

Curriculum Vitæ

Dr Benjamin David Stocker

ORCID 0000-0003-2697-9096

Key achievements

- Provided first consistent quantification of multiple climate feedbacks from the terrestrial biosphere using a coupled Earth System Model (Stocker et al., 2013, *Nature Climate Change*)
- Developed first dynamic global model to simulate the distribution of peatlands and their effect on the carbon cycle under a changing climate (Stocker et al., 2014, *Geosci. Model Dev.*)
- Improved understanding of land use change effects on the Earth system: effect of sub-grid scale land use transitions (Stocker et al., 2014), definition of land use emissions for carbon budget accountings (Stocker & Joos, 2015), preindustrial human impacts on the carbon cycle and climate (Stocker et al., 2010)

Current position and research foci

March 2014 – present

PostDoctoral Research Associate at the Department of Life Sciences, Imperial College, London, U.K

- Understanding global environmental change impacts on ecosystem functioning and vegetation growth.
- Developing a new model framework for the coupled carbon and nitrogen cycling in terrestrial ecosystems and integrating observational data into model predictions (github.com/stineb/sofun).
- Co-supervision of graduate and undergraduate students
- Management of code development and data in the research group
- Successfully generated own research funding, starting in March 2015

Qualifications

Nov. 2009- Dec. 2013 **Ph.D. Climate Sciences at Climate- and Environmental Physics**, University

of Bern,

Climate Forcings and Feedbacks from the Terrestrial Biosphere – From Greenhouse-Gas Emissions to Anthropogenic Land Use Change

final grade: 6.0 (maximum: 6.0)

Sep. 2007- Oct. 2009 **M.Sc. Climate Sciences at Climate- and Environmental Physics**, University

of Bern,

Transient Simulations of Land Use Change in the Holocene – Separating the Human Impact from Natural Drivers of the Carbon Cycle

final grade: 5.73 (maximum: 6.0)

Jun. 2006 **Bachelor Geography** (120 ECTS) with a Minor (60 ECTS) in **Physics**, and a complementary (15 ECTS) in **Ecology**, University of Bern

Aug.-Dec. 2006 Erasmus exchange semester at Université Bordeaux 3, France

Employment

- Jan.-Feb. 2014** PostDoctoral Research Assistant at Climate- and Environmental Physics, University of Bern.
- Model development for coupled Earth system simulations
- Mar.-Jun. 2011** Visiting Scholar at Macquarie University, Sydney, Australia, Invitation and supervision by Prof. Colin Prentice
- Model development for representing carbon-nitrogen cycle interactions
- Jan.-Jun. 2007** Internship at FirstClimate, company developing climate change mitigation projects
- Jan.-Jun. 2006** Research assistant, Centre for Development and Environment, development of a GIS-based database for FAO statistics

Awards

- **Marie Skłodowska-Curie Individual Fellowship**, granted by ERC, starting in 2017
- **Early Postdoc.Mobility scholarship**, granted by the Swiss National Science Foundation, 18 months starting in March 2015, total 72,750 CHF (72,000 CHF – approx. 56,000 GBP).
- **Faculty prize** for best Master's thesis at the Physics Institute, University of Bern, obtained Feb. 2010
- **Travel grant** for early career scientists for participation at the XIX INQUA Congress in Nagoya (60,000 JPY – approx. 1000 GBP)
- **Travel grant** for a Short Term Science Mission, funded by EU eCost (ca. 600 GBP)
- **Erasmus** scholarship from the European Union (ca. 600 GBP)

