, P. J. und F. Arnold, Nitric acid cloud formation in the cold antarctic stratosphere: a major cause for the springtime 'ozone hole', *Nature*, 324, 651-655, 1986.
- De Backer, H., E. Schoubs und M. Allaart, Comparison of Brewer-Mast and ECC ozone sonde profiles at Uccle and De Bilt, in: Proc. of the third European workshop on polar stratospheric ozone, Schliersee, 1995.

- De Moore, W. B., S. P. Sander, D. M. Golden, R. F. Hampson, M. J. Kurylo, C. J. Howard, A. R. Ravishankara, C. E. Kolband und M. J. Molina, Chemical kinetics and photochemical data for use in stratospheric modeling, JPL publication 94-26, Pasadena, 1994.
- De Muer, D. und H. De Backer, Trend analysis of 25 years of regular ozone soundings at Uccle (Belgium), Abstract, EUROTRAC meeting, Garmisch-Partenkirchen, 1994.
- Deniel, C., Persönliche Mitteilung, 1996.
- Dickinson, R. E., A method of parameterization for infrared cooling between altitudes of 30 to 70 km, *J. Geophys. Res.*, 78, 4451-4457, 1973.
- Dobson, G. M. B., D. N. Harrison und J. Lawrence, Measurements of the amount of ozone in the earth's atmosphere and its relation to other geophysical conditions: Part III, *Proc. R. Soc.*, A122, 456-486, 1929.
- Dobson, G. M. B., A photoelectric spectrometer for measuring the amount of atmospheric ozone, *Proc. Phys. Soc., London*, 43, 324, 1931.
- Douglass, A. R., M. R. Schoeberl, R. S. Stolarski, J. W. Waters, J. M. Russel III, A. E. Roche und S. T. Massie, Interhemispheric differences in springtime production of HCl and ClONO₂ in the polar vortices, *J. Geophys. Res.*, 100, 13967-13978, 1995.
- Dunkerton, T. J. und D. P. Delisi, Evolution of potential vorticity in the winter stratosphere of January-February 1979, *J. Geophys. Res.*, 91, 1199-1208, 1986.
- Dye, J. E., D. Baumgartner, B. W. Gandrud, S. R. Kawa, K. K. Kelly, M. Loewenstein, G. V. Ferry, K. R. Chan und B. L. Gary, Particle size distribution in arctic polar stratospheric clouds, growth and freezing of sulfuric acid droplets, and implications for cloud formation, *J. Geophys. Res.*, 97, 8015-8034, 1992.
- Edouard, S., B. Legras, F. Lefèvre und R. Eymard, The effect of small-scale inhomogeneities on ozone depletion in the Arctic, *Nature*, 384, 1996.
- Evans, W. F. J., Ozone depletion in the Arctic vortex at Alert during February 1989, *Geophys. Res. Lett.*, 17, 167-170, 1990.
- Fahey, D. W., K. K. Kelly, S. R. Kawa, A. F. Tuck, M. Loewenstein, K. R. Chan und L. E. Heidt, Observations of denitrification and dehydration in the winter polar stratospheres, *Nature*, 344, 321-324, 1990.
- Farman, J. C., B. G. Gardiner und J. D. Shanklin, Large losses of total ozone in Antarctica reveal seasonal ClO_x/NO_x interaction, *Nature*, 315, 207-210, 1985.
- von der Gathen, P., M. Rex, N. R. P. Harris, D. Lucic, B. M. Knudsen, G. O. Braathen, H. De Backer, R. Fabian, H. Fast, M. Gil, E. Kyrö, I. S. Mikkelsen, M. Rummukainen, J. Stähelin und C. Varotsos, Observational evidence for chemical ozone depletion over the Arctic winter 1991-92, *Nature*, 375, 1995.
- von der Gathen, P., H. Gernandt, R. Neuber und M. Rex, Chemically and dynamically induced ozone deficits in the lower and middle stratosphere of the Arctic Polar Vortex, Abstracts of the XVIII Quadrennial Ozone Symposium, l'Aquila, 1996.
- von der Gathen, P., Persönliche Mitteilung, 1996.

- Geb, M. und B. Naujokat, Nordhemisphärischer Klimabericht zum Oktober 1995, in: *Beilage zur Berliner Wetterkarte*, 109, 1995.
