

Curriculum Vitae

Christoph Gerbig

Max-Planck Institute for Biogeochemistry

Hans-Knöll-Str. 10, 07745 Jena, Germany

Phone: +49 (36 41) 57 6373

Fax +49 (36 41) 57 7300

email: cgerbig@bgc-jena.mpg.de

Education and University Degrees

- 2009 Habilitation (postdoctoral lecture qualification) in Biogeochemistry, Friedrich-Schiller-University Jena (Germany)
- 1997 Dr. rer. nat. (Ph.D., Atmospheric Chemistry) *magna cum laude* University of Wuppertal (Germany)
- 1993 Diploma (M.S., Physics) University of Wuppertal, Germany
- 1992-1993 Studies of Physics at University of Wuppertal, Germany
- 1987-1992 Studies of Physics at University RWTH Aachen, Germany

Professional Experience

- 2004-present Research Scientist, Leader of the Group Airborne Measurements and Mesoscale Modeling, Biogeochemical Systems, Max Planck Institute for Biogeochemistry Jena.
- 2002-2004 Research Associate, Division of Engineering and Applied Sciences, Harvard University.
- 1999-2001 Postdoctoral Research Fellow, Division of Engineering and Applied Sciences, Harvard University.
- 1997-1998 Postdoctoral Research Fellow, Institute of Chemistry and Dynamics of the Geosphere, Forschungszentrum Juelich (Germany).
- 1993-1997 Graduate Research Assistan, Institute of Chemistry and Dynamics of the Geosphere, Forschungszentrum Juelich (Germany).
- 1992-1993 Undergraduate Research Fellow, Institute of Chemistry and Dynamics of the Geosphere, Forschungszentrum Juelich (Germany).
- 1991-1992 Teaching Fellow, Institute for theoretical Physics A, Technical University of Aachen (Germany).
- 1988-1990 Laboratory Technical Assistant, Institute for experimental Physics III, Technical University of Aachen (Germany).

Research Interests

Interaction between Biosphere and Atmosphere

- Develop and apply experimental strategies for quantification of greenhouse gas budgets
- Development of models to quantify regional scale budgets of greenhouse gases
- Linking earth system models to atmospheric observations for validation/calibration
- Instrument development for airborne measurements

Other professional responsibilities:

Member of the WMO-GAW Scientific Advisory Group (SAG) on Greenhouse Gases

Editor of "Atmospheric Chemistry and Physics (ACP)" of the European Geosciences Union

Frequent reviewer for: Atmospheric Chemistry and Physics, Atmospheric Environment, Global

Biogeochemical Cycles, Journal of Atmospheric Science, Journal of Geophysical Research, Nature,

Nature Geoscience, Proceedings of the National Academie of Sciences, Tellus Series B-Chemical and Physical Meteorology
Frequent proposal reviewer

Memberships:

American Geophysical Union, European Geosciences Union, Deutsche Physikalische Gesellschaft

Major Research Projects:

MAXOX, ACE-2, TACIA, ACSOE, EULINOX, OCTA (EU-Projects)

NASA SOLVE, CRYSTAL-FACE, PRE-AVE (NASA funded)

COBRA-NA, COBRA-BRAZIL (LBA), COBRA-ME (NSF, NOA, DOE and NASA funded)

CARBOEUROPE (EU project)

ICOS (EU Research Infrastructure), ICOS-Inwire (EU FP7 project)

IAGOS (EU design study), IAGOS-ERI (EU Research Infrastructure), IAGOS-AISBL (EU Research Infrastructure), IGAS (EU FP7 project)

Teaching:

Lecture course “Physikalische Geographie - Klimatologie” at the Friedrich-Schiller-University, Jena (since 2006)

Publications:

1. Gerbig, C., Kley, D., Volz-Thomas, A., Kent, J., Dewey, K., & McKenna, D. S. (1996). Fast response resonance fluorescence CO measurements aboard the C-130: Instrument characterization and measurements made during North Atlantic Regional Experiment 1993. *Journal of Geophysical Research-Atmospheres*, 101(D22), 29229-29238. doi:10.1029/95JD03272.
2. Flatoy, F., Hov, O., Gerbig, C., & Oltmans, S. J. (1996). Model studies of the meteorology and chemical composition of the troposphere over the North Atlantic during August 18-30, 1993. *Journal of Geophysical Research-Atmospheres*, 101(D22), 29317-29334. doi:10.1029/96JD01227.
3. Emmons, L. K., Carroll, M. A., Hauglustaine, D. A., Brasseur, G. P., Atherton, C., Penner, J., Sillman, S., Levy, H., Rohrer, F., Wauben, W. M. F., VanVelthoven, P. F. J., Wang, Y., Jacob, D., Bakwin, P., Dickerson, R., Doddridge, B., Gerbig, C., Honrath, R., Hubler, G., Jaffe, D., Kondo, Y., Munger, J. W., Torres, A., & Volz-Thomas, A. (1997). Climatologies of NO_x and NO_y: A comparison of data and models. *Atmospheric Environment*, 31(12), 1851-1904. doi:10.1016/S1352-2310(96)00334-2.
4. Bethan, S., Vaughan, G., Gerbig, C., Volz-Thomas, A., Richer, H., & Tiddeman, D. A. (1998). Chemical air mass differences near fronts. *Journal of Geophysical Research-Atmospheres*, 103(D11), 13413-13434. doi:10.1029/98JD00535.
5. Gerbig, C., Schmitgen, S., Kley, D., Volz-Thomas, A., Dewey, K., & Haaks, D. (1999). An improved fast-response vacuum-UV resonance fluorescence CO instrument. *Journal of Geophysical Research-Atmospheres*, 104(D1), 1699-1704. doi:10.1029/1998JD100031.
6. Holloway, J. S., Jakoubek, R. O., Parrish, D. D., Gerbig, C., Volz-Thomas, A., Schmitgen, S., Fried, A., Wert, B., Henry, B., & Drummond, J. R. (2000). Airborne intercomparison of vacuum ultraviolet fluorescence and tunable diode laser absorption measurements of tropospheric carbon monoxide.

Journal of Geophysical Research-Atmospheres, 105(D19), 24251-24261.
doi:10.1029/2000JD900237.

7. Osborne, S. R., Johnson, D. W., Wood, R., Bandy, B. J., Andreae, M. O., O'Dowd, C. D., Glantz, P., Noone, K. J., Gerbig, C., Rudolph, J., Bates, T. S., & Quinn, P. (2000). Evolution of the aerosol, cloud and boundary-layer dynamic and thermodynamic characteristics during the 2nd Lagrangian experiment of ACE-2. *Tellus, Series B - Chemical and Physical Meteorology*, 52(2), 375-400. doi:10.1034/j.1600-0889.2000.00051.x.
8. Suhre, K., Crassier, V., Mari, C., Rosset, R., Johnson, D. W., Osborne, S., Wood, R., Andreae, M. O., Bandy, B., Bates, T. S., Businger, S., Gerbig, C., Raes, F., & Rudolph, J. (2000). Chemistry and aerosols in the marine boundary layer: 1-D modelling of the three ACE-2 Lagrangian experiments. *Atmospheric Environment*, 34(29-30), 5079-5094. doi:10.1016/S1352-2310(00)00221-1.
9. Richard, E. C., Aikin, K. C., Andrews, A. E., Daube, B. C., Gerbig, C., Wofsy, S. C., Romashkin, P. A., Hurst, D. F., Ray, E. A., Moore, F. L., Elkins, J. W., Deshler, T., & Toon, G. C. (2001). Severe chemical ozone loss inside the Arctic Polar Vortex during winter 1999-2000 inferred from in-situ airborne measurements. *Geophysical Research Letters*, 28(16), 3167-3167. doi:10.1029/2001GL013627.
10. Richard, E. C., Aikin, K. C., Andrews, A. E., Daube, B. C., Gerbig, C., Wofsy, S. C., Romashkin, P. A., Hurst, D. F., Ray, E. A., Moore, F. L., Elkins, J. W., Deshler, T., & Toon, G. C. (2001). Severe chemical ozone loss inside the Arctic polar vortex during winter 1999-2000 inferred from in situ airborne measurements. *Geophysical Research Letters*, 28(11), 2197-2200. doi:10.1029/2001GL012878.
11. Huntrieser, H., Feigl, C., Schlager, H., Schroder, F., Gerbig, C., van Velthoven, P., Flatoy, F., They, C., Petzold, A., Holler, H., & Schumann, U. (2002). Airborne measurements of NO_x, tracer species, and small particles during the European lightning nitrogen oxides experiment. *Journal of Geophysical Research-Atmospheres*, 107(D11): 4113. doi:10.1029/2000JD000209.
12. Chou, W. W., Wofsy, S. C., Harriss, R. C., Lin, J. C., Gerbig, C., & Sachse, G. W. (2002). Net fluxes of CO₂ in Amazonia derived from aircraft observations. *Journal of Geophysical Research-Atmospheres*, 107(D22): 4614. doi:10.1029/2001JD001295.
13. Gerbig, C., Lin, J. C., Wofsy, S. C., Daube, B. C., Andrews, A. E., Stephens, B. B., Bakwin, P. S., & Grainger, C. A. (2003). Toward constraining regional-scale fluxes of CO₂ with atmospheric observations over a continent: 2. Analysis of COBRA data using a receptor-oriented framework. *Journal of Geophysical Research-Atmospheres*, 108(D24): 4757. doi:10.1029/2003JD003770.
14. Bakwin, P. S., Tans, P. P., Stephens, B. B., Wofsy, S. C., Gerbig, C., & Grainger, A. (2003). Strategies for measurement of atmospheric column means of carbon dioxide from aircraft using discrete sampling. *Journal of Geophysical Research-Atmospheres*, 108(D16): 4514. doi:10.1029/2002JD003306.
15. Lin, J. C., Gerbig, C., Wofsy, S. C., Andrews, A. E., Daube, B. C., Davis, K. J., & Grainger, C. A. (2003). A near-field tool for simulating the upstream influence of atmospheric observations: The Stochastic Time-Inverted Lagrangian Transport (STILT) model. *Journal of Geophysical Research-Atmospheres*, 108(D16): 4493. doi:10.1029/2002JD003161.
16. Gerbig, C., Lin, J. C., Wofsy, S. C., Daube, B. C., Andrews, A. E., Stephens, B. B., Bakwin, P. S., & Grainger, C. A. (2003). Toward constraining regional-scale fluxes of CO₂ with atmospheric observations over a continent: 1. Observed spatial variability from airborne platforms. *Journal of Geophysical Research-Atmospheres*, 108(D24): 4756. doi:10.1029/2002JD003018.

