

Curriculum Vitae

Stephan Mertes



Education & Employment

1981 - 1988	Diploma physics study, University of Bonn
1988 - 1992	PhD student at the Institute for Atmospheric Chemistry (ICG-3) of the HGF Research Centre Jülich
1992	Doctorate degree at the University of Bonn
1988-1991	Graduate assistant at the Institute for Atmospheric Chemistry (ICG-3) of the HGF Research Centre Jülich
1991-1992	Research associate at the Institute for Atmospheric Chemistry (ICG-3) of the HGF Research Centre Jülich
1992-1995	Postdoctoral research fellow at the Leibniz-Institute for Tropospheric Research, Leipzig
Since 1995	Scientific employee at the Leibniz-Institute for Tropospheric Research, Leipzig

Projects & Field campaigns

1994	Field campaign of the EU-project CHEMDROP, Po-valley, Italy
1995 - 1997	EU-project CIME, Puy-de-Dôme, France
1998 - 2000	PI within the German aerosol research program AFS, Mt. Brocken, Germany
2001 - 2003	PI within FEBUKO within the German atmospheric research program AFO2000, Schmücke, Germany
2004	PI during PRACS-RICO, Pico del Este, Puerto Rico
2004, 2005, 2006	PI during CLACE-3, CLACE-4 and CLACE-5, Jungfrauoch, Switzerland

Research Interests

Investigation of aerosol cloud interactions by in-situ ground-based and airborne measurements. This implies sampling of hydrometeors (droplets, ice particles) and interstitial/out-of-cloud aerosols for the in-situ physico-chemical characterisation of residual, interstitial and ambient atmospheric particles. By means of these measurements, the impact of the abundant aerosol population on the microphysical parameters of warm clouds as well as on ice formation in cold clouds by heterogeneous nucleation can be analysed.

Publications

2006

Cozic, J., Verheggen, B., Mertes, S., Connolly, P., Bower, K.N., Petzold, A., Baltensperger, U. and Weingartner, E., 2006. Scavenging of black carbon in mixed phase clouds at the high alpine site Jungfraujoch. *Atmospheric Chemistry and Physics Discussion*: accepted.

Mertes, S., Verheggen, B., Walter, S., Conolly, P., Ebert, M., Schneider, J., Bower, K.N., Inerle-Hof, M., Cozic, J., Baltensperger, U. and Weingartner, E., 2006. Counterflow virtual impactor based collection of small ice particles in mixed-phase clouds for the physico-chemical characterisation of tropospheric ice nuclei: Sampler description and first case study. *Aerosol Science and Technology*: submitted.

Verheggen, B., Cozic, J., Weingartner, E., Bower, K.N., Mertes, S., Connolly, P., Gallagher, M., Flynn, M., Choulaton, T.W. and Baltensperger, U., 2006. Aerosol activation in mixed phase clouds at the high alpine site Jungfraujoch. *Journal of Geophysical Research (D)*: submitted.

Weingartner, E., Verheggen, B., Lohmann, U., Bower, K.N., Mertes, S., Schneider, J., Cozic, J., Walter, S., Alfarra, M.R., Borrmann, S., Choulaton, T., Coe, H., Connolly, P., Crosier, J., Curtius, J., Ebert, M., Ekeren, J.S.v., Flynn, M., Gallagher, M.W., Gysel, M., Henning, S., Worringer, A., Petzold, A., Sjogren, S., Weinbruch, S. and Baltensperger, U., 2006. Ice clears up a cloudy picture. *Nature*, submitted.

2005

Brüggemann, E., Gnauk, T., Mertes, S., Acker, K., Auel, R., Wieprecht, W., Möller, D., Collett Jr., J.L., Chang, H., Galgon, D., Chemnitzer, R., Rüd, C., Junek, R., Wiedensohler, A. and Herrmann, H., 2005. Schmücke hill cap cloud and valley stations aerosol characterisation during FEBUKO (I): Particle size distribution, mass, and main components. *Atmospheric Environment*, 39(23-24): 4291-4303.

Herrmann, H., Wolke, R., Müller, K., Brüggemann, E., Gnauk, T., Barzagli, P., Mertes, S., Lehmann, K., Massling, A., Birmili, W., Wiedensohler, A., Wieprecht, W., Acker, K., Jaeschke, W., Kramberger, H., Svrčina, B., Bächmann, K., Collett Jr., J.L., Galgon, D., Schwirn, K., Nowak, A., van Pinxteren, D., Plewka, A., Chemnitzer, R., Rüd, C., Hofmann, D., Tilgner, A., Diehl, K., Heinold, B., Hinneburg, D., Knoth, O., Sehili, A.M., Simmel, M., Wurzler, S., Majdik, Z.-T., Mauersberger, G. and Müller, F., 2005. FEBUKO and MODMEP: Field measurements and modelling of aerosol and cloud multiphase processes. *Atmospheric Environment*, 39(23-24): 4169-4183.