- Geb, M. und B. Naujokat, Nordhemisphärischer Klimabericht zum Dezember 1995, in: *Beilage zur Berliner Wetterkarte*, 21, 1996a.
- Geb, M. und B. Naujokat, Nordhemisphärischer Klimabericht zum Februar 1996, in: *Beilage zur Berliner Wetterkarte*, 44, 1996b.
- Geb, M. und B. Naujokat, Nordhemisphärischer Klimabericht zum März 1996, in: *Beilage zur Berliner Wetterkarte*, 52, 1996c.
- Gelman, M. E., V. Ramaswamy, J. Angell, J. Barnett, M. L. Chanin, J. Christy, L. Coy, D. Cullum, Y. Koshelkov, K. Labitzke, J.-J. Lin, A. J. Miller, J. Nash, A. O'Neill, A. Oort, W. Randel, K. P. Shine und R. Swinbank, Stratospheric temperature trends derived from SPARC datasets, in: Proc. of the First SPARC General Assembly, Melbourne, eingereicht, 1996.
- Gernandt, H., A. Herber, P. von der Gathen, M. Rex, A. Rinke, S. Wessel und S. Kaneto, Variability of ozone and aerosols in the polar atmosphere, Memoirs of National Institute of Polar Research, Special Issue, No. 51, in: Proc. of the International Symposium on Environmental Research in the Arctic, Tokyo, 1996.
- Gille, J. C. und J. M. Russel III, The Limb Infrared Monitor of the Stratosphere: experiment description, performance, and results, *J. Geophys. Res.*, 89, 5125-5140, 1984.
- Götz, F. W. P., Der Stand des Ozonproblems, *Vierteljahresschrift der Naturf. Gesellschaft in Zürich*, 89, 250-264, 1944.
- Goutail, F., J.-P. Pommereau, C. Phillips, F. Lefèvre, E. Kyrö, M. Rummukainen, P. Eriksen, S. B. Andersen, B.-A. Kåstad Høiskar, G. Braathen, V. Dorokhov und V. U. Khattatov, Ozone depletion in the Arctic during the winter 1994-95, *J. Atm. Chem.*, angenommen, 1997.
- Grabbe, G. C., Untersuchung des troposphärischen Ozons mit DIAL, Examensarbeit, Max-Planck-Institut für Meteorologie Hamburg, Nr. 31, 36, 1995.
- Hall, T. M. und M. J. Prather, Seasonal evolution of N₂O, O₃ and CO₂: Three-dimensional simulations of stratospheric correlations, *J. Geophys. Res.*, 100, 16699-16720, 1995.
- Hansen, G., persönliche Mitteilung, 1996.
- Hanson, D. R. und K. Mauersberger, Laboratory studies of the nitric acid trihydrate: implications for the south polar stratosphere, *Geophys. Res. Lett.*, 15, 855-858, 1988.
- Hanson, D. R., The uptake of HNO₃ onto ice, NAT, and frozen sulfuric acid, *Geophys. Res. Lett.*, 19, 2063-2066, 1992.
- Hanson, D. R. und A. R. Ravishankara, Reaction of ClONO₂ with HCl on NAT, NAD, and frozen sulfuric acid and hydrolysis of N₂O₅ and ClONO₂ on frozen sulfuric acid, *J. Geophys. Res.*, 98, 22931-22936, 1993.
- Hanson, D. R. und E. R. Lovejoy, The reaction of ClONO₂ with submicrometer sulfuric acid aerosol, *Science*, 267, 1326-1328, 1995.
- Hills, A. J. und C. J. Howard, Rate coefficient temperature dependence and branching ratio for the OH - ClO reaction, *J. Chem. Phys.*, 81, 4458-4465, 1984.

- Hofmann, D. J., T. L. Deshler, P. Amedieu, W. A. Matthews, P. V. Johnston, Y. Kondo, W. R. Sheldon, G. J. Byrne und J. R. Benbrook, Stratospheric clouds and ozone depletion in the Arctic during January 1989, *Nature*, 340, 117-121, 1989.
- Hofmann, D. J. und T. Deshler, Evidence from balloon measurements for chemical depletion of stratospheric ozone in the Arctic winter of 1989-90, *Nature*, 349, 300-305, 1991.
- Hofmann, D. J., S. J. Oltmans, J. A. Lathrop, J. M. Harris und H. Voemel, Record low ozone at the South Pole in spring of 1993, *Geophys. Res. Lett.*, 21, 421-424, 1994.
