

Personal Details

Name of Organisation:	Centre for Ecology & Hydrology
Name of Person:	Bridget Anne EMMETT
Nationality:	British
Profession/specialisation:	Soil and Ecosystem Scientist
Position in organisation:	Head of Site, Section Head & CEH Soil Science Area Lead (Band 3)
Specialisation in organisation:	Soils; land use; ecosystem science, climate change, air pollution, national and agri-environment monitoring; natural capital accounts

Qualifications / Awards etc.

Marsh Award for Climate Change Research, British Ecological Society, 2016
 Fellow of the Learned Society of Wales, 2015
 Fellow of the British Society of Soil Science, 2015
 AGI Award for Geospatial Excellence (team award) 2014
 Fellow of the Royal Society of Biology, 2010
 Honorary Professorship, Bangor University, 2009
 PhD (Soil Ecology) University of Exeter 1990.
 Bachelor of Science (First Class Honours, Plant Science) University of Aberdeen 1985.

Career Outline

2017 - CEH Science Area Head for Soils and Land Use; Head of Site CEH Bangor (Band 3[S])
 2009 - 2017 CEH Soils Science Area Lead; Head of Site CEH Bangor & Head of Emmett Section (Band 3[S])
 2008 - 2008 Acting CEH Director Biogeochemistry (Band 2 [S]) (6 months)
 2004 - 2008 Head of Site Bangor, Deputy Director of Biogeochemistry, CEH, and Head of 'Emmett' Section (Band 3[S])
 2001 - 2004 Director of CEH-Bangor, Band 3[S]
 1998 - 2001 Principal Scientific Officer Band 4 [S], Centre for Ecology and Hydrology (CEH - a organisation formed from 4 NERC Institutes: ITE, IFE, IH and IVEM)
 1994 - 1998 Senior Scientific Officer Band 5 [S], ITE Bangor
 1988 - 1994 Higher Scientific Officer Band 6 [S], Institute of Terrestrial Ecology (ITE), Bangor

Membership of committees, boards etc.

2019 - Member of UKRI BBSRC "Transforming the UK Food System for Healthy People and a Healthy Environment" "Assessment Panel"
 2019 - Member of the UKRI EPSRC Circular Economy Assessment Panel
 2019 - 2020 Contributor to the 3rd Climate Change Risk Assessment for the UK (Natural Environment Chapter)
 2018 - Member of the EU Mission Board for Soil Health and Food
 2017 - International Scientific Committee of CREAM, Spain.
 2017 - Scientific Advisory Board, Sustainable Soils Alliance
 2016 - Learned Society of Wales – Cellular, Molecular, Evolutionary, Organismal and Ecosystem Sciences Scrutiny Committee
 2016 - 2019 NERC Science Programme Advisory Group (SPAG)
 2016 - 2016 Specialist Adviser to the UK House of Commons Environment Audit Committee Inquiry on Soil Health
 2015 - 2019 Chair of the NERC Soil Security Programme Advisory Board
 2014 - 2014 BBSRC Rothamsted Mid Term Review Panel
 2014 - 2016 Defra Smarter Environmental Legislation Working Group
 2014 - 2018 UK representative for EU COST Action – ClimMani: Climate Change Manipulation experiments in Terrestrial Ecosystems Networks and Outreach.
 2014 - 2014 BBSRC SARISA grant review panel
 2014 - 2017 Scientific Advisory Board for Department of Geosciences and Natural Resource