Lehmann, K., Maßling, A., Tilgner, A., Mertes, S., Galgon, D. and Wiedensohler, A., 2005. Size-resolved soluble volume fractions of submicrometer particles in air masses of different character. *Atmospheric Environment*, 39(23-24): 4257-4266.

Mertes, S., Galgon, D., Schwirn, K., Nowak, A., Lehmann, K., Maßling, A., Wiedensohler, A. and Wieprecht, W., 2005a. Evolution of particle concentration and size distribution observed upwind, inside and downwind hill cap clouds at connected flow conditions during FEBUKO. *Atmospheric Environment*, 39(23-24): 4233-4245.

Mertes, S., Lehmann, K., Nowak, A., Maßling, A. and Wiedensohler, A., 2005b. Link between aerosol hygroscopic growth and droplet activation observed for hill-capped clouds at connected flow conditions during FEBUKO. *Atmospheric Environment*, 39(23-24): 4247-4256.

van Pinxteren, D., Plewka, A., Hofmann, D., Müller, K., Kramberger, H., Svrčina, B., Bächmann, K., Jaeschke, W., Mertes, S., Collett Jr., J.L. and Herrmann, H., 2005. Schmücke hill cap cloud and valley stations aerosol characterisation during FEBUKO (II): Organic compounds. *Atmospheric Environment*, 39(23-24): 4305-4320.

Wieprecht, W., Acker, K., Mertes, S., Collett Jr., J.L., Jaeschke, W., Brüggemann, E., Möller, D. and Herrmann, H., 2005. Cloud physics and cloud water sampler comparison during FEBUKO. *Atmospheric Environment*, 39(23-24): 4267-4277.

2004

Mertes, S., Dippel, B. and Schwarzenböck, A., 2004. Quantification of graphitic carbon in atmospheric aerosol particles by Raman spectroscopy and first application for the determination of mass absorption efficiencies. *Journal of Aerosol Science*, 35: 347-361.

2002

Acker, K., Mertes, S., Möller, D., Wieprecht, W., Auel, R. and Kalaß, D., 2002. Case study of cloud physical and chemical processes in low clouds at Mt. Brocken. *Atmospheric Research*, 64(1-4): 41-51.

2001

Laj, P., Flossmann, A.I., Wobrock, W., Fuzzi, S., Orsi, G., Ricci, L., Mertes, S., Schwarzenböck, A., Heintzenberg, J. and Ten Brink, H., 2001. Behaviour of H₂O₂, NH₃ and black carbon in a mixed phase clouds during CIME. *Atmospheric Research*, 58(4): 315-336.

Mertes, S., Schwarzenböck, A., Laj, P., Wobrock, W., Pichon, J.M., Orsi, G. and Heintzenberg, J., 2001. Changes of cloud microphysical properties during the transition from supercooled to mixed-phase conditions during CIME. *Atmospheric Research*, 58(4): 267-294.

Schwarzenböck, A., Mertes, S., Heintzenberg, J., Wobrock, W. and Laj, P., 2001. Impact of the Bergeron-Findeisen process on the release of aerosol particles during the evolution of cloud ice. *Atmospheric Research*, 58(4): 295-313.

Wobrock, W., Flossmann, A.I., Monier, M., Pichon, J.M., Cortez, L., Fournol, J.F., Schwarzenböck, A., Mertes, S., Heintzenberg, J., Laj, P., Orsi, G., Ricci, L., Fuzzi, S., Ten Brink, H., Jongejan, P. and Otjes, R., 2001. The Cloud Ice Mountain Experiment CIME 1998: Experiment overview and modelling of the microphysical processes during the seeding by isentropic gas expansion. *Atmospheric Research*, 58(4): 231-265.

2000

Gérémy, G., Wobrock, W., Flossmann, A.I., Schwarzenböck, A. and Mertes, S., 2000. A modelling study on the activation of small Aitken-mode particles during CIME 97. *Tellus*, 52B(3): 959-979.

Schwarzenböck, A., Heintzenberg, J. and Mertes, S., 2000. Incorporation of aerosol particles between 25 and 850 nanometers into cloud elements: Measurement with a new complementary sampling system. *Atmospheric Research*, 52(4): 241-260.