- Hofmann, D. J., The Antarctic ozone hole, *Nature*, 383, 1996.
- Holton, J., P. Haynes, M. E. McIntyre, A. R. Douglass, R. B. Rood und L. Pfister, Stratosphere-troposphere exchange, *Reviews of Geophysics*, 33, 403-439, 1995.
- Holton, J., Middle Atmosphere Dynamics, in: The role of the stratosphere in the climate system, G. Brasseur (Editor), NATO ASI series, Springer, Hamburg, im Druck, 1997.
- Hübner, G., D. W. Fahey, K. K. Kelly, D. D. Montzka, M. A. Carroll, A. F. Tuck, L. E. Heidt, W. H. Pollock, G. L. Gregory und J. F. Vedder, Redistribution of reactive odd nitrogen in the lower Arctic stratosphere, *Geophys. Res. Lett.*, 17, 453-456, 1990.
- Kerr, J. B., H. Fast, C. T. McElroy, S. J. Oltmans, J. A. Lathrop, E. Kyrö, A. Paukkunen, H. Claude, U. Köhler, C. R. Sreedharan, T. Takao und Y. Tsukagoshi, The international 1991 WMO ozonesonde intercomparison at Vanscoy, Canada, *Atmosphere-Ocean*, 32, 685-716, 1994.
- Kiehl, J., Radiative transfer theory, in: The role of the stratosphere in the climate system, G. Brasseur (Editor), NATO ASI series, Springer, Hamburg, im Druck, 1997.
- Kilbane-Dawe, I., Persönliche Mitteilung, 1997.
- Knudsen, B., Trajektorien Daten, NADIR Datenbank, NILU, 1996.
- Knudsen, B., J. M. Rosen, N. T. Kjome und A. T. Whitten, Accuracy of ECMWF stratospheric temperature analyses and the implications for PSC formation in the Arctic, in: Proc. of the XVIII Quadrennial Ozone Symposium, l'Aquila, eingereicht, 1996.
- Komhyr, W. D. und T. B. Harris, Development of the ECC ozonesonde, NOAA Technical Report ERL 200-APCL 18, U.S. department of Commerce, NOAA Environmental Research Laboratories, Boulder, Colorado, 1971.
- Komhyr, W. D., Operations Handbook: Ozone measurements to 40 km altitude with model 4A electrochemical concentration cell (ECC) ozonesondes, NOAA Technical Memorandum, ERL ARL-149, Nat. Oceanic and Atmos. Admin., Washington D.C., 1986.
- Kuhlbarsch, T. und B. Naujokat, Nordhemisphärischer Klimabericht zum Januar 1996, in: *Beilage zur Berliner Wetterkarte*, 31, 1996.
- Labitzke, K. und H. van Loon, Associations between the 11-year solar cycle, the QBO and the atmosphere. Part I: the troposphere and the stratosphere in the northern hemisphere in winter, *J. A. T. Phys.*, 50, 197-206, 1988.
- Labitzke, K. und H. van Loon, Die 10-12jährige Schwingung in der Stratosphäre, *Promet, Heft 2-4*, 58-62, 1992.

- Labitzke, K. und H. van Loon, Some recent studies of probable connections between solar and atmospheric variability, *Ann. Geophys.*, *11*, 1084-1094, 1993.
- Lacis, A. A. und J. E. Hansen, A parameterization for the absorption of solar radiation in the earth's atmosphere, *J. Atmos. Sci.*, 118-113, 1974.
- Lary, D. J., M. P. Chipperfield und R. Toumi, The potential impact of the reaction $\text{OH} + \text{ClO} \rightarrow \text{HCl} + \text{O}_2$ on polar ozone photochemistry, *J. of Atmos. Chem.*, *21*, 61-79, 1995.
- Lefèvre, F., Persönliche Mitteilung, 1996.
- Lehmann R. und J. Notholt, Comparison of trace gas column densities, measured by FTIR in the Arctic, with results of a one-dimensional model including vertical transport and chemistry, in: Proc. of the XVIII Quadrennial Ozone Symposium, l'Aquila, eingereicht, 1996.
- Lehmann, R., Persönliche Mitteilung, 1997.
- Leu, M. T. und C. L. Lin, Rate constants for the reactions of OH with ClO, Cl₂, and Cl₂O at 298 K, *Geophys. Res. Lett.*, *6*, 425, 1979.