	Management, University of Copenhagen
2014 - 2017	Welsh Water Independent Environment Advisory Panel
2013 - 2014	RCUK UK Energy Research Centre Phase 3 Commissioning Advisory Group
2013 -	UK Land Use, Land Use Change and Forestry Greenhouse Gas Inventory Steering Committee
2012 - 2013	NERC <i>ad hoc</i> Sustainable Use of Natural Resources Advisory Committee (covers Theme Leader duties)
2012 - 2012	BBSRC Rothamsted Research Institute Assessment Panel
2012 - 2013	Welsh Government Chief Scientist Bovine-TB Advisory Group
2012 - 2014	UK National Ecosystem Assessment Follow-on Phase Expert Panel
2012 - 2012	BBSRC Institute Strategic Programme Grant Review Panel
2011 - 2013	INRA Environment, Agro-ecosystem, Biogeochemical Cycles and Biodiversity (SOERE-ACBB) Assessment Panel
2010 - 2018	Science Advisory Council for Wales (Advisory group for Welsh Gov. Chief Scientist)
2010 - 2010	NERC Moderating Panel for Network of Sensors RP call
2009 - 2013	Steering Committee of ESF funded ClimMani project (Climate change – Manipulation experiments in terrestrial ecosystems)
2009 - 2016	UK Government Dept for Environment, Food and Rural Affairs Demonstration Catchment Advisory Panel
2009 - 2011	UK Government Dept for Environment, Food and Rural Affairs National Ecosystem Assessment Expert Panel
2009 - 2015	Welsh Assembly Government Land Use and Climate Change Group
2008 - 2016	Management Board of Wales Environment Research Hub
2007 - 2011	US EPA Review Group on N deposition Effects on Ecosystems
2007 - 2011	Steering Committee for the Centre for Integrated Research in the Rural Environment, Research and Enterprise Partnership, Bangor and Aberystwyth University (CIRRE)
2007 - 2009	BBSRC Review of Environmental Change Research Panel
2006 - 2010	Ecological Continuity Trust Steering Committee
2006 - 2009	UK NERC/BBSRC Soils Research Advisory Committee (SRAC)
2006 - 2013	Ecological Continuity Trust Steering Committee
2006 - 2008	UK Government Dept for Environment, Food and Rural Affairs Soils Action Plan Forum / Soils Advisory Forum
2005 - 2015	Steering Committee for Danish Climate Change Centre (CLIMAITE)
2004 -	UN/ECE Working Group on Effects, Joint Expert Group on Dynamic Modelling
2002 - 2005	Vice-President British Ecological Society
2001 - 2002	NERC Randall Report Implementation Group and NERC Corporate Development Group
1999 - 2002	Member of NERC Promotion Panel III
1999 - 2005	Member of NERC Global Nitrogen Enrichment Thematic Programme Steering Committee
1997 - 2000	Council member of British Ecological Society

Current Research Grants and Contracts:

- Welsh Government Environment and Rural Affairs Monitoring and Evaluation Programme: PI: **B. Emmett (CEH)** Oct 2017 – Sep 2022) £3.6m. 18 organisations as subcontractors.
- BBSRC Newton Fund UK-China Virtual Joint Centre for Improved Nitrogen Agronomy (CINAG), . PI T. Misselbrook (Rothamsted), CoIs **B Emmett (CEH)** and 4 others + 5 Chinese CoIs. £2,965,000 total, £500,000 managed by BE.
- NERC eDNA: LOFRESH Understanding the ecological relevance of eDNA in freshwater lotic ecosystems. PI: Simon Creer (Bangor), CoI **B Emmett (CEH)** and 4 others. £1,000,000 total, £164k to CEH.

Recently completed:

- NERC Turf-2-Surf PI: Macronutrient project. Co-PIs: A. Wade (Reading) **B. Emmett (CEH)**, C. Jago (Bangor). Sept 2012 – Aug 2016. , £3,200,000 total. £2,000,000 to CEH managed by BE.
-

-
- NERC Biodiversity and Ecosystem Services (BESS) small grant exploring spatial configurations of land management and implications for ecosystem services. PI: **B Emmett (CEH)**. £120k
 - Welsh Government Glastir Monitoring and Environment Evaluation Programme. PI: **B Emmett (CEH)**. 6th Sept 2012 – 31st Aug 2016. £8,490,000 total. 10 organisations as subcontractors
 - Defra funded Integrated Data and Modelling Platform. PI: **B Emmett (CEH)**. £600,000; 4 subcontractors
 - Defra Sustainable Intensification Platform Project 2 (landscape interactions). PI: Michael Winter (Exeter). (Sep 2014 - Oct 2017) £215,000 to CEH managed by **B Emmett (CEH)**.
 - EPSRC Internet of the Wild Co-PIs: G Blair (Lancaster), **B Emmett (CEH)**, D Jones (Bangor). (July 2014 – Dec 2015), £370,000 total. £140,000 to BE.
-

Research Areas

Particular interest in soils, biogeochemical and ecosystem science. Many projects involve coordination of large number of partners and inter-disciplinary working to improve integration across different disciplines and sectors from catchment/landscape to national scale. Specific research areas include; soil health; impact of land management on natural capital and the implications for ecosystem services; land-sea interactions; impacts of air pollution and climate change on soils and ecosystem function; new data and modelling tools for supporting policy development and improving evidence; and natural capital accounts. Techniques include national-scale surveys and monitoring and assessment of co-benefits and trade-offs, large long-term, field-scale manipulation experiments, range of field and laboratory techniques, data visualisation tools and ecosystem modelling. Income generation has come from a wide range of funders including NERC, BBSRC, EPSRC, DEFRA, EU & Welsh Government. International involvement includes over 9 EU projects over the last 10 years and Newton project in China. (acting as lead for the UK in 7 of these projects). Contribution to international initiatives e.g. co-author of UN System of Environmental Economic Accounts (SEEA) manual for species accounts; contribution to expert meetings relating to development of UNSEEA Ecosystem Experimental Accounts and SEEA indicators for SDG's and post 2020 Agenda for Biodiversity.

