

Biography

Prof Dr. Roland Bol

1962, Male, Netherlands

Institute of Bio- and Geosciences, Agrosphere, Forschungszentrum Jülich, Germany & School of Natural Sciences, Bangor University (UK)



EDUCATION:

Doctoral (Drs), Physical Geography, University of Amsterdam, NL (1989)

Dr. (Ph.D), University of Bangor (Wales) (Soil Science) (1994)

PROFESSIONAL RESEARCH INTEREST:

Biogeochemistry, soil-water-air interface research in natural and agricultural ecosystems, Stable isotopes

RESEARCH TOPICS:

• Organic matter, elemental fluxes and colloidal fluxes in ecosystems on the lysimeter, field and small catchment scale • Carbon, nitrogen and phosphorus cycles in forest, agricultural, arid and hyper-arid ecosystems • Stable isotopes as environmental tracers

SCIENTIFIC CAREER:

2020 -current	Professor Biogeochemistry (0.2 FT), Environment Centre Wales, Bangor University (UK)
2019-current	Visiting Professor Biogeochemistry & Geomicrobiology, Geology Dept, Universidad Catholica del Norte, Antofagasta (Chile)
2017-current	Visiting special Chair Terrestrial Biogeochemistry - Institute for Biodiversity and Ecosystem Dynamics, Amsterdam University, Netherlands
2012-current	Research leader Soil organic matter & Elemental cycles (0.8 FT) FZJ, Germany
2010-2012	Leader Biogeochemistry Soil, Water & Air Team, Rothamsted, North Wyke
2009-2010	Leader Biogeochemistry of Soils & Water Team, NWR
2008-2009	Leader Soil & Water Interactions Team, North Wyke Research (NWR)
2007-2008	Principal Research Scientist, North Wyke Research (formally IGER)
1995-2006	(Senior) Research Scientist, IGER North Wyke
2003-2004	Visiting Research Scientist, Lincoln University, New Zealand (OECD Fellowship).
1992-1995	Post-doc NERC Radiocarbon Laboratory, Scotland.

RESEARCH OUTPUT

Publications (summary):

Publications in international (peer) reviewed scientific journals: **325 (total); 124 (2018-2023)**

Contributions to books: **7**; Number of citations: **>18K**; H-index: **69**; i10 index: **240** (Google scholar)

Researcher ID: H-9324-2013 and ORCID ID: 0000-0003-3015-7706

Publications with highest impact (number of citations and/or impact factor):

Adv. Agronomy (2010) (2478); Geoderma (1999) (623); Ecology (429); Nature Communication (2020) (265).

Nature communication (2022) (12). Critical Reviews in Environmental Science and Technology (2022) (1).

Nature Reviews Earth & Environment (2023)

Selected publications (in the last 3 years)

- Rahmati, M., Or, D., Amelung, W., Bauke, S.L., **Bol, R.**, ..., Vereecken, H. (2023). Soil is a living archive of the Earth system. *Nature Reviews Earth & Environment* <https://www.nature.com/articles/s43017-023-00454-5>
- Li, X., Wang, N., Ding, Y., ... **Bol, R.**, You, X. and Li, G., (2022). Globally elevated chemical weathering rates beneath glaciers. *Nature Communications* 13, 407 <https://doi.org/10.1038/s41467-022-28032-1>
- Arenas-Díaz, F., **Bol, R.**, Fuentes, B., Reyers, M., Fiedler, F., Böhm, C., Campos, E. and Shao, Y. (2022). Atmospheric Deposition in the Atacama Desert. *Earth Science Reviews* 226 (2022) 103925 <https://doi.org/10.1016/j.earscirev.2022.103925>
- Jia, Y., Klumpp, E., **Bol, R.**, Amelung, W. (2022). Uptake of metallic nanoparticles by crops. *Critical Reviews in Environmental Science and Technology*. DOI: 10.1080/10643389.2022.2156225.
- Amelung, W., Bossio, D., de Vries, W., ..., **Bol, R.**, ...M., Chabbi, A. (2020). Towards a global-scale soil climate mitigation strategy. *Nature Communications*. <https://doi.org/10.1038/s41467-020-18887-7>.

