

**Prof. Dr. Klaus Butterbach-Bahl**

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**Curriculum vitae**

1982-1989	Study of Biology (Diplom and Geography(Diplom), University Giessen
1992	Doctorate (Dr. rer. nat.), Technical University München
Since 1993	Scientist at IMK-IFU
2002	Habilitation & Venia legendi (soil ecology), Albert-Ludwigs University Freiburg
since 1998	Group leader at IMK-IFU, "Regionalisation of biogenic trace gas emissions"
since 2005	Guest Research Professor, Inst. Atmosph. Physics, Chinese Acad. Sci., Beijing, China
since 2008	Head of Department "Bio-Geo-Chemical Processes"
since 2013	Principal scientist Biogeochemistry, International Livestock Research Institute (ILRI), Kenya, (Joined appointment with KIT)
since 2016	Scientific Advisory Board ZALF

**Awards and honors**

2005	Guest Research Professor, Inst. Atmosph. Physics, Chinese Acad. Sci., Beijing, China
2006	Honorary Principal Fellow at the School of Forest and Ecosystem Science, University of Melbourne, Australia
2008	Adjunct Professor, Albert-Ludwigs University Freiburg
2011	China Academy of Sciences, Honorary Research Professor
2013	Schrödinger Prize of the Stifterverband für die Deutsche Wissenschaft and the Helmholtz Society
2014	Vladimir Ivanovich Vernadsky Medal 2014 of the European Geosciences

**Research interests**

- Environmental footprint of agricultural production systems
- Identification and characterisation of microbial processes involved in N- and C-trace gas production and consumption
- Feedback of global environmental changes on biosphere-hydrosphere-atmosphere exchange processes
- Process oriented modelling of nitrogen/ carbon turnover and associated N and C trace gas exchange in terrestrial ecosystems
- Development of emission inventories of biogenic trace substances on regional and global scales for current and future environmental conditions

**Longer term research stays**

Complex System Research Center, University of New Hampshire, USA (1999+2001), School of Forest and Ecosystem Science, University of Melbourne, Australia (2002+2004); CSIRO, Tropical Forest Research Centre, Atherton, Australia (1998, 2000, 2003); Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China (2005, 2011)

**Editorial Board Memberships**

Ecosystems, Global Biogeochemical Cycles

**Publications**

> 230 ISI listed peer review publications

**Supervision of PhD and master students**

>30 PhD students (mainly at University of Freiburg, but also in co-supervision with Universities of Trento, Copenhagen, Helsinki, etc., Chinese Academy of Sciences)

>20 Diplom-/Master-Students (Universities Trier, Freiburg, München, Augsburg, Würzburg, Flensburg, Chinese Academy of Sciences, Beijing Normal Univ.)