- van der Leun, J. C., X. Tang und M. Tevini, Environmental effects of ozone depletion: 1994 assessment, *Ambio*, *24*, 139-141, 1995.
- Manney, G. L., L. Froidevaux, J. W. Waters, R. W. Zurek, W. G. Read, L. S. Elson, J. B. Kumer, J. L. Mergenthaler, A. E. Roche, A. O'Neill, R. S. Harwood, I. MacKenzie und R. Swinbank, Chemical depletion of ozone in the Arctic lower stratosphere during winter 1992-93, *Nature*, *370*, 429-434, 1994.
- Manney, G. L., R. W. Zurek, L. Froidevaux und J. W. Waters, Evidence for Arctic ozone depletion in late February and early March 1994, *Geophys. Res. Lett.*, *22*, 2941-2944, 1995.
- Manney, G. L., M. L. Santee, L. Froidevaux, J. W. Waters und R. W. Zurek, Polar vortex conditions during the 1995-96 Arctic winter: meteorology and MLS ozone, *Geophys. Res. Lett.*, *23*, 3203-3206, 1996a.
- Manney, G. L., L. Froidevaux, J. W. Waters, M. L. Santee, W. G. Read, D. A. Flower, R. F. Jarnot und R. W. Zurek, Arctic ozone depletion observed by UARS MLS during the 1994-95 winter, *Geophys. Res. Lett.*, *23*, 85-88, 1996b.
- Michelsen, H. A., R. J. Salawitch, M. R. Gunson, C. Aellig, N. Kämpfer, M. M. Abbas, M. C. Abrams, T. L. Brown, A. Y. Chang, A. Goldman, F. W. Irion, M. J. Newchurch, C. P. Rinsland, G. P. Stiller und R. Zander, Stratospheric chlorine partitioning: constraints from shuttle-borne measurements of [HCl], [ClONO₂], and [ClO], *Geophys. Res. Lett.*, *23*, 2361-2364, 1996.
- Molina, M. J. und F. S. Rowland, Stratospheric sink for chlorofluoromethans: Chlorine atom catalysed destruction of ozone, *Nature*, *249*, 810-812, 1974.
- Molina, L. T. und M. J. Molina, Production of Cl₂O₂ from the selfreaction of the ClO radical, *J. Phys. Chem.*, *91*, 433-436, 1987.
- Molina, M. J., R. Zhang, P. J. Woodbridge, J. R. McMahon, J. E. Kim, H. Y. Chang und K. D. Beyer, Physical chemistry of the H₂SO₄/HNO₃/H₂O system: implications for polar stratospheric clouds and heterogenous chemistry, *Science*, *261*, 1418-1423, 1993.

- Müller, R., Die Chemie des Ozons in der polaren Stratosphäre, Dissertation, Freie Universität Berlin, Shaker, Aachen, 1994.
- Müller, R., T. Peter, P. J. Crutzen, H. Oelhaf, G. P. Adrian, T. v. Clarmann, A. Wegener, U. Schmidt und D. Lary, Chlorine chemistry and the potential for ozone depletion in the arctic stratosphere in the winter 1991/92, *Geophys. Res. Lett.*, *21*, 1427-1430, 1994.
- Müller, R., P. J. Crutzen, J. U. Grooß, C. Brühl, J. M. Russel und A. F. Tuck, Chlorine activation and ozone depletion in the Arctic vortex: Observations by the Halogen Occultation Experiment on the Upper Atmosphere Research Satellite, *J. Geophys. Res.*, *101*, 12531-12554, 1996.
- Müller, R., P. J. Crutzen, J.-U. Grooß, C. Brühl, J. M. Russell III, H. Gernandt, D. S. McKenna und A. F. Tuck, Record chemical ozone loss in the Arctic during the winter of 1995-1996, *Nature*, angenommen, 1997.
- Nagatani, R. M., A. J. Miller, M. E. Gelman und P. A. Newman, A comparison of the Arctic lower stratospheric winter temperatures for 1988-89 with temperatures since 1964, *Geophys. Res. Lett.*, *17*, 333-336, 1990.
- Naujokat, B., K. Petzold, K. Labitzke, R. Lenschow, B. Rajewski, M. Wiesner und R.-C. Wohlfart, The Stratospheric Winter 1991/92: The Winter of the European Arctic Stratospheric Ozone Experiment, *Beilage zur Berliner Wetterkarte, SO 18/92*, 1992.