Scientific presentations

- Jan. 2015** “Optimal plant carbon allocation implies a biological control on nitrogen availability”, PLECO, University of Antwerp, **invited seminar**
- Dec. 2015** “Optimal plant carbon allocation implies a biological control on nitrogen availability”, AGU 2015, San Francisco, **oral presentation**
- Oct. 2015** “How should we represent terrestrial carbon-nitrogen cycle interactions in Earth System Models?”, WCRP CMIP6 Workshop, Dubrovnik, poster presentation
- Sep. 2015** “Simulating carbon history and the realism of current LULC reconstructions”, PAGES LandCover6K Workshop, Reading, **invited oral presentation**
- Jul. 2015** “Lost peatlands: Hindcasting the spatial shift in peatland distribution since the Last Glacial Maximum and its implication for the global peatland carbon balance”, INQUA 2015, Nagoya, Japan, oral presentation
- Jul. 2015** “Feedbacks between climate change and the terrestrial biosphere”, Our Common Future under Climate Change (CFCC) Conference, Paris, poster presentation

- Jun. 2015** “Preindustrial human impacts on the carbon cycle”, University of Reading, **invited seminar**
- Apr. 2015** “Modelling C allocation in response to nutrient availability”, European Geosciences Union 2015, Vienna, poster presentation
- Jan. 2015** “Preindustrial human impacts on the carbon cycle”, University College London, **invited seminar**
- Dec. 2014** “Spatio-temporal dynamics of global peatland extent and carbon stocks as simulated for the past twenty thousand years”, American Geosciences Union, San Francisco, poster presentation
- Sep. 2014** “Spatio-temporal dynamics of global peatland extent and carbon stocks as simulated for the past twenty thousand years”, MPI Hamburg, **invited seminar**
- Sep. 2013** „Quantifying land-climate feedbacks in the Bern3D-LPX EMIC“, GREENCYCLES II Feedbacks Synthesis Workshop, Bristol, **invited** oral presentation
- Apr. 2013** „Multiple greenhouse gas feedbacks from the land biosphere under future climate change scenarios“, European Geophysical Union, Vienna, oral presentation
- Feb. 2013** „Multiple Terrestrial Greenhouse Gas Feedbacks under Future Climate“, Oeschger Centre for Climate Change Research Plenary Meeting, Bern, **invited** oral presentation
- Oct. 2012** „Land use modelling with LPX-Bern - Lessons learned and unresolved questions“, Land Use Change Conference, Exeter, **invited** oral presentation
- Oct. 2012** „Multiple greenhouse gas feedbacks from the land biosphere under future climate change scenarios“, Greencycles MiniConference, Biosphere-mediated human impacts on the Earth-System, Potsdam, oral presentation
- Sep. 2011** „Terrestrial ecosystem nitrogen loss under future climate change“, NCCR Climate Summer School, Grindelwald, poster presentation
- Jan. 2011** „Holocene land use change emissions“, EPFL Lausanne, **invited seminar**
- Jul. 2011** „Holocene atmospheric CO₂ and land use change - Analyses with a process-based model“, INQUA 2011, Bern, poster presentation
- Sep. 2009** „Transient simulations of the global carbon cycle, atmospheric CO₂ and climate over the preindustrial Holocene: anthropogenic land cover change vs. natural drivers, Carbon Dioxide Conference“, Jena, poster presentation

Professional activities and service

- Journal reviewer for: *Nature* (1), *Nature Climate Change* (1), *Nature Geoscience* (1), *New Phytologist* (1), *Geoscientific Model Development* (1), *Biogeosciences* (2), *Journal of Climate* (1), *Earth System Dynamics* (1), *Environmental Research Letters* (1), *Geophysical Research Letters* (1)
- Contributing author to IPCC AR5, WGI, Chapter 6 *Carbon and other Biogeochemical Cycles*, and IPCC AR5, WGIII
- Contributor to the Global Carbon Project (<http://www.globalcarbonproject.org/carbonbudget>)
 - Co-authoring annual summary of the state-of-the-art of the global carbon balance and CO₂ emission estimates
 - Providing simulation results of global CO₂ emissions from land use change
- Session convener, INQUA 2015, *Using palaeoenvironmental data to quantify climate feedbacks*
 - Designed the scientific scope
 - Selected proposed contributions and organized the session programme