Principal supervision (and co-supervision):

1 Early Career scientist, 3 Ph.Ds. and 3 Ph.D. Sandwich students. (8 Ph.Ds. as co-supervisor).

Awards

2003 Isotope Award from Karleugen Habfast Foundation (Germany) for outstanding analytical and/or scientific work applying mass spectrometry techniques.

1999 Lifetime Millennium Fellow of Royal Society & British Millennium Association.

Current projects (last three selected)

2023 Sino-German mobility program. Environmental behaviour of heavy metals and soil nanoparticles in soil: Characteristics, formation, and co-transport (till 2025). With Sun Yat-Sen University.

2022 German BIOSC BOOST FUND-Project. BioPlastiCycle (till 2025)

2022 EU project TwinSubDyn. Twinning excellence on organic soil amendment effect on nutrient and

All peer reviewed papers 2022-2023

Li, X., Wang, N., Ding, Y., Hawkings, Yde, J.C, Raisber, R., Liu, J., Zhang, S., Kang, S., Wang, B., Liu, Q., Liu, S., Bol, R., You, X. and Li, G., (2022). Globally elevated chemical weathering rates beneath glaciers. *Nature Communications* 13, 407 <https://doi.org/10.1038/s41467-022-28032-1>.

Arenas-Díaz, F., Bol, R., Fuentes, B., Reyers, M., Fiedler, F., Böhm, C., Campos, E. and Shao, Y. (2022). Atmospheric Deposition in the Atacama Desert. *Earth-Science Reviews* 226 (2022) 103925 <https://doi.org/10.1016/j.earscirev.2022.103925>

Sun, S., Amelung, W., Wu, B., Haneklaus, S. Schnug, E. and Bol, R. (2022). Fertilizer-derived uranium continues to accumulate at Rothamsted long-term experiments and, thus, likely at other places of the world. *Science of the Total Environment* doi.org/10.1016/j.scitotenv.2022.153118.

Znaidi A., Brahim N., Ibrahim H., Bol R., Chaouachi M. (2022) Comparison of Organic Carbon Stock of Regosols Under Two Different Climates in Tunisia. In: Çiner A. et al. (eds) *Recent Research on Geomorphology, Sedimentology, Marine Geosciences and Geochemistry. CAJG 2019. Advances in Science, Technology & Innovation.* https://doi.org/10.1007/978-3-030-72547-1_6.

Fuentes, B., Gómez, F., Valdez, C., Videla, A., Castro-Severyn, J., Barahona, S., Bol, R., Riquelme, R., Quispe, J., Remonsellez, F., (2022). Effects of altitude on soil properties in coastal fog ecosystems in Morro Moreno National Park, Antofagasta, Chile. *European Journal of Soil Science* 73 :e13217. <https://doi.org/10.1111/ejss.13217>.

Zhuang, L., Schnepf, A., Unger, K., Liang, Z., Bol, R. (2022). Home-field advantage of litter decomposition faded 8 Years after Spruce forest clearcutting in Western Germany. *Soil Syst.* 2022, 6, 26. <https://doi.org/10.3390/soilsystems6010026>.

Brahim, N. Ibrahim, H., Mlih, R., Bouajila, A., Karbout, N., Bol, R. (2022). Soil OC and N stocks in the saline soil of Tunisian Gataaya oasis eight years after application of manure and compost. *Land* 2022, 11, 442. <https://doi.org/10.3390/land11030442>.