- Naujokat, B. und C. Marquardt, Die annähernd zweijährige Schwingung (QBO), *Promet, Heft 2-4*, 62-68, 1992.
- Naujokat, B., Stratosphärenenerwärmung: Synoptik, *Promet, Heft 2-4*, 81-89, 1992c.
- Naujokat, B., K. Labitzke, R. Lenschow, B. Rajewski, M. Wiesner und R.-C. Wohlfart, The Stratospheric winter 1994/95: A cold winter with a strong minor warming, *Beilage zur Berliner Wetterkarte, SO 24/95*, 1995.
- Naujokat, B. und S. Pawson, The cold stratospheric winters 1994/95 and 1995/96, *Geophys. Res. Lett.*, *23*, 3703-3706, 1996.
- Newman, P., L. R. Lait, M. Schoeberl, E. R. Nash, K. Kelly, D. W. Fahey, R. Nagatani, D. Toohey, L. Avallone und J. Anderson, Stratospheric meteorological conditions in the Arctic Polar Vortex, 1991 to 1992, *Science*, *261*, 1143-1145, 1993.
- Notholt, J., Persönliche Mitteilung, 1997.
- Oelhaf, H., G. Wetzell, T. von Clarmann, M. Schmidt, J. B. Renard, M. Pirre, E. Lateltin, P. Amedieu, C. Phillips, F. Goutail, J.-P. Pommereau, Y. Kondo, T. Sugita, H. Nakajima, M. Koike, W. J. Williams, F. J. Mucray, P. Sullivan, A. Engel, U. Schmidt und A. M. Lee, Correlative balloon measurements of the vertical distribution of N₂O, NO, NO₂, NO₃, HNO₃, N₂O₅, ClONO₂ and total reactive NO_y inside the polar vortex during SESAME, in: Proc. of the third European workshop on polar stratospheric ozone, Schliersee, 1995.
- Pawson, S., B. Naujokat und K. Labitzke, On the polar stratospheric cloud formation potential of the northern stratosphere, *J. Geophys. Res.*, *100*, 23215-23225, 1995.
- Peter, T., The Stratospheric ozone layer - an overview, *Environ. Pollut.*, *83*, 69-79, 1993.

- Petzold, K., B. Naujokat und K. Neugeboren, Correlation between stratospheric temperature, total ozone, and tropospheric weather systems, *Geophys. Res. Lett.*, *21*, 1203-1206, 1994.
- Plumb, R. A. und M. W. K. Ko, Interrelationships between mixing ratios of long-lived stratospheric constituents, *J. Geophys. Res.*, *97*, 10145-10156, 1992.
- Poulet, G., G. Laverdet und G. Le Bras, Rate constant and branching ratio for the reaction of OH and ClO, *J. Phys. Chem.*, *90*, 159, 1986.
- Portmann, R. W., S. Solomon, R. R. Garcia, L. W. Thomason, L. R. Poole, M. P. McCormick, The role of aerosol variations in anthropogenic ozone depletion in the polar regions, *J. Geophys. Res.*, *101*, 22991-23006, 1996.
- Prather, M. J., Numerical advection by conservation of second order moments, *J. Geophys. Res.*, *91*, 6671-6681, 1986.
- Proffitt, M. H., J. J. Margitan, K. K. Kelly, M. Loewenstein, J. R. Podolske und K. R. Chan, Ozone loss in the Arctic polar vortex inferred from high altitude aircraft measurements, *Nature*, *347*, 31-36, 1990.
- Proffitt, M. H., K. Aiken, J. J. Margitan, M. Loewenstein, J. R. Podolske, A. Weaver, K. R. Chan, H. Fast und J. W. Elkins, Ozone loss inside the northern polar vortex during the 1991-92 winter, *Science*, *261*, 1150-1154, 1993.
- Ravishankara, A. R., F. L. Eisele und P. H. Wine, The kinetics of the reaction of OH with ClO, *J. Chem. Phys.*, *78*, 1140-1144, 1983.
- Reid, S. J., M. Rex, P. von der Gathen, I. Fløisand, F. Stordal, G. D. Carver, E. Reimer, R. Krüger-Carstensen, F. M. O'Connor, G. O. Braathen, G. Murphy, J. Wenger, C. Zerefos und C. Varotsos, A study of ozone laminae using quasi isentropic trajectories, contour advection and photochemical trajectory model simulations, *J. Atmos. Chem.*, angenommen, 1997.