- Ph.D. jury member at UAB Barcelona, Spain

Technical skills

- Programming languages: Fortran, R, Python, Bash, Matlab, NCL, NCO, CDO
- LINUX, cluster/parallel computing
- SVN and *github* code management
- Strong background in Physics; firm background in Mathematics for applications in Earth System modelling

Language skills

- German: mother tongue
- English: proficient in reading, writing, and conversation
- French: fluent in reading, writing, and conversation
- Italian: simple conversation
- Spanish: beginner's level reading, writing, and conversation

Training

- 20-27 Sep. 2014** MPI Biogeochemistry Autumn School, „Data Assimilation in Biogeochemical Cycles“, Trieste, Italy (*confirmed participation*)
- 25-28 Feb. 2013** Greencycles Training Workshop IV, „Nitrogen in the Earth System“, Jena, Germany
- 22-25 Mai 2012** Greencycles Training Workshop VI, „Physiology of primary production in terrestrial and marine plants“, Silwood Park, United Kingdom
- 4-9 Sep. 2011** 10th International NCCR Climate Summer School; „Climate Change, Extremes, and Ecosystem Services“, Grindelwald, Switzerland

Teaching

- **Lecturing Introduction to the Carbon Cycle** (MRes in Ecosystem and Environmental Change, Imperial College London), based on own teaching material and exercise
- **Co-supervision of a graduate student** (Physics, University of Bern), and an undergraduate student (Biology, Imperial College London)
 - Provided close guidance in the implementation and publication of an innovative method to simulate land use transitions within a global vegetation model
- **Author of a problem series** for an introduction to programming in R for carbon cycle science
 - Designed problems and lead exercises for graduate students in two consecutive years
- **Teaching assistant,**
 - *Introduction to Carbon Cycle* by Prof. F. Joos (spring 2012, autumn 2013)
 - *Introduction to Climate- and Environmental Physics* (autumn 2010, autumn 2012)
 - *Physics Lab* (spring 2013)

- *Climate Modelling and Introduction to Carbon Cycle*, translation of lecture notes from German to English