Current Role

Responsibilities as Head of Site and CEH Science Area Head of Soils and Land Use which includes 55 staff and > 20 PhD students spread across two teams at Bangor; two teams in Lancaster and one team in Wallingford – managing personnel, financial and research activities. Staff have expertise covering ecophysiology, soils, ecology, biodiversity, molecular ecology; land use; catchment science, biogeochemistry, ecosystem science, coastal research and modelling.

PUBLICATIONS

H-index = 51 (WOS)

Total ISI publications = 158 journal papers

Citations = 8,740

ORCID identifier: <http://orcid.org/0000-0002-2713-4389>

Researcher id: D-6199-2011; <https://publons.com/researcher/2793788/bridget-a-emmett/>

<http://www.ceh.ac.uk/staff/bridget-emmett>

Refereed Journal Papers

1. Nundloll, Vatsala; Porter, Barry; Blair, Gordon S.; **Emmett, Bridget**; Cosby, Jack; Jones, Davey L.; Chadwick, Dave; **Winterbourn, Ben**; Beattie, Philip; Dean, Graham; Shaw, Rory; **Shelley, Wayne**; Brown, Mike; Ullah, Izhar. 2019 The design and deployment of an end-to-end IoT infrastructure for the natural environment [in special issue: Cloud computing and internet of things] *Future Internet*, 11 (6), 129. 27, pp. <https://doi.org/10.3390/fi11060129> <http://nora.nerc.ac.uk/id/eprint/524468>
2. Peguero, Guille; Sol, Daniel; Arnedo, Miquel; Petersen, Henning; Salmon, Sandrine; Ponge, Jean-François; Maspons, Joan; **Emmett, Bridget**; Beier, Claus; Schmidt, Inger K.; Tietema, Albert; De Angelis, Paolo; Kovács-Láng, Edit; Kröel-Dulay, György; Estiarte, Marc; Bartrons, Mireia; Holmstrup, Martin; Janssens, Ivan A.; Peñuelas, Josep. 2019.