1998

Fuzzi, S., Laj, P., Ricci, L., Orsi, G., Heintzenberg, J., Wendisch, M., Yuskiewicz, B., Mertes, S., Orsini, D., Schwanz, M., Wiedensohler, A., Stratmann, F., Berg, O.H., Swietlicki, E., Frank, G., Martinsson, B.G., Günther, A., Dierssen, J., Schell, D., Jaeschke, W., Berner, A., Dusek, U., Galambos, Z., Krusiz, C., Mesfin, S.N., Wobrock, W., Arends, B. and ten Brink, H., 1998. Overview of the Po Valley fog experiment 1994 (CHEMDROP). *Contributions to Atmospheric Physics*, 71(1): 3-19.

Wendisch, M., Mertes, S., Heintzenberg, J., Wiedensohler, A., Schell, D., Wobrock, W., Frank, G., Martinsson, B., Fuzzi, S., Orsi, G., Kos, G. and Berner, A., 1998. Drop size distribution and LWC in Po Valley fog. *Contributions to Atmospheric Physics*, 71(1): 87-100.

Wobrock, W., Jaeschke, W., Schell, D., Wendisch, M., Mertes, S., Teichmann, U., Laubach, J., Fuzzi, S. and Orsi, G., 1998. Observations of the turbulence structure of wind, temperature and liquid water content in a foggy surface layer. *Contributions to Atmospheric Physics*, 71(1): 171-187.

1997

Mertes, S. and Wendisch, M., 1997. Microphysical and optical features of polluted cooling tower clouds. *Atmospheric Research*, 44: 271-292.

1996

Wendisch, M., Mertes, S., Ruggaber, S. and Nakajima, T., 1996. Vertical profiles of aerosol and radiation under cloudless conditions: measurements and radiative transfer calculations. *Journal of Applied Meteorology*, 35(10): 1703-1715.

1995

Mertes, S., Schröder, F. and Wiedensohler, A., 1995. The particle detection efficiency curve of the TSI-3010 CPC as a function of the temperature difference between saturator and condenser. *Aerosol Science and Technology*, 23: 257-261.

Mertes, S. and Wahner, A., 1995. Uptake of nitrogen dioxide and nitrous acid on aqueous surfaces. *Journal of Physical Chemistry*, 99: 14000-14006.

Colloquia and Invited Talks

Mertes, S., 2006. Sammlung kleiner Eispartikel zur physiko-chemischen Charakterisierung troposphärischer Eiskeime mithilfe der Counterflow Virtual Impactor Technik. 8. Mitgliederversammlung des SFB 641 TROPEIS, Mainz, Deutschland.

Mertes, S., 2006. Felduntersuchungen der Aerosol-Wolken Wechselwirkungen basierend auf der Counterflow Virtual Impactor Technik. Atmosphärisch-Chemisches Kolloquium des Instituts der Chemie der Geosphäre, Forschungszentrum Jülich.

Mertes, S., 2004. Eiskeime: Feldmessungen auf dem Jungfraujoch. Kolloquium der Atmosphären-Wissenschaften und der Umwelt-Wissenschaften, Institut für Meteorologie und Geophysik, Universität Frankfurt am Main.

Oral Presentations

Mertes, S., Verheggen, B., Walter, S., Ebert, M., Connolly, P., Schneider, J., Bower, K.N., Cozic, J., Worrigen, A. and Weingartner, E., 2006. Physico-chemical characterisation of ice particle residuals in tropospheric mixed-phase clouds, 12th Conference on Cloud Physics. American Meteorological Society, Madison, WI, USA, 10-14 July.

Mertes, S., Verheggen, B., Walter, S., Ebert, M., Conolly, P., Schneider, J., Bower, K.N., Cozic, J., Worrigen, A. and Weingartner, E., 2006. Counterflow virtual impactor based collection of small ice particles in mixed-phase clouds for the physico-chemical characterisation of tropospheric ice nuclei. In: P. Biswas, D.R. Chen and S. Hering (Editors), 7th International Aerosol Conference. American Association for Aerosol Research (AAAR), St. Paul, Minnesota, USA, 10-15 September, pp. 1363-1364.

Mertes, S., Verheggen, B., Schneider, J., Ebert, M., Walter, S., Worrigen, A., Inerle-Hof, M., Cozic, J., Flynn, M.J., Connolly, P., Bower, K.N. and Weingartner, E., 2005. Sampling and physico-chemical characterisation of ice nuclei in mixed phase clouds at the high alpine research station Jungfraujoch (3580 m asl) during CLACE, European Aerosol Conference (EAC), Ghent, Belgium, 28 August - 2 September.