Ngaba, M.J.Y., Uwiragiye, Y., Bol, R., de Vries, W. and Zhou, J. (2022). Low-level nitrogen and short-term addition increases soil carbon sequestration in Chinese forest ecosystems. *Catena* 215,106333. <https://doi.org/10.1016/j.catena.2022.106333>

Mlih, R., Liang, L., Zhang, M., Tombacz, E., Bol, R., Klumpp, E. (2022). Transport and Retention of Poly(acrylic acid-co-maleic acid) Coated Magnetite Nanoparticles in Porous Media: Effect of Input Concentration, Ionic Strength and Grain Size. *Nanomaterials* [doi: 10.3390/nano12091536](https://doi.org/10.3390/nano12091536).

Rodríguez, A., Ibáñez, M., Bol, R., Brüggemann, N., Lobo, A., Jimenez, J.J., Ruess, L., Sebastià, M.T. (2022). Fairy ring-induced soil potassium depletion gradients reshape microbial community composition in a montane grassland. *European Journal of Soil Science* 73, e13239. <https://doi.org/10.1111/ejss.13239>.

Wang, Q. Zhang, W., Gao, W., Bol, R., Xiao, Q. Wu, L. (2022). Microbial regulation of net nitrogen mineralization is driven by C, N, P content and their stoichiometric ratios. *European Journal of Soil Science* 73, e13257. <https://doi.org/10.1111/ejss.13257>.

Sun, X., Bol, R., Klumpp, E., Li, M (2022). Organic phosphorus leaching risk from agricultural soils across China. *Chemical and Biological Technologies Agriculture* 9:35 <https://doi.org/10.1186/s40538-022-00302-6>