Peer-reviewed publications

- 2016** Murray-Tortarolo, G., Friedlingstein, P., Sitch, S., Jaramillo, V. J., Murguía-Flores, F., Anav, A., Liu, Y., Arneth, A., Arvanitis, A., Harper, A., Jain, A., Kato, E., Koven, C., Poulter, B., **Stocker, B. D.**, Wiltshire, A., Zaehle, S., and Zeng, N.: The carbon cycle in Mexico: past, present and future of C stocks and fluxes, *Biogeosciences*, 13, 223-238, doi:10.5194/bg-13-223-2016, 2016
- 2015** **Stocker, B. D.** and Joos, F.: Large differences in land use emission quantifications implied by definition discrepancies, *Earth Syst. Dynam.*, 6, 547-577, doi:10.5194/esdd-6-547-2015, 2015.
- Le Quééré, C., Moriarty, R., Andrew, R. M., Canadell, J. G., Sitch, S., Korsbakken, J. I., Friedlingstein, P., Peters, G. P., Andres, R. J., Boden, T. A., Houghton, R. A., House, J. I., Keeling, R. F., Tans, P., Arneth, A., Bakker, D. C. E., Barbero, L., Bopp, L., Chang, J., Chevallier, F., Chini, L. P., Ciais, P., Fader, M., Feely, R. A., Gkritzalis, T., Harris, I., Hauck, J., Ilyina, T., Jain, A. K., Kato, E., Kitidis, V., Klein Goldewijk, K., Koven, C., Landschützer, P., Lauvset, S. K., Lefèvre, N., Lenton, A., Lima, I. D., Metzl, N., Millero, F., Munro, D. R., Murata, A., Nabel, J. E. M. S., Nakaoka, S., Nojiri, Y., O'Brien, K., Olsen, A., Ono, T., Pérez, F. F., Pfeil, B., Pierrot, D., Poulter, B., Rehder, G., Rödenbeck, C., Saito, S., Schuster, U., Schwinger, J., Séférian, R., Steinhoff, T., **Stocker, B. D.**, Sutton, A. J., Takahashi, T., Tilbrook, B., van der Laan-Luijkx, I. T., van der Werf, G. R., van Heuven, S., Vandemark, D., Viovy, N., Wiltshire, A., Zaehle, S., and Zeng, N.: Global Carbon Budget 2015, *Earth Syst. Sci. Data*, 7, 349-396, doi:10.5194/essd-7-349-2015, 2015.
 - Fowler, D., Steadman, C. E., Stevenson, D., Coyle, M., Rees, R. M., Skiba, U. M., Sutton, M. A., Cape, J. N., Dore, A. J., Vieno, M., Simpson, D., Zaehle, S., **Stocker, B. D.**, Rinaldi, M., Facchini, M. C., Flechard, C. R., Nemitz, E., Twigg, M., Erisman, J. W., Butterbach-Bahl, K., and Galloway, J. N.: Effects of global change during the 21st century on the nitrogen cycle, *Atmos. Chem. Phys.*, 15, 13849-13893, doi:10.5194/acp-15-13849-2015, 2015.
 - Olin, S., Lindeskog, M., Pugh, T. A. M., Schurgers, G., Wårlind, D., Mishurov, M., Zaehle, S., **Stocker, B. D.**, Smith, B., and Arneth, A.: Soil carbon management in large-scale Earth system modelling: implications for crop yields and nitrogen leaching, *Earth Syst. Dynam.*, 6, 745-768, doi:10.5194/esd-6-745-2015, 2015.
 - Ballantyne, A. P., Andres, R., Houghton, R., **Stocker, B. D.**, Wanninkhof, R., Anderegg, W., Cooper, L. A., DeGrandpre, M., Tans, P. P., Miller, J. B., Alden, C., and White, J. W. C.: Audit of the global carbon budget: estimate errors and their impact on uptake uncertainty, *Biogeosciences*, 12, 2565-2584, doi:10.5194/bg-12-2565-2015, 2015.
 - A. Ahlström and M. R. Raupach and G. Schurgers and B. Smith and A. Arneth and M. Jung and M. Reichstein and J. G. Canadell and P. Friedlingstein and A. K. Jain and E. Kato and B. Poulter and S. Sitch and **B. D. Stocker** and N. Viovy and Y. P. Wang and A. Wiltshire and S. Zaehle and N. Zeng: The dominant role of semi-arid ecosystems in the trend and variability of the land CO₂ sink, *Science*, 348, 895-899, 2015.
 - Le Quééré, C., Moriarty, R., Andrew, R. M., Peters, G. P., Ciais, P., Friedlingstein, P., Jones, S. D., Sitch, S., Tans, P., Arneth, A., Boden, T. A., Bopp, L., Bozec, Y., Canadell, J. G., Chini, L. P., Chevallier, F., Cosca, C. E., Harris, I., Hoppema, M., Houghton, R. A., House, J. I., Jain, A. K., Johannessen, T., Kato, E., Keeling, R. F., Kitidis, V., Klein Goldewijk, K., Koven, C., Landa, C. S., Landschützer, P., Lenton, A., Lima, I. D., Marland, G., Mathis, J. T., Metzl, N., Nojiri, Y., Olsen, A., Ono, T., Peng, S., Peters, W., Pfeil, B., Poulter, B., Raupach, M. R., Regnier, P., Rödenbeck, C., Saito, S., Salisbury, J. E., Schuster, U., Schwinger, J., Séférian, R., Segschneider, J., Steinhoff, T., **Stocker, B. D.**, Sutton, A. J., Takahashi, T., Tilbrook, B., van der Werf, G. R., Viovy, N., Wang, Y.-P., Wanninkhof, R., Wiltshire, A., and Zeng, N.: Global carbon budget 2014, *Earth Syst. Sci. Data*, 7, 47-85, doi:10.5194/essd-7-47-2015, 2015.
 - Bohn, T. J., Melton, J. R., Ito, A., Kleinen, T., Spahni, R., **Stocker, B. D.**, Zhang, B., Zhu, X., Schroeder, R., Glagolev, M. V., Maksyutov, S., Brovkin, V., Chen, G., Denisov, S. N., Eliseev, A. V., Gallego-Sala, A., McDonald, K. C., Rawlins, M.A., Riley, W. J., Subin, Z. M., Tian, H., Zhuang, Q., and Kaplan, J. O.: WETCHIMP-WSL: intercomparison of wetland methane emissions models over West Siberia, *Biogeosciences*, 12, 3321-3349, doi:10.5194/bg-12-3321-2015, 2015.