**2017**

- Arias-Navarro C, Díaz-Pinés E, Klatt S, Brandt P, Rufino MC, **Butterbach-Bahl K**, Verchot L, 2017, Spatial variability of soil N<sub>2</sub>O and CO<sub>2</sub> fluxes in different topographic positions in a tropical montane forest in Kenya. *J. Geophysical Res. Biogeosciences* 122, 514-527, DOI: 10.1002/2016JG003667
- Arias-Navarro C, Díaz-Pinés E, Zuazo P, Rufino M, Verchot L, **Butterbach-Bahl K**, 2017, Quantifying the contribution of land use to N<sub>2</sub>O, NO and CO<sub>2</sub> fluxes in a montane forest ecosystem of Kenya. *Biogeochemistry*, DOI: 10.1007/s10533-017-0348-3
- Brandt P, Kvakic M, **Butterbach-Bahl K**, Rufino MC, 2017, How to target climate-smart agriculture? Concept and application of the consensus-driven decision support framework "targetCSA". *Agricultural Systems* 151, 234-245
- Bureau J, Grossela A, Loubet B, Laville P, Massad R, Haas E, **Butterbach-Bahl K**, Guimbaud C, Hénault C, 2017, Evaluation of new flux attribution methods for mapping N<sub>2</sub>O emissions at the landscape scale. *Agric. Ecosys. Environm.* 247, 9–22, doi.org/10.1016/j.agee.2017.06.012
- Butterbach-Bahl K**, Wolf B, 2017, Greenhouse gases – Warming from freezing soils. *Nature Geosciences* 10, 248-249, <http://www.nature.com/articles/doi:10.1038/ngeo2915>
- De Vries W, Du E, **Butterbach-Bahl K**, Schulte-Uebbing L, Dentener F, 2017, Global-scale impact of human nitrogen fixation on greenhouse gas emissions. *Oxford Research Encyclopedia*, DOI: 10.1093/acrefore/9780199389414.013.13
- Denk TR, Mohn J, Decock C, Lewicka-Szczebak D, Harris E, **Butterbach-Bahl K**, Kiese R, Wolf B, 2017, The nitrogen cycle: A review of isotope effects and isotope modelling approaches. *Soil Biol. Biochem.* 105, 121-137
- Díaz-Pinés E, Molina-Herrera S, Dannenmann M, Braun J, Haas E, Willibald G, Arias-Navarro C, Grote R, Wolf B, Saiz G, Aust C, Schnitzler JP, **Butterbach-Bahl K**, 2016, Nitrate leaching and soil nitrous oxide emissions diminish with time in a hybrid poplar short-rotation coppice in southern Germany. *Global Change Biology Bioenergy* 9, 613-626, doi: 10.1111/gcbb.12367
- Fu J, Gasche R, Wang N, Lu H, **Butterbach-Bahl K**, Kiese R, 2017, Impacts of climate and management on water balance and nitrogen leaching from montane grassland soils of S-Germany. *Environm. Pollut.* 229, 119-131
- Houska T, Kraft P, Liebermann R, Klatt S, Kraus D, Haas E, Santabarbara I, Kiese R, **Butterbach-Bahl K**, Müller C, Breuer L, 2017, Rejecting hydro-biogeochemical model structures by multi-criteria evaluation. *J. Environm Modelling & Software* 93, 1-12
- Hu B, Zhou M, Dannenmann M, Saiz G, Simon J, Bilela S, Liu X, Hou L, Chen H, Zhang S, **Butterbach-Bahl K**, Rennenberg H, 2017, Comparison of nitrogen nutrition and soil carbon status of afforested stands established in degraded soil of the Loess Plateau, China. *Forest Ecology Management* 389, 46-58
- Hu B, Zhou M, Bilela S, Simon J, Dannenmann M, Liu X, Alfarraj S, Hou L, Chen H, Zhang S, **Butterbach-Bahl K**, Rennenberg H, 2017, Nitrogen nutrition of native and introduced forest tree species in N-limited ecosystems of the Qinling Mountains, China. *Trees* DOI 10.1007/s00468-017-1537-3
- Jacobs SR, Breuer L, **Butterbach-Bahl K**, Pelster DE, Rufino MC, 2017, Land use affects total dissolved nitrogen and nitrate concentrations in tropical montane streams in Kenya. *Sci. Total Environm.* 603-604, 519-532
- Klatt S, Kraus D, Kraft P, Breuer L, Wlotzka M, Heuveline V, Haas E, Kiese R, **Butterbach-Bahl K**, 2017, Exploring impacts of vegetated buffer strips on nitrogen cycling using a spatially explicit hydro-biogeochemical modeling approach. *Environmental Modelling & Software* 90, 55-67
- Lammel DR, **Butterbach-Bahl K**, Cerri CEP, Louis S, Schnitzler JP, Feigl BJ, Cerri CC, 2017, C and N stocks are not impacted by land use change from Brazilian Savanna (Cerrado) to agriculture despite changes in soil fertility and microbial abundances. *Plant Nutrition and Soil Science* 180, 436/445. DOI: 10.1002/jpln.201600614
- Liu Y, Wang C, He NP, Wen X, Gao Y, Li S, Niu S, **Butterbach-Bahl K**, Luo Y, Yu G, 2016, A global synthesis of the rate and temperature sensitivity of soil nitrogen mineralization: latitudinal patterns and mechanisms. *Global Change Biology* 23, 455-464, doi: 10.1111/gcb.13372
- Molina-Herrera S, Haas E, Grote R, Kiese R, Klatt S, Kraus D, Kampffmeyer T, Friedrich R, Andreae H, Loubet B, Ammann C, Horváth L, Larsen K, Gruening C, Frumau A, **Butterbach-Bahl K**, 2017, Importance of soil NO emissions for the total atmospheric NO<sub>x</sub> budget of Saxony, Germany. *Atmospheric Environment* 152, 61-76
- Pelster DE, Rufino MC, Rosenstock T, Mango J, Saiz G, Díaz-Pinés E, Baldi G, **Butterbach-Bahl K**, 2015, Smallholder African farms in western Kenya have limited greenhouse gas fluxes. *Biogeosciences* 14, 187-202, doi:10.5194/bg-14-187-2017
- Schweier J, Molina-Herrera S, Ghirardo A, Grote R, Díaz-Pinés E, Kreuzwieser J, Haas E, **Butterbach-Bahl K**, Rennenberg H, Schnitzler JP, Becker G, 2017, Environmental impacts of bioenergy wood production from poplar short rotation coppice grown at a marginal agricultural site in Germany. *Global Change Biol. Bioenergy*, DOI: 10.1111/gcbb.12423
- Yao Z, Zheng X, Liu C, Lin S, Zuo Q, **Butterbach-Bahl K**, 2017, Improving rice production sustainability by reducing water demand and greenhouse gas emissions with biodegradable films. *Scientific Reports* 7, 39855, DOI: 10.1038/srep39855
- Yao Z, Yan G, Zheng X, Wang R, Liu C, **Butterbach-Bahl K**, 2017, Straw return reduces yield-scaled N<sub>2</sub>O plus NO emissions from annual winter wheat-based cropping systems in the North China Plain. *The Science of the Total Environment* 590-591, 174-185, DOI:10.1016/j.scitotenv.2017.02.194
- Yao Z, Zheng X, Zhang Y, Liu C, Wang R, Lin S, Zuo Q, **Butterbach-Bahl K**, 2017, Urea deep placement reduces yield-scaled greenhouse gas (CH<sub>4</sub> and N<sub>2</sub>O) and NO emissions from a ground cover rice production system. *Scientific Reports* 7, 11415, DOI:10.1038/s41598-017-11772-2
- Zhang Y, Liu M, Dannenmann M, Tao Y, Yao Z, Jing R, Zheng X, **Butterbach-Bahl K**, Lin S, 2017, Benefit of using biodegradable film on rice grain yield and N use efficiency in ground cover rice production system. *Field Crop Research* 201, 52-59, doi.org/10.1016/j.fcr.2016.10.022
- Zhang Y, Liu M, Saiz G, Dannenmann M, Guo L, Tao Y, Shi J, Zuo Q, **Butterbach-Bahl K**, Li G, Lin S, 2017, Enhancement of root systems improves productivity and sustainability in water saving ground cover rice production system. *Field Crops Research* 213, 186-193.