- Mertes, S., 2004. Ein Counterflow-Virtual Impactor (CVI) System zur Sammlung frisch gebildeter Eispartikel in Mischphasenwolken auf der hochalpinen Forschungsstation Jungfrauoch (3580 m): Funktionsweise und erste Ergebnisse des ICE-CVI. Workshop "Die troposphärische Eisphase" TROPEIS II, Frankfurt am Main, Deutschland.
- Mertes, S. and Schwarzenböck, A., 2004. First airborne cloud measurements with a counterflow virtual impactor equipped with a passive wind tunnel for operation on slowly flying aircraft, 14th International Conference on Clouds and Precipitation (ICCP), Bologna, Italy, 19-23 July, pp. 1134-1137.
- Mertes, S., 2003. Feld-Untersuchungen zu Bildung und Wachstum von Eispartikeln in Mischphasenwolken mithilfe der Counterflow-Virtual-Impactor Technik. 1. Workshop "Die troposphärische Eisphase" TROPEIS, Frankfurt/Main, Deutschland.
- Mertes, S., Schwarzenböck, A. and Dippel, B., 2001. Comparison of the aerosol absorption coefficient obtained by the particle soot absorption photometer (PSAP) to a Raman spectroscopic graphitic carbon analysis of the PSAP internal filters, European Aerosol Conference (EAC), Leipzig, Germany, 3-7 September.
- Mertes, S., Schwarzenböck, A., Brüggemann, E., Gnauk, T. and Dippel, B., 2001. Phase partitioning of black carbon, non-volatile organic carbon and soluble inorganic substances between the droplet and interstitial phase of clouds at Mt. Brocken, Germany, European Aerosol Conference (EAC), Leipzig, Germany, 3-7 September.
- Mertes, S., Schwarzenböck, A., Heintzenberg, J. and Wobrock, W., 1999. Changes of the phase partitioning of atmospheric aerosol particles during ice formation in supercooled clouds due to the Bergeron Findeisen process., European Aerosol Conference (EAC), Prague, Czech Republic, 6-10 September.
- Mertes, S., Wiedensohler, A. and Schröder, F., 1994. Changes of the particle detection efficiency curve of the CPC TSI- 3010 in dependence of the temperature difference between saturator and condenser, Fourth International Aerosol Conference, Los Angeles, USA, 29 August - 2 September.

Posters

- Mertes, S., Walter, S., Schneider, J., Borrmann, S., Baumgardner, D., Raga, G., Montero, G., Kraemer, M., Mayol-Bracero, O.L., Frank, G., Allen, J. and Gysel, M., 2006. Aerosol particle activation observed inside clouds at a mountain site on Puerto Rico, 12th Conference on Cloud Physics. American Meteorological Society, Madison, WI, USA, 10-14 July.
- Mertes, S., Lehmann, K., Galgon, D., Nowak, A., Maßling, A. and Wiprecht, W., 2004. Link between size-resolved hygroscopic growth measurements of aerosol particles entering a hill cloud and number size distributions of interstitial and cloud drop residual particles measured in-cloud, 14th International Conference on Clouds and Precipitation (ICCP), Bologna, Italy, 19-23 July, pp. 1138-1141.
- Mertes, S., Schwarzenböck, A., Schneider, J., Walter, S., Ebert, M., Inerle-Hof, M., Verheggen, B., Cozic, J. and Weingartner, E., 2004. Design and operation of a counterflow virtual impactor inlet system to collect small ice particles out of mixed phase clouds at the high alpine site Jungfrauoch (3580 m asl), European Aerosol Conference (EAC), Budapest, Hungary, 6-10 September.
- Mertes, S., Lehmann, K., Brüggemann, E., Gnauk, T., Müller, K., van Pinxteren, D., Galgon, D., Acker, K. and Wiprecht, W., 2004. Link from particle hygroscopic growth to particle activation and phase partitioning of chemical substances in clouds during FEBUKO. AFO 2000. The German Atmospheric Research Programme. Final Symposium, Bad Tölz, Germany.
- Mertes, S., Brüggemann, E., Gnauk, T., Müller, K., van Pinxteren, D. and Galgon, D., 2002. Phase partitioning of biogenic and anthropogenic organic aerosol components and volatile organic compounds in clouds. AFO 2000. The German Atmospheric Research Programme 2000 - 2006. Statusseminar, Schliersee, Germany.

Mertes, S. and Wendisch, M., 1994. In-situ measurements from aircraft for studying the interaction between aerosol, clouds and radiation, Third International Symposium on Tropospheric Profiling: Needs and Technologies, Hamburg, Germany, 30 August - 2 September, pp. 429-432.

Mertes, S., 1992. Heterogeneous processes of nitrogen dioxide on liquid surfaces, International Symposium on Environmental Sensing, Berlin.