- Fast attrition of springtail communities by experimental drought and richness-decomposition relationships across Europe. *Global Change Biology*, 25 (8). 2727-2738. <https://doi.org/10.1111/gcb.14685> <http://nora.nerc.ac.uk/id/eprint/524428>
3. George, P.B., Lallias, D., Creer, S., Seaton, F., Kenny, J.G., Eccles, R.M., Griffiths, R.I., Lebron, I., **Emmett, B.A.**, Robinson, D.A., Jones, D.L. (2019). Divergent national-scale trends of microbial and animal biodiversity revealed across diverse temperate soil ecosystems. *Nature Communications* 10:
 4. Maskell, L., G. Tordoff, D. Maxwell, P. Henrys, S. Smart, **B.A. Emmett**, J. Skates, M. Botham, G.M. Siriwardena, E. Tebbs, S. Jarvis, C. Rowland, D. Robinson. 2019. Exploring relationships between land use intensity, habitat heterogeneity and biodiversity to identify and monitor areas of High Nature Value farming (2019) *Biological Conservation*.231
 5. Seymour, M, Durance, I, Cosby, BJ, Ransom-Jones, E, Deiner, K, Ormerod, SJ, Colbourne, JK, Wilgar, G, Carvalho, G, De Bruyn, M, Edwards, F, Emmett, BA, Bik, HM & Creer, S 2018, Acidity promotes degradation of multi-species environmental DNA in lotic mesocosms. *Communications Biology*, vol. 1, 4. <https://doi.org/10.1038/s42003-017-0005-3>
 6. Norton L.R., Smart S.M., Maskell L.C., Henrys P.A., Wood C.M., Keith A.M., Emmett B.A., Cosby B.J., Thomas A., Scholefield P.A., Greene S., Morton R.D., Rowland C.S.(2018). Identifying effective approaches for monitoring national natural capital for policy use. *Ecosystem Services* 30
 7. Andresen L.C., Dominguez M.T., Reinsch S., Smith A.R., Schmidt I.K., Ambus P., Beier C., Boeckx P., Bol R., de Dato G., Emmett B.A., Estiarte M., Garnett M.H., Kroel-Dulay G., Mason S.L., Nielsen C.S., Penuelas J., Tietema A. (2018). Isotopic methods for non-destructive assessment of carbon dynamics in shrublands under long-term climate change manipulation. *Methods in Ecology and Evolution*. 9
 8. Bussi G., Whitehead P.G., Thomas A.R.C., Masante D., Jones L., Jack Cosby B., Emmett B.A., Malham S.K., Prudhomme C., Prosser H. (2017). Climate and land-use change impact on faecal indicator bacteria in a temperate maritime catchment (the River Conwy, Wales). *J. Hydrol.* 553.
 9. Rowe E.C., Jones L., Dise N.B., Evans C.D., Mills G., Hall J., Stevens C.J., Mitchell R.J., Field C., Caporn S.J.M., Helliwell R.C., Britton A.J., Sutton M.A., Payne R.J., Vieno M., Dore A.J., Emmett B.A.(2017). Metrics for evaluating the ecological benefits of decreased nitrogen deposition. *Biol. Cons.* 212.
 10. George, P.B., Keith, A.M., Creer, S., Barrett, G.L., Lebron, I., **Emmett, B.A.**, Robinson, D.A. and Jones, D.L., 2017. Evaluation of mesofauna communities as soil quality indicators in a national-level monitoring programme. *Soil Biology and Biochemistry*, 115, pp.537-546.
 11. Maxwell, D. D.A. Robinson, A. Thomas, B. Jackson, L. Maskell, D.L. Jones, **B.A. Emmett**, 2017. Potential contribution of soil diversity and abundance metrics to identifying high nature value farmland (HNV) *Geoderma* 305: 417–432.
 12. Reinsch S, Koller E, Sowerby A, deDato G, Estiarte M, Guidolotti G, Kovacs-Lang E, Larsen KS, Liberati D, Penuelas J, Ransijn J, Robinson DA, Schmidt IK, Smith AR, Tietema A, Dukes JS, Beier C, **Emmett BA** (2017) Shrubland primary production and soil respiration diverge along European climate gradient. *Scientific Reports* 7: srep43952. DOI: 10.1038/srep43952.
 13. Smart SM, Glanville HC, Blanes MC, Mercado LM, **Emmett BA**, Jones DL, Cosby BJ, Marrs RH, Butler A, Marshall MR, Reinsch S, Herrero-Jauregui C, Hodgson JG (2017) Leaf dry matter content is better at predicting above-ground net primary production than specific leaf area. *Functional Ecology*. DOI: 10.1111/1365-2435.142832.
 14. Sharps, K., Masante, D., Thomas, A., Jackson, B., Redhead, J., May, L., Prosser, H., Cosby, **B.**, **Emmett**, B. & Jones, L. (2017) Comparing strengths and weaknesses of three ecosystem services modelling tools in a diverse UK river catchment. *Science of the Total Environment* 584-585:118-130.
 15. Carey, J.C., Tang, J., Templer, P.H., Kroeger, K.D., Crowther, T.W., Burton, A, Dukes, J.S., **Emmett, B.**, Frey, S., Heskell, M., Jiang, L., Machmuller, M., Mohan, J.E., Panetta, A.M., Reich, P.B., Reinsch, S., Wang, X., Allison, S.D., Bamminger, C. Bridgham, S.D., Collins, S.L., Dato, G., Eddy, W.C., Enquist, B.J., Estiarte, M.,Harte, J.,Henderson, A.,Johnson, B.R., Larsen, K.S, Luo, Y.,Marhan, S., Melillo, J.,Peñuelas, J., Pfeifer-Meister, L.,Poll, C., Rastetter, E.B., Reinmann, A., Reynolds, L.L., Schmidt, I.K., Shaver, G,R., Strong, A.L., Suseela, V., Tietema, A. (2016) Temperature response of soil respiration largely unaltered with experimental warming. *Proceedings of the National Academy of Sciences*. 113: 13797 – 13802.