- Bhanja, S.N., Wang, J., Bol, R. (2022) Soil CO₂ emission largely dominates the total ecosystem CO₂ emission at Canadian boreal forest. *Frontiers in Environmental Science*, 28 June 2022 | <https://doi.org/10.3389/fenvs.2022.898199>.
- van Soest M.A.J., Anderson, N.J., Bol, R., Dixon, E.R., Bourdenet, M., Haygarth, P.M. (2022). Nutrient pool variability in relation to catena slope and grazing in low Arctic soils. *European Journal of Soil Science* 73, e13278.
- De la Luz Mora, M., Klumpp, E., Bol, R., Jara, A., Poblete-Grant, P., Sepúlveda, P., Nicolás Arancibia-Miranda, N. and Suazo-Hernández, J.M. (2022). Combined effect of soil particle size fractions and engineered nanoparticles on phosphate sorption processes in volcanic soils evaluated by Elovich and Langmuir-Freundlich models. *Journal of Soil Science and Plant Nutrition*. <https://doi.org/10.1007/s42729-022-00919-4>.
- Zhao, Y., Reichel, R., Herbst, M., Sun, Y., Brüggemann, N., Mörchen, R., Welp, G., Meng, F., Bol, R. (2022). Declining total carbon stocks in carbonate-containing agricultural soils over a 62-year recultivation chronosequence under humid conditions. *Geoderma* 425, 116060.
- Jia, M., Bol, R., Kooijman, A. Wessel, W., Tietema, A. (2022). A Decision support tool in ecological research to optimize the selection of 15N analysis method of ammonium and nitrate. *Nutrient Cycling in Agroecosystems* <https://doi.org/10.1007/s10705-022-10227-z>.
- Gu, J., Bol, R., Sun, Y., Zhang, H. (2022). Soil carbon quantity and forms mainly controlled by mean annual temperature along 4,000 km Eastern China North-South Transect. *Catena* 21, 106498. double affiliation BU.
- Lei, K., Creber, H., Bol, R., and Sohi, S.P. (2022). Preferences of *Pinus sylvestris* seedling roots for different phosphorus sources under phosphorus-deficient conditions. *Plant and Soil* <https://doi.org/10.1007/s11104-022-05682-0>.
- Al-Rabaia, A., Blackburn, D. M., Al-Ismaily, S., Janke, R., Pracejus, B., Al-Alawi, A., Al-Kindi, M., Bol, R. (2022). Customised biochar for soil health applications in arid land: effect of feedstock type and pyrolysis temperature. *Journal of Analytical and Applied Pyrolysis* 168, 105693.
- Huang, W. Hu, T., Mao, J., Montzka, C. Bol, R. Wan, S., Li, J. Yue, J., Dai, H. (2022). Hydrological drivers for the spatial distribution of wetland herbaceous communities in the Poyang Lake. *Remote Sensing* remotesensing-1914749.
- Tan, Y., Wang, Y., Chen, Z., Yang, M., Ning, Y., Zheng, C., Du, Z., Bol, R., Wu, D. (2022). Long-term artificial drainage altered the product stoichiometry of denitrification in alpine peatland soil of Qinghai-Tibet Plateau. *Geoderma* <https://doi.org/10.1016/j.geoderma.2022.116206>.
- Robinson, K.L., Bogena, H.R., Bol, R., Cammeraat, E. (2022) Effects of deforestation on dissolved organic carbon and nitrate in catchment stream water revealed by wavelet analysis. *Frontiers in Water* DOI 10.3389/frwa.2022.1003693.
- Wang, Q. Yuquan Q, Robinson, K.L., Bogena, H., Graf, A., Vereecken, H., Tietema, T., Bol, R. (2022). Deforestation alters dissolved organic carbon and sulfate dynamics in a mountainous headwater catchment-a wavelet analysis. *Frontiers in Forests and Global Change* DOI 10.3389/ffgc.2022.1044447.
- Bauke, S.L., Amelung, W., Bol, R., Brandt, L., Brüggemann, N., Kandeler, E., Meyer, M., Or, D., Schnepf, A., Schloter, M., Schulz, S., Siebers, N., von Sperber, C., Vereecken, H. (2022) Soil water status shapes nutrient cycling from micrometer to landscape scales. *Journal of Plant Nutrition and Soil Science*. DOI: 10.1002/jpln.202200357
- Keller, N., Bol, R., Marschner, B., Heinze, S. (2022) Catchment scale spatial distribution of soil enzyme activities in a mountainous German coniferous forest. *Soil Biology and Biochemistry* <https://doi.org/10.1016/j.soilbio.2022.108885>
- Liu, C., Bol, R., Ju, X., ; Tian, J., Wu, D. (2023). Trade-offs on carbon and nitrogen availability lead to only a minor effect of elevated CO₂ on potential denitrification in soil. *Soil Biology and Biochemistry* <https://doi.org/10.1016/j.soilbio.2022.108888>
- Chen, Z., Yang, T., Yang, S., Tan, Y., Bol, R., Duan, H., He, J. (2022) Global Transcriptomic Analysis Reveals Candidate Genes Associated with Different Phosphorus Acquisition Strategies among Soybean Varieties. *Frontiers in Plant Science*. Doi:10.3389/fpls.2022.1080014