17. Vaughan, G., Garland, W., Dewey, D., & Gerbig, C. (2003). Aircraft measurements of a warm conveyor belt - A case study. *Journal of Atmospheric Chemistry*, 46(2), 117-129. doi:10.1023/A:1026025516092.
18. Lamarque, J., Edwards, D., Emmons, L., Gille, J., Wilhelmi, O., Gerbig, C., Prevedel, D., Deeter, M., Warner, J., Ziskin, D., Khattatov, B., Francis, G., Yudin, V., Ho, S., Mao, D., Chen, J., & Drummond, J. (2003). Identification of CO plumes from MOPITT data: Application to the August 2000 Idaho-Montana forest fires. *Geophysical Research Letters*, 30(13): 1688. doi:10.1029/2003GL017503.
19. Ray, E. A., Rosenlof, K. H., Richard, E. C., Hudson, P. K., Cziczo, D. J., Loewenstein, M., Jost, H. J., Lopez, J., Ridley, B., Weinheimer, A., Montzka, D., Knapp, D., Wofsy, S. C., Daube, B. C., Gerbig, C., Xueref, I., & Herman, R. L. (2004). Evidence of the effect of summertime midlatitude convection on the subtropical lower stratosphere from CRYSTAL-FACE tracer measurements. *Journal of Geophysical Research-Atmospheres*, 109(D18): D18304. doi:10.1029/2004JD004655.
20. Yi, C., Davis, K. J., Bakwin, P. S., Denning, A. S., Zhang, N., Desai, A., Lin, J. C., & Gerbig, C. (2004). Observed covariance between ecosystem carbon exchange and atmospheric boundary layer dynamics at a site in northern Wisconsin. *Journal of Geophysical Research-Atmospheres*, 109(D8): D08302. doi:10.1029/2003JD004164.
21. Lin, J. C., Gerbig, C., Daube, B. C., Wofsy, S. C., Andrews, A. E., Vay, S. A., & Anderson, B. E. (2004). An empirical analysis of the spatial variability of atmospheric CO₂: Implications for inverse analyses and space-borne sensors. *Geophysical Research Letters*, 31(23): L23104. doi:10.1029/2004GL020957.
22. Lin, J., Gerbig, C., Wofsy, S., Andrews, A., Daube, B., Grainger, C., Stephens, B., Bakwin, P., & Hollinger, D. (2004). Measuring fluxes of trace gases at regional scales by Lagrangian observations: Application to the CO₂ budget and rectification airborne (COBRA) study. *Journal of Geophysical Research-Atmospheres*, 109(D15): D15304. doi:10.1029/2004JD004754.
23. Xueref, I., Gerbig, C., Fridlind, A., Lin, J. C., Wofsy, S. C., Daube, B. C., Ackerman, A. S., Smith, J. E., Sayres, D., Vellovic, J., Baumgardner, D. G., Wang, D., Weinstock, E., Andrews, A. E., Gottlieb, E. W., & Anderson, J. G. (2004). Combining a receptor-oriented framework for tracer distributions with a cloud-resolving model to study transport in deep convective clouds: Application to the NASA CRYSTAL-FACE campaign. *Geophysical Research Letters*, 31(14): L14106. doi:10.1029/2004GL019811.
24. Jost, H. J., Drdla, K., Stohl, A., Pfister, L., Loewenstein, M., Lopez, J. P., Hudson, P. K., Murphy, D. M., Cziczo, D. J., Fromm, M., Bui, T. P., Dean-Day, J., Gerbig, C., Mahoney, M. J., Richard, E. C., Spichtinger, N., Pittman, J. V., Weinstock, E. M., Wilson, J. C., & Xueref, I. (2004). In-situ observations of mid-latitude forest fire plumes deep in the stratosphere. *Geophysical Research Letters*, 31(11): L11101. doi:10.1029/2003GL019253.
25. Emmons, L. K., Deeter, M. N., Gille, J. C., Edwards, D. P., Attie, J. L., Warner, J., Ziskin, D., Francis, G., Khattatov, B., Yudin, V., Lamarque, J. F., Ho, S. P., Mao, D., Chen, J. S., Drummond, J., Novelli, P., Sachse, G., Coffey, M. T., Hannigan, J. W., Gerbig, C., Kawakami, S., Kondo, Y., Takegawa, N., Schlager, H., Baehr, J., & Ziereis, H. (2004). Validation of Measurements of Pollution in the Troposphere (MOPITT) CO retrievals with aircraft in situ profiles. *Journal of Geophysical Research-Atmospheres*, 109(D3): D03309. doi:10.1029/2003JD004101.