- Rex, M., Stratosphärische Ozonabbauraten aus den Ozonsondendaten der EASOE-Kampagne, Diplomarbeit, Georg-August-Universität Göttingen, 1993.
- Rex, M., P. von der Gathen, N. R. P. Harris, E. Reimer, A. Beck, R. Alfier, B. M. Knudsen, I. S. Mikkelsen, M. Chipperfield, D. Lucic, M. Allaart, H. De Backer, G. O. Braathen, S. J. Reid, H. Claude, F. O'Connor, H. Dier, H. Fast, A. Gamma, M. Gil, M. Guirlet, E. Kyrö, M. Rummukainen, Z. Litynska, B. Kois, G. Murphy, F. Ravegnani, C. Varotsos, J. Wenger, V. Yushkov, V. Dorokhov, C. Zerefos, D. Balis und I. Ziomas, A lagrangian approach to separate stratospheric chemical ozone loss from dynamical effects: results for the arctic winters 91/92 and 94/95, in: Abstracts of the international conference on ozone in the lower stratosphere, Halkidiki, 1995a.
- Rex, M., P. von der Gathen, N. R. P. Harris, E. Reimer, A. Beck, R. Alfier, R. Krüger-Carstensen, B. M. Knudsen, I. S. Mikkelsen, M. P. Chipperfield, D. Lucic, M. Allaart, H. De Backer, G. O. Braathen, S. Reid, H. Claude, F. O'Connor, H. Dier, H. Fast, A. Gamma, M. Gil, S. Godin, M. Guirlet, E. Kyrö, M. Rummukainen, Z. Litynska, B. Kois, G. Murphy, F. Ravegnani, C. Varotsos, J. Wenger, V. Yushkov, V. Dorokhov, C. Zerefos, D. Balis und I. Ziomas, Chemical ozone loss in the Arctic winters 1991/92 and 1994/95 (Match), in: Proc. of the third European workshop on polar stratospheric ozone, Schliersee, 1995b.

- Rex, M., P. von der Gathen, N. R. P. Harris, D. Lucic, B. M. Knudsen, G. O. Braathen, S. J. Reid, H. De Backer, H. Claude, R. Fabian, H. Fast, M. Gil, E. Kyrö, I. S. Mikkelsen, M. Rummukainen, H. G. Smit, J. Stähelin, C. Varotsos und I. Zeitcev, In-situ measurements of stratospheric ozone depletion rates in the Arctic winter 1991/92: a Lagrangian approach, *J. Geophys. Res.*, eingereicht, 1996a.
- Rex, M., P. von der Gathen, G. O. Braathen, S. J. Reid, N. R. P. Harris, M. Chipperfield, E. Reimer, A. Beck, R. Alfier, R. Krüger-Carstensen, H. De Backer, D. Balis, C. Zerefos, F. O'Connor, H. Dier, V. Dorokhov, H. Fast, A. Gamma, M. Gil, E. Kyrö, M. Rummukainen, Z. Litynska, I. S. Mikkelsen, M. Molyneux und G. Murphy, Chemical ozone loss in the Arctic winter 1994/95 as determined by the Match technique, *J. Atm. Chem.*, eingereicht, 1996b.
- Rex, M., N. R. P. Harris, P. von der Gathen, R. Lehmann, G. O. Braathen, E. Reimer, A. Beck, M. P. Chipperfield, R. Alfier, M. Allaart, F. O'Connor, H. Dier, V. Dorokhov, H. Fast, M. Gil, E. Kyrö, Z. Litynska, I. S. Mikkelsen, M. Molyneux, H. Nakane, J. Notholt, M. Rummukainen, P. Viatte und J. Wenger, *Nature*, eingereicht, 1996c.
- Rosenfield, J. E., P. A. Newman und M. R. J. Schoeberl, Computations of diabatic descent in the stratospheric polar vortex, *J. Geophys. Res.*, 99, 16677-16689, 1994.
- Rummukainen, M., B. Knudsen und P. von der Gathen, Dynamical diagnostics of the edges of the polar vortices, *Ann. Geophysicae*, 12, 1114-1118, 1994.