- Joe M. Osborne; F. Hugo Lambert; Margriet Groenendijk; Anna B. Harper; Charles D. Koven; Benjamin Poulter; Thomas A. M. Pugh; Stephen Sitch; **Benjamin D Stocker**; Andy Wiltshire; Sönke Zaehle: Reconciling precipitation with runoff: observed hydrological change in the mid-latitudes, *Journal of Hydrometeorology*, 16, 2403–2420, 2015
- Berchet, A., Pison, I., Chevallier, F., Paris, J.-D., Bousquet, P., Bonne, J.-L., Arshinov, M. Y., Belan, B. D., Cressot, C., Davydov, D. K., Dlugokencky, E. J., Fofonov, A. V., Galanin, A., Lavrič, J., Machida, T., Parker, R., Sasakawa, M., Spahni, R., **Stocker, B. D.**, and Winderlich, J.: Natural and anthropogenic methane fluxes in Eurasia: a mesoscale quantification by generalized atmospheric inversion, *Biogeosciences*, 12, 5393-5414, doi:10.5194/bg-12-5393-2015, 2015.
- 2014 Stocker, B. D.**, Spahni, R., and Joos, F.: DYPTOP: a cost-efficient TOPMODEL implementation to simulate sub-grid spatio-temporal dynamics of global wetlands and peatlands, *Geosci. Model Dev.*, 7, 3089-3110, doi:10.5194/gmd-7-3089-2014, 2014.
- **Stocker, B. D.**, Feissli, F., Strassmann, K., Spahni, R., Joos, F: Past and future carbon fluxes from land use change, shifting cultivation and wood harvest, *Tellus B*, 66, 23188, <http://dx.doi.org/10.3402/tellusb.v66.23188>, 2014.
- Le Quéré, C., Peters, G. P., Andres, R. J., Andrew, R. M., Boden, T., Ciais, P., Friedlingstein, P., Houghton, R. A., Marland, G., Moriarty, R., Sitch, S., Tans, P., Arneeth, A., Arvanitis, A., Bakker, D. C. E., Bopp, L., Canadell, J. G., Chini, L. P., Doney, S. C., Harper, A., Harris, I., House, J. I., Jain, A. K., Jones, S. D., Kato, E., Keeling, R. F., Klein Goldewijk, K., Körtzinger, A., Koven, C., Lefèvre, N., Omar, A., Ono, T., Park, G.-H., Pfeil, B., Poulter, B., Raupach, M. R., Regnier, P., Rödenbeck, C., Saito, S., Schwinger, J., Segschneider, J., **Stocker, B. D.**, Tilbrook, B., van Heuven, S., Viovy, N., Wanninkhof, R., Wiltshire, A., Zaehle, S., and Yue, C.: Global carbon budget 2013, *Earth Syst. Sci. Data*, 6, 235-263, doi:10.5194/essd-6-235-2014, 2014.
- 2013 Stocker, B. D.**, Roth, R. Joos, F., Spahni, R., Steinacher, M., Zaehle, S., Bouwman, L., Xu-Ri, Prentice, C.: Multiple greenhouse-gas feedbacks from the land biosphere under future climate change scenarios, *Nature Climate Change*, 3, 666–672, doi:10.1038/nclimate1864, 2013.
- Le Quéré, C., Andres, R. J., Boden, T., Conway, T., Houghton, R. A., House, J. I., Marland, G., Peters, G. P., van der Werf, G. R., Ahlström, A., Andrew, R. M., Bopp, L., Canadell, J. G., Ciais, P., Doney, S. C., Enright, C., Friedlingstein, P., Huntingford, C., Jain, A. K., Jourdain, C., Kato, E., Keeling, R. F., Klein Goldewijk, K., Levis, S., Levy, P., Lomas, M., Poulter, B., Raupach, M. R., Schwinger, J., Sitch, S., **Stocker, B. D.**, Viovy, N., Zaehle, S., and Zeng, N.: The global carbon budget 1959–2011, *Earth Syst. Sci. Data*, 5, 165-185, doi:10.5194/essd-5-165-2013, 2013.
- Spahni, R., Joos, F., **Stocker, B. D.**, Steinacher, M., and Yu, Z. C.: Transient simulations of the carbon and nitrogen dynamics in northern peatlands: from the Last Glacial Maximum to the 21st century, *Clim. Past*, 9, 1287-1308, doi:10.5194/cp-9-1287-2013, 2013.
- 2011 Stocker, B. D.**, Strassmann, K., and Joos, F.: Sensitivity of Holocene atmospheric CO₂ and the modern carbon budget to early human land use: analyses with a process-based model, *Biogeosciences*, 8, 69-88, doi:10.5194/bg-8-69-2011, 2011.
- 2009** Frank, D. C., Esper, J., Raible, C. C., Büntgen, U., Trouet, V., **Stocker, B.**, and Joos, F.: Ensemble reconstruction constraints on the global carbon cycle sensitivity to climate, *Nature*, 463, 529-530, 2009.