26. Lin, J. C., & Gerbig, C. (2005). Accounting for the effect of transport errors on tracer inversions. *Geophysical Research Letters*, 32, L01802. doi:10.1029/2004GL021127.
27. Dolman, A. J., Noilhan, J., Durand, P., Sarrat, C., Brut, A., Pignatelli, B., Butet, A., Jarosz, N., Brunet, Y., Loustau, D., Lamaud, E., Tolk, L., Ronda, R., Miglietta, F., Gioli, B., Magliulo, V., Esposito, M., Gerbig, C., Körner, S., Glademard, P., Ramonet, M., Ciais, P., Neininger, B., Hutjes, R. W. A., Elbers, J. A., Macatangay, R., Schrems, O., Pérez-Landa, G., Sanz, M. J., Scholz, Y., Facon, G., Ceschia, E., & Beziat, P. (2006). The CarboEurope regional experiment strategy. *Bulletin of the American Meteorological Society*, 87(10), 1367-1379. doi:10.1175/BAMS-87-10-1367.
28. Gerbig, C., Lin, J. C., Munger, J. W., & Wofsy, S. C. (2006). What can tracer observations in the continental boundary layer tell us about surface-atmosphere fluxes? *Atmospheric Chemistry and Physics*, 6(2), 539-554. doi:10.5194/acp-6-539-2006.
29. Matross, D. M., Andrews, A., Pathmathevan, M., Gerbig, C., Lin, J. C., Wofsy, S. C., Daube, B. C., Gottlieb, E. W., Chow, V. Y., Lee, J. T., Zhao, C. L., Bakwin, P. S., Munger, J. W., & Hollinger, D. Y. (2006). Estimating regional carbon exchange in New England and Quebec by combining atmospheric, ground-based and satellite data. *Tellus, Series B - Chemical and Physical Meteorology*, 58B(5), 344-358. doi:10.1111/j.1600-0889.2006.00206.x.
30. Hurst, D. F., Lin, J. C., Romashkin, P. A., Daube, B. C., Gerbig, C., Matross, D. M., Wofsy, S. C., Hall, B. D., & Elkins, J. W. (2006). Continuing global significance of emissions of Montreal Protocol - restricted halocarbons in the United States and Canada. *Journal of Geophysical Research - Atmospheres*, 111(15), D15302. doi:10.1029/2005JD006785.
31. Lin, J. C., Gerbig, C., Wofsy, S. C., Daube, B. C., Matross, D. M., Chow, V. Y., Gottlieb, E., Andrews, A. E., Pathmathevan, M., & Munger, J. W. (2006). What have we learned from intensive atmospheric sampling field programmes of CO₂? *Tellus, Series B - Chemical and Physical Meteorology*, 58B(5), 331-343. doi:10.1029/2006JD006785.
32. Sarrat, C., Noilhan, J., Lacarrere, P., Donier, S., Lac, C., Calvet, J. C., Dolman, A. J., Gerbig, C., Neininger, B., Ciais, P., Paris, J. D., Boumard, F., Ramonet, M., & Butet, A. (2007). Atmospheric CO₂ modeling at the regional scale: Application to the CarboEurope Regional Experiment. *Journal of Geophysical Research - Atmospheres*, 112(12), D12105. doi:10.1029/2006JD008107.
33. Weinstock, E. M., Pittman, J. V., Sayres, D. S., Smith, J. B., Anderson, J. G., Wofsy, S. C., Xueref, I., Gerbig, C., Daube, B. C., Pfister, L., Richard, E. C., Ridley, B. A., Weinheimer, A. J., Jost, H. J., Lopez, J. P., Loewenstein, M., & Thompson, T. L. (2007). Quantifying the impact of the North American monsoon and deep midlatitude convection on the subtropical lowermost stratosphere using in situ measurements. *Journal of Geophysical Research - Atmospheres*, 112(18), D18310. doi:10.1029/2007JD008554.
34. Sarrat, C., Noilhan, J., Dolman, A. J., Gerbig, C., Ahmadov, R., Tolk, L. F., Meesters, A., Hutjes, R. W. A., Ter Maat, H. W., Perez-Landa, G., & Donier, S. (2007). Atmospheric CO₂ modeling at the regional scale: an intercomparison of 5 meso-scale atmospheric models. *Biogeosciences*, 4(6), 1115-1126. doi:10.5194/bg-4-1115-2007.
35. Pittman, J. V., Weinstock, E. M., Oglesby, R. J., Sayres, D. S., Smith, J. B., Anderson, J. G., Cooper, O. R., Wofsy, S. C., Xueref, I., Gerbig, C., Daube, B. C., Richard, E. C., Ridley, B. A., Weinheimer, A. J., Loewenstein, M., Jost, H. J., Lopez, J. P., Mahoney, M. J., Thompson, T. L., Hargrove, W. W., & Hoffman, F. M. (2007). Transport in the subtropical lowermost stratosphere during the Cirrus