- Salawitch, R. J., M. B. McElroy, J. H. Yatteau, S. C. Wofsy, M. R. Schoeberl, L. R. Lait, P. A. Newman, K. R. Chan, M. Loewenstein, J. R. Podolske, S. E. Strahan und M. H. Proffitt, Loss of ozone in the Arctic vortex for the winter of 1989, *Geophys. Res. Lett.*, 17, 561-564, 1990.
- Salawitch, R. J., S. C. Wofsy, E. W. Gottlieb, L. R. Lait, P. A. Newman, M. R. Schoeberl, M. Loewenstein, J. R. Podolske, S. E. Strahan, M. H. Proffitt, C. R. Webster, R. D. May, D. W. Fahey, D. Baumgardner, J. E. Dye, J. C. Wilson, K. K. Kelly, J. W. Elkins, K. R. Chan, J. G. Anderson, Chemical loss of ozone in the Arctic polar vortex in the winter of 1991-1992, *Science*, 261, 1146-1149, 1993.
- Santee, M. L., W. G. Reed, J. W. Waters, L. Froidevaux, G. L. Manney, D. A. Flower, R. F. Jamot, R. S. Harwood und G. E. Peckham, Interhemispheric differences in polar stratospheric HNO₃, H₂O, ClO, and O₃, *Science*, 267, 849-852, 1995.
- Santee, M. L., L. Froidevaux, G. L. Manney, W. G. Read, J. W. Waters, M. P. Chipperfield, A. E. Roche, J. B. Kumer, J. L. Mergenthaler und J. M. Russell, Chlorine deactivation in the lower stratospheric polar regions during late winter: results from UARS, *J. Geophys. Res.*, 101, 18835-18859, 1996a.
- Santee, M. L., G. L. Manney, W. G. Read, L. Froidevaux und J. W. Waters, Polar vortex conditions during the 1995-1996 Arctic winter: MLS ClO and HNO₃, *Geophys. Res. Lett.*, 23, 3207-3210, 1996b.
- Santee, M. L., Persönliche Mitteilung, 1997.
- Scherhag, R., Die explosionsartige Stratosphärenenerwärmung des Spätwinters 1951-52, *Ber. Deut. Wetterdienst*, 38, 51-36, 1952.
- Schoeberl, M. R., M. H. Proffitt, K. K. Kelly, L. R. Lait, P. A. Newman, J. E. Rosenfield, M. Loewenstein, J. R. Podolske, S. E. Strahan und K. R. Chan, Stratospheric constituent trends from ER-2 profile data, *Geophys. Res. Lett.*, 17, 469-472, 1990.

- Shine, K. P., The middle atmosphere in the absence of dynamical heat fluxes, *Q. J. R. Meteorol. Soc.*, *113*, 603-633, 1987.
- Shine, K. P. und J. A. Rickaby, Solar radiative heating due to absorption by ozone, in: Proc. of Quadrennial Ozone Symposium, A. Deepak, Hampton, Va., 597-600, 1989.
- Smit, H. G., W. Sträter, M. Helten, D. Kley, D. Ciupa, H. Claude, U. Köhler, B. Hoegger, G. Levrat, B. Johnson, S. J. Oltmans, J. B. Kerr, D. Tarasick, J. Davies, M. Shitamichi, S. Srivastav und C. Vialle, JOSIE: The 1996 WMO international intercomparison of ozonesondes under quasi flight conditions in the environmental simulation chamber at Jülich, in: Proc. of the XVIII Quadrennial Ozone Symposium, l'Aquila, eingereicht, 1996.
- Solomon, S., R. R. Garcia, F. S. Rowland und D. J. Wuebbles, On the depletion of Antarctic ozone, *Nature*, *321*, 755-758, 1986.
- Solomon, S., R. R. Garcia und A. R. Ravishankara, On the role of iodine in ozone depletion, *J. Geophys. Res.*, *99*, 20491-20499, 1994.
- Solomon, S., R. W. Portmann, R. R. Garcia, L. W. Thomason, L. R. Poole und M. P. McCormick, The role of aerosol variations in anthropogenic ozone depletion at northern mid-latitudes, *J. Geophys. Res.*, *101*, 6713-6727, 1996.
- Stebel, K., O. Schrems, R. Neuber, G. Beyerle, J. Biele, I. Beninga, P. Scheuch, H. Schütt und P. von der Gathen, Polar stratospheric clouds above Spitsbergen, in: Proc. of the XVIII Quadrennial Ozone Symposium, l'Aquila, eingereicht, 1996.