- Zhou M, **Butterbach-Bahl K**, Vereecken H, Brüggemann N, 2017, A meta-analysis of soil salinization effects on nitrogen pools, cycles and fluxes in coastal ecosystems. *Global Change Biol.* 23, 1338-1352
- 2016**
- Díaz-Pinés E, Heras P, Gasche R, Rubio A, Rennenberg H, **Butterbach-Bahl K**, Kiese R, 2015, Nitrous oxide emissions from stems of ash (*Fraxinus angustifolia* Vahl) and European beech (*Fagus sylvatica* L.). *Plant Soil* 398, 35-45, DOI: 10.1007/s11104-015-2629-8
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- Korir D, Goopy JP, Gachui C, **Butterbach-Bahl K**, 2016, Supplementation with *Calliandra calothyrsus* improves nitrogen retention in cattle fed low-protein diets. *Animal Prod. Sci.* 50, 619-626, DOI: 10.1071/AN15569
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- Medinets S, Gasche R, Skiba U, Medinets V, **Butterbach-Bahl K**, 2016, The impact of management and climate on soil nitric oxide fluxes from arable land in the Southern Ukraine. *Atmospheric Environment* 137, 113-126
- Medinets S, Gasche R, Skiba U, Schindlbacher A, Kiese R, **Butterbach-Bahl K**, 2016, Cold season soil NO fluxes from a temperate forest: drivers and contribution to annual budgets. *Environ. Res. Letters* 11, 114012, doi:10.1088/1748-9326/11/11/114012
- Molina-Herrera S, Haas E, Klatt S, David Kraus, Augustin J, Magliulo V, Tallec T, Ceschia E, Ammann C, Loubet B, Skiba U, Jones S, Brümmer C, **Butterbach-Bahl K**, Kiese R, 2016, A modeling study on mitigation of N<sub>2</sub>O emissions and NO<sub>3</sub> leaching at different agricultural sites across Europe using LandscapeDNDC. *Science Total Environm.* 553, 128-140.
- Ortiz C, Vazquez E, Rubio A, Benito M, Schindlbacher A, Jandl R, **Butterbach-Bahl K**, Diaz-Pines E, 2016, Soil organic matter dynamics after afforestation of mountain grasslands in both a Mediterranean and a temperate climate. *Biogeochemistry* 3, 267-280, DOI: 10.1007/s10533-016-0278-5
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- Roman-Cuesta RM, Rufino MC, Herold M, **Butterbach-Bahl K**, Rosenstock TS, Herrero M, Ogle S, Li C, Poulter B, Verchot L, Martius C, Stuver J, de Bruin S, 2016, Hotspots of gross emissions from the land use sector: patterns, uncertainties, and leading emission sources for the period 2000–2005 in the tropics. *Biogeosciences* 13, 1–17
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- Saiz G, Wandera FM, Pelster DE, Ngetich W, Okalebo JR, Rufino MC, **Butterbach-Bahl K**, 2016, Long-term assessment of soil and water conservation measures (Fanya-juu terraces) on soil organic matter dynamics in South Eastern Kenya. *Geoderma* 274, 1-9
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- Wang D, Wang K, Diaz-Pines E, Zheng X, **Butterbach-Bahl K**, 2016, Applicability of an eddy covariance system based on a close-path quantum cascade laser spectrometer for measuring nitrous oxide fluxes from subtropical vegetable fields. *Atmospheric and Oceanic Science Letters*, DOI: 10.1080/16742834.2016.1211468
- Wen Y, Chen Z, Dannenmann M, Carminati A, Willibald G, Kiese R, Wolf B, Veldkamp E, **Butterbach-Bahl K**, Corré MD, 2016, Disentangling gross N<sub>2</sub>O production and consumption in soil. *Scientific Reports* 6, 36517, DOI: 10.1038/srep36517
- Weller S, Janz B, Jörg L, Kraus D, Racela HSU, Wassmann R, **Butterbach-Bahl K**, Kiese R, 2016, Greenhouse gas emissions and global warming potential of traditional and diversified tropical rice rotation systems. *Global Change Biol.* 22, 432-448, doi: 10.1111/gcb.13099
- Zhou M, Zhu B, Brüggemann N, Dannenmann M, Wang Y, **Butterbach-Bahl K**, 2016, Sustaining crop productivity while reducing environmental nitrogen losses in the subtropical wheat-maize cropping systems: A comprehensive case study of nitrogen cycling and balance. *Agriculture, Ecosystems and Environment* 231, 1-14