- Ngaba, M.J.Y., Uwiragiye, Y., Bol, R., de Vries, W., Jian, J., Zhou, J. (2023). Global cross-biome patterns of soil respiration responses to nitrogen addition, altered precipitation and warming. *Science of the Total Environment* 858, 159808 <https://doi.org/10.1016/j.scitotenv.2022.159808>
- Zhang, Q., Boutton, T.W., Hsiao, C.J., Mushinski, R.M., Wang, L., Bol, R., Klumpp, E. (2023). Soil colloidal particles in a subtropical savanna: Biogeochemical significance and influence of anthropogenic disturbances. *Geoderma* <https://doi.org/10.1016/j.geoderma.2022.116282>
- Gu, J., Bol, R., Yang Wang, Y., Zhang, H. (2023). Controls on soil dissolved organic carbon along the 4000 km North-South Forest transect in Eastern China. *Catena* Volume 220, 106691 <https://doi.org/10.1016/j.catena.2022.106691>.
- Jiang, X., Amelung, W., Bol, R., Klumpp, E. (2023). Soil colloidal P content over a 2000 years of paddy-rice management chronosequence in the Yangtze River Delta, China. *Geoderma* 430, 116296* <https://doi.org/10.1016/j.geoderma.2022.116296>.
- Jia, Y., Klumpp, E., Bol, R., Amelung, W. (2022). Uptake of metallic nanoparticles by crops. *Critical Reviews in Environmental Science and Technology*. DOI: 10.1080/10643389.2022.2156225.
- Zhang, H., Liang, Q., Peng, Z., Zhao, Y., Tan, Y., Zhang, X., Bol, R. (2023). Response of greenhouse gases emissions and yields to irrigation and straw practices in wheat-maize cropping system. *Agricultural Water Management*, 282, 108281. <https://doi.org/10.1016/j.agwat.2023.108281>.
- de Nijs, E., Maas, L., Bol, R., Tietema, A. (2023). Co-composting rose waste, assessing the potential as a sustainable waste management strategy: nutrient availability and disease control. *Journal of Cleaner Production* 399, 136685. <https://doi.org/10.1016/j.jclepro.2023.136685>.
- Walk, J., Schulte, P., Bartz, M., Binnie, A., Kehl, M., Mörchen, R., Sun, X., Stauch, G., Tittmann, C., Bol, R., Brückner, H., Lehmkuhl, F. (2023). Pedogenesis under coastal hyperaridity assessed along a Late Quaternary chronosequence at Paposo, Atacama Desert. *Catena* <https://doi.org/10.1016/j.catena.2023.107171>. *
- Wang, S., Bol, R., Adhikari, K., Zhuang, Q., Jin, X., Han, C., Qian, F., (2023). Spatial-temporal variations and driving factors of soils carbon in forest ecosystems of China. *Forest ecosystems*, 10, 100101.
- Zhang, X., Liang, Q., Zhang, H., Zhang, A., Tan, Y., Bol, R. (2023). Incorporating straw into intensively farmed cropland soil can reduce N₂O emission through inhibition of nitrifiers and denitrifiers. *Journal of Environmental Management*, 342, 118115 doi.org/10.1016/j.jenvman.2023.118115
- Jin, X., Wang, S., Zhuang, Q., Bol, R., Adhikari, K., Wang, Y., Wang, Z., Zhang, X., Qian, F., (2023). Quantifying soil organic carbon sequestration potential of cultivated lands in Northeast China. *Geoderma Regional* 33, e00655 DOI: 10.1016/j.geodrs.2023.e00655
- Zu, Z., Zou, Z., Ma, L., Wang, X., Chen, R., Jones, D.L., Bol, R., Wu, D. (2023) Decadal application of mineral fertilizers alters the molecular composition and origins of organic matter in particulate and mineral-associated fractions. *Soil Biology and Biochemistry* Volume 182, 109042. <https://doi.org/10.1016/j.soilbio.2023.109042>.
- Ntinyari, W., Reichel, R., Gweyi-Onyango, J.P., Giweta, M., Wissel, H., Masso, C., Bol, R., Brüggemann, N. (2023). Nitrogen fertilization and liming increased CO₂ and N₂O emissions from tropical ferralsols, but not from a vertisol. *Soil Use and Management* DOI: 10.1111/sum.12927.
- Jin, X., Bol, R., An, T., Zheng, L., Li, S., Pei, J., Wang, J. (2023). Long-term fertilization and plastic film mulching modify temporal incorporation of ¹³C/¹⁵N-labelled particulate organic matter. *European Journal of Soil Science* (74):e13386. <https://doi.org/10.1111/ejss.13386>
- Shukla, S., Meshesha, T., Sen, I., Bol, R., Bogena, H., Wang, J., (2023). Assessing Impacts of Land Use and Land Cover (LULC) Change on Stream Flow and Runoff in Rur Basin, Germany. *Sustainability*-2370787
- Rahmati, M., Or, D., Amelung, W., Bauke, S.L., Bol, R., Hendricks Franssen, H.J., Montzka, C., Vanderborght, J., Vereecken, H. (2023). Soil is a living archive of the Earth system. *Nature Reviews Earth & Environment* (accepted). <https://www.nature.com/articles/s43017-023-00454-5>