- Stolarski, R., R. Bojkov, L. Bishop, C. Zerefos, J. Stähelin und J. Zawodny, Measured trends in stratospheric ozone, *Science*, *256*, 342-349, 1992.
- Strahan, S. E., J. E. Rosenfield, M. Loewenstein, J. R. Podolske und A. Weaver, Evolution of the 1991-1992 Arctic vortex and comparison with the geophysical fluid dynamics laboratory SKYHI general circulation model, *J. Geophys. Res.*, *99*, 20713-20723, 1994.
- Tabazadeh, A., R. P. Turco und M. Z. Jacobson, A model for studying the composition and chemical effects of stratospheric aerosols, *J. Geophys. Res.*, *99*, 12897-12914, 1994.
- Tabazadeh, A., O. B. Toon, B. L. Gary, J. T. Bacmeister und M. R. Schoeberl, Observational constraints on the formation of type Ia polar stratospheric clouds, *Geophys. Res. Lett.*, *23*, 2109-2112, 1996.
- Tolbert, M. A., Sulfate aerosols and polar stratospheric cloud formation, *Science*, *264*, 527-528, 1994.
- Toon, O. B., P. Hamill, R. P. Turco und J. Pinto, Condensation of HNO₃, and HCl in the winter polar stratosphere, *Geophys. Res. Lett.*, *13*, 1284-1286, 1986.
- Toon, O. B. und M. A. Tolbert, Spectroscopic evidence against nitric acid trihydrate in polar stratospheric clouds, *Nature*, *375*, 218-221, 1995.
- Urban, J., V. Eyring, H. Küllmann, K. Künzi, G. Mellmann, J. Wohlgemuth, A. Goede, A. de Jonge, Q. Kleipool, J. Mees, J. de Valk, N. Whyborn, H. Hetzheim, H. W. Hübers, G. Schwaab und M. P. Chipperfield, Observations of stratospheric ClO, HCl, O₃, N₂O, and HO₂ at high latitudes during the winters of 1995 and 1996 with the Airborne-Submillimeter-SIS-Radiometer, in: Proc. of the XVIII Quadrennial Ozone Symposium, l'Aquila, eingereicht, 1996.

- Vaisala, Ozonesondes users's guide, Vaisala GmbH, Hamburg, 1991.
- Valero, F. P. J., S. Platnick, S. Kinne, P. Pielewski und A. Bucholtz, Airborne brightness temperature measurements of the polar winter troposphere as part of the Airborne Arctic Stratospheric Experiment II and the effect of brightness temperature variations on the diabatic heating in the lower stratosphere, *Geophys. Res. Lett.*, 20, 2575-2578, 1993.
- Vömel, H., M. Rummukainen, R. Kivi, J. Karhu, T. Turunen, E. Kyrö, J. Rosen, N. Kjome und S. Oltmans, Dehydration and sedimentation of ice particles in the Arctic stratospheric vortex, *Geophys. Res. Lett.*, 24, 795-798, 1997.
- Waters, J. W., L. Froidevaux, W. G. Read, G. L. Manney, L. S. Elson, D. A. Flower, R. F. Jarnot und R. S. Harwood, Stratospheric ClO and ozone from the Microwave Limb Sounder on the Upper Atmosphere Research Satellite, *Nature*, 362, 597-602, 1993a.
- Waters, J. W., L. Froidevaux, G. L. Manney, W. G. Read und L. S. Elson, MLS observations of lower stratospheric ClO and O₃ in the 1992 southern hemisphere winter, *Geophys. Res. Lett.*, 20, 1219-1222, 1993b.
- Webster, C. R., R. D. May, D. W. Toohey, L. M. Avallone, J. G. Anderson, P. Newman, L. Lait, M. R. Schoeberl, J. W. Elkins und K. R. Chan, Chlorine chemistry on polar stratospheric cloud particles in the Arctic winter, *Science*, 261, 1130-1133, 1993.
- Wirth, M. und W. Renger, Evidence of large scale ozone depletion within the arctic polar vortex 94/95 based on airborne LIDAR measurements, *Geophys. Res. Lett.*, 23, 813-816, 1996.
- World Meteorological Organisation, Scientific Assessment of Ozone Depletion: 1994, Report No. 37, 1995.