- Regional Study of Tropical Anvils and Cirrus Layers-Florida Area Cirrus Experiment. *Journal of Geophysical Research - Atmospheres*, 112(D8), D08304. doi:10.1029/2006jd007851.
36. Emmons, L. K., Pfister, G. G., Edwards, D. P., Gille, J. C., Sachse, G., Blake, D., Wofsy, S., Gerbig, C., Matross, D., & Nedelec, P. (2007). Measurements of Pollution in the Troposphere (MOPITT) validation exercises during summer 2004 field campaigns over North America. *Journal of Geophysical Research - Atmospheres*, 112(12), D12S02. doi:10.1029/2006JD007833.
 37. Ahmadov, R., Gerbig, C., Kretschmer, R., Körner, S., Neininger, B., Dolman, A. J., & Sarrat, C. (2007). Mesoscale covariance of transport and CO₂ fluxes: Evidence from observations and simulations using the WRF-VPRM coupled atmosphere-biosphere model. *Journal of Geophysical Research - Atmospheres*, 112(22), D22107. doi:10.1029/2007JD008552.
 38. Lin, J. C., Gerbig, C., Wofsy, S. C., Chow, V. Y., Gottlieb, E., Daube, B. C., & Matross, D. M. (2007). Designing Lagrangian experiments to measure regional-scale trace gas fluxes. *Journal of Geophysical Research - Atmospheres*, 112(13), D13312. doi:10.1029/2006JD008077.
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 40. Dolman, A. J., Noilhan, J., Tolk, L., Lauvaux, T., Vandermolén, M., Gerbig, C., Miglietta, F., & Perez-Landa, G. (2008). Regional measurements and modelling of carbon exchange. In A. J. Dolman, A. Freibauer, & R. Valentini (Eds.), *The continental-scale greenhouse gas balance of Europe* (pp. 285-307). New York [u.a.]: Springer.
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 44. Gerbig, C., Körner, S., & Lin, J. C. (2008). Vertical mixing in atmospheric tracer transport models: error characterization and propagation. *Atmospheric Chemistry and Physics*, 8(3), 591-602. doi:10.5194/acp-8-591-2008.
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 46. Gerbig, C., Dolman, A. J., & Heimann, M. (2009). On observational and modelling strategies targeted at regional carbon exchange over continents. *Biogeosciences*, 6(10), 1949-1959. doi:10.5194/bg-6-1949-2009.

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48. Rödenbeck, C., Gerbig, C., Trusilova, K., & Heimann, M. (2009). A two-step scheme for high-resolution regional atmospheric trace gas inversions based on independent models. *Atmospheric Chemistry and Physics*, 9(14), 5331-5342. doi:10.5194/acp-9-5331-2009.
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