**2015**

Barton L, Wolf B, Rowlings D, Scheer C, Kiese R, Grace P, Stefanova K, **Butterbach-Bahl K**, 2015, Sampling frequency affects estimates of annual nitrous oxide fluxes. *Scientific Reports* 5, 16912, DOI: 10.1038/srep15912

Cao N, Wang R, Liao TT, Chen N, Zheng XH, Yao ZS, Zhang H, **Butterbach-Bahl K**, 2015, Characteristics of N<sub>2</sub>, N<sub>2</sub>O, NO, CO<sub>2</sub> and CH<sub>4</sub> emissions in anaerobic condition from sandy loam paddy soil. *Huanxing Kexue/ Environmental Science* 36, 3373-3382

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Fowler D, Steadman CE, Stevenson D, Coyle M, Rees RM, Skiba UM, Sutton MA, Cape JN, Dore AJ, Vieno M, Simpson D, Zaehle S, Stocker BD, Rinaldi M, Facchini MC, Flechard CR, Nemitz E, Twigg M, Erisman JW, **Butterbach-Bahl K**, Galloway JN, 2015, Effects of global change during the 21<sup>st</sup> century on the nitrogen cycle. *Atmos. Chem. Phys.* 15, 13849-13893

Karhu K, Dannenmann M, Kitzler B, Díaz-Pinés E, Tejedor J, Ramírez DA, Parra A, Resco de Dios V, Moreno JM, Rubio A, Guimaraes-Povoas L, Zechmeister-Boltenstern S, **Butterbach-Bahl K**, Ambus P, 2015, Fire increases the risk of higher soil N<sub>2</sub>O emissions from Mediterranean *Macchia* ecosystems. *Soil Biology Biochemistry* 82, 44-51

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**2014**

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Chen N, Liao TT, Wang R, Zheng X, Hu R, **Butterbach-Bahl K**, 2014, Effect of carbon substrate concentration on N<sub>2</sub>, N<sub>2</sub>O, NO, CO<sub>2</sub> and CH<sub>4</sub> emissions from a paddy soil in anaerobic condition. *Environmental Sci.* 35, 3595-3604 (in Chinese).

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