Publications in review

- 2015** Zhao F., Zeng N., Akihiko I, Asrar G, Friedlingstein F., Jain A, Kalnay E., Kato E., Koven C., Poulter B., Rafique R., Sitch S., Shu S., **Stocker B.**, Viovy N., Wiltshire A., Zaehle S.: Attributing the role of CO₂, climate and land use in regulating the seasonal amplitude increase of carbon fluxes in terrestrial ecosystems: a multimodal analysis, submitted to *Glob. Biogeochem. Cycles*

- Zaichun Zhu, Shilong Piao, Ranga B. Myneni, Mengtian Huang, Zhenzhong Zeng, Josep G. Canadell, Philippe Ciais, Stephen Sitch, Pierre Friedlingstein, Almut Arneth, **Benjamin D. Stocker**, Benjamin Poulter, Charles Koven, Chunxiang Cao, Etsushi Kato, Hui Yang, Jiafu Mao, Josep Peñuelas, Lei Cheng, Ning Zeng, Sönke Zaehle, Thomas Pugh, Yaozhong Pan, Yingping Wang, Yue Li: Greening of the Earth and its drivers, submitted to *Nature Climate Change*
- Renato Spahni, Jochen Schmitt, Michael Bock, Barbara Seth, **Benjamin D. Stocker**, Xu-Ri, Adrian Schilt, Edward Brook, Bette Otto-Bliesner, Zhengyu Liu, I. Colin Prentice, Hubertus Fischer, Fortunat Joos: Glacial-Interglacial and Holocene N₂O changes constrain terrestrial N cycling, submitted to *Science Advances*
- Robert Mendelsohn, Iain C. Prentice, Oswald Schmitz, **Benjamin Stocker**, Robert Buchkowski, and Benjamin Dawson: The ecosystem impacts of severe warming, submitted to *American Economic Review*

Media coverage of my work

Holocene land use

Paul Voosen, “Climate Scientist Charts an Early Start for the Epoch of Man”, The Chronicle of Higher Education, February 20, 2013

Jeff Tollefson, “The 8,000-year-old climate puzzle”, Nature News, March 25, 2011

Global Carbon Project

Author of prelease for German-media

Der Bund, “Universität an CO₂ Bericht beteiligt”, November 19, 2013

Radio Rabe, radio interview, November 19, 2013