16. Crowther, T.W., Todd-Brown, K.E.O., Rowe, C.W., Wieder, W.R., Carey, J.C., Machmuller, M.B., Snoek, L.B, Fang, S., Zhou, G., Allison, S.D., Blair, J.M., Bridgham, S.D., Burton, A.J., Carrillo, Y., Reich, P.B., Clark, J.S., Classen, A.T., Dijkstra, F.A., Elberling, B., **Emmett, B.**, Estiarte, M., Frey, S.D., Guo, J., Harte, J., Jiang, L., Johnson, B.R., Kröel-Dulay, G., Larsen, K.S., Laudon, H., Lavalley, J.M., Luo, Y., Lupascu, M., Ma, L.N., Marhan, S., Michelsen, A., Mohan, J., Niu, S., Pendall, E, Peñuelas, J., Pfeifer-Meister, L., Poll, C., Reinsch, S., Reynolds, L.L., Schmidt, I.K., Sistla, S., Sokol, N.W., Templer, P.H., Treseder, K.K., Welker, J.M., & Bradford, M.A.(2016) Quantifying global soil C losses in response to warming. *Nature* 540: 104-108.
17. Dominguez MT, Smith AR, Reinsch S, **Emmett BA** (2017) Inter-annual variability of soil respiration in wet shrublands: do plants modulate its sensitivity to climate? *Ecosystems*. DOI: 10.1007/s10021-016-0062-3.
18. Dominguez M.T., Holthof E., Smith A.R., Koller E., Emmett B.A. (2017). Contrasting response of summer soil respiration and enzyme activities to long-term warming and drought in a wet shrubland (NE Wales, UK). *Applied Soil Ecology* 110.
19. Andresen L.C., Muller C., de Dato G., Dukes J.S., Emmett B.A., Estiarte M., Jentsch A., Kroel-Dulay G., Luscher A., Niu S., Penuelas J., Reich P.B., Reinsch S., Ogaya R., Schmidt I.K., Schneider M.K., Sternberg M., Tietema A., Zhu K., Bilton M.C.(2016) Shifting Impacts of Climate Change: Long-Term Patterns of Plant Response to Elevated CO₂, Drought, and Warming Across Ecosystems. *Adv. Ecol. Res.* 55.
20. Estiarte M, Vicca S, Penuelas J, Bahn M, Beier C, **Emmett BA**, Fay PA, Hanson PJ, Hasibeder R, Kigel J, Kröel-Dulay G, Larsen SL, Lellei-Kovács E, Limousin JM, Ogaya R, Ourcival JM, Reinsch S, Sala OE, Schmidt IK, Sternberg M, Tielbörger K, Tietema A, Janssens IA (2016) Few multi-year precipitation-reduction experiments find a shift in the productivity-precipitation relationship. *Global Change Biology* 22: 2570-2581. DOI: 10.1111.gcb.13269.
21. **Emmett, B.A.**, Cooper D., Smart S., Jackson B., Thomas A., Cosby, B., Evans C., Glanville H., McDonald J.E., Malham, S.K., Marshall M., Jarvis S., Rajko-Nenow P., Webb, GP., Ward, S., Rowe E., Jones, L., Vanbergen, A.J., Keith, A., Carter, H., Pereira, M.G., Hughes, S., Robinson, I., Wade, A. and Jones, D.L. (2016). Spatial patterns and environmental constraints on ecosystem services at a catchment scale. *Science of the Total Environment*. 572: 1586-1600.
22. DeLuca T.H., Glanville, H.C., Harris, M., Emmett, B.A., Pingree, M.R.A., deSosa, L.L., Cerda-Moreno, C., (2015) A novel biologically-based approach to evaluating soil phosphorus availability across complex landscapes. *Soil biology and biochemistry* 88:110-119.
23. Keith AM, Griffiths RI, Henrys PA, Hughes S, Lebron I, Maskell LC, Ogle SM, Robinson DA, Rowe EC, Smart SM, Spurgeon D, Wood CM & Emmett BA (2015). Monitoring soil natural capital and ecosystem services utilising large-scale survey data. In: Stromberger, Lindbo & Comerford (eds.) *Soil Ecosystem Services*. ASA-CSSA-SSSA. doi:10.2136/2015.soilecosystemservices.2014.0070
24. Jones L., Norton L., Austin, Z., Browne, A.L., Donovan, D., Emmett, B.A., Grabowski, Z.J., Howard D.C., Jones, J.P.G., Kenter, J.O., Manley, W., Morris C., Robinson, D.A., Short C., Siriwardena, G.M., Stevens C.J., Storkey, J., Waters, R.D., Willis, G.F. 2016. Stocks and flows of natural and human-derived capital in ecosystem services. *Land Use Policy* 52: 151-162
25. Robinson, D.A., S.B. Jones, I. Lebron, S. Reinsch, M.T. Domínguez, A.R. Smith, D.L. Jones, M.R. Marshall, and B.A. Emmett. 2016. Experimental evidence for drought induced alternative stable states of soil moisture, *Scientific Reports* (6: 20018)
26. Dominguez M.T., A. Sowerby, A.R. Smith, D.A. Robinson, S. Van Baarsel, R.T.E. Mills, M.R. Marshall, E. Koller, I. Lebron, J. Hall, B.A. Emmett. 2015. Sustained impact of drought on wet shrublands mediated by soil physical changes. *Biochemistry Letters*, DOI 10.1007/s10533-014-0059-y
27. Kroel-Dulay, G., Ransijn, J., Schmidt, I.K. Beier, C., Angelis, P., Dato G., Dukes, J.S, Emmett, B., Estiarte, M., Garadnai, J., Kongstad, J., Kova'cs-La'ng, E., Larsen, K.S., Liberati, D., Ogaya, R., Riis-Nielsen, T., Smith, A., Sowerby, A., Tietema, A., Penuelas, J., (2015) Increased sensitivity to climate change in disturbed ecosystems. *Nature Communications* 6:6682. DOI: 10.1038/ncomms7682
28. Erisman, Jan Willem; Leach, Allison; Adams, Mark; Agboola , Julius I.; Ahmetaj, Luan; Alard, Didier; Austin, Amy; Awodun, Moses A.; Bareham, Simon; Bird, Theresa L.; Bleeker, Albert; Bull, Keith; Cornell, Sarah E.; Davidson, Eric; De Vries, Wim; Dias, Teresa; Emmett, Bridget; Goodale, Christine; Greaver, Tara; Haeuber, Richard;

- Harmens, Harry; Hicks, W. Kevin; Hogbom, Lars; Jarvis, Paul; Johansson, Matti; Russell, Zoe; McClean, Colin; Paton, Bill; Perez, Tibisay; Plesnik, Jan; Rao, Nalini; Schmidt, Susanne; Sharma, Yogendra B.; Tokuchi, Naoko; Whitfield, Clare P.. 2014 Nitrogen deposition effects on ecosystem services and interactions with other pollutants and climate change. In: Sutton, Mark A.; Mason, Kate E.; Sheppard, Lucy J.; Sverdrup, Harald; Haeuber, Richard; Hicks, W. Kevin, (eds.) *Nitrogen deposition, critical loads and biodiversity*. Dordrecht, Springer, 493-505.
29. Jones, L.; Provins, A.; Holland, M.; Mills, G.; Hayes, F.; Emmett, B.; Hall, J.; Sheppard, L.; Smith, R.; Sutton, M.; Hicks, K.; Ashmore, M.; Haines-Young, R.; Harper-Simmonds, L.. 2014 A review and application of the evidence for nitrogen impacts on ecosystem services. *Ecosystem Services*, 7. 76-88. 10.1016/j.ecoser.2013.09.001
 30. Dominguez, Maria T., Sowerby, Alwyn, Smith, Andrew R., Robinson, David A., Van Baarsel, Susie, Mills, Rob T. E., Marshall, Miles R., Koller, Eva, Lebron, Inma, Hall, Jane, Emmett, Bridget A. (2015) Sustained impact of drought on wet shrublands mediated by soil physical changes. *Biogeochemistry* 122: 151 - 163
 31. Raffaelli, D., J.M. Bullock, S. Cinderby, I. Durance, B. Emmett, J. Harris, K. Hicks, T.H. Oliver, D. Paterson, and P.C.L. White. 2014. "Big Data and Ecosystem Research Programmes". *Advances in Ecological Research*. 51: 41-78
 32. Field, Chris D., Nancy B. Dise, Richard J. Payne, Andrea J. Britton, Bridget A. Emmett, Rachel C. Helliwell, Steve Hughes, et al. 2014. "The Role of Nitrogen Deposition in Widespread Plant Community Change Across Semi-natural Habitats". *Ecosystems*. (23).
 33. Mills, R. T. E., Tipping, E., Bryant, C. L., Emmett, B. A. (2014) Long-term organic carbon turnover rates in natural and semi-natural topsoils. *Biogeochemistry* 118: 257 – 272
 34. Jones, David L., Simfukwe, Paul, Hill, Paul W., Mills, Robert T. E., Emmett, Bridget A. (2014) Evaluation of Dissolved Organic Carbon as a Soil Quality Indicator in National Monitoring Schemes PLOS ONE 9: AR e90882
 35. Lawley, Russell, Emmett, Bridget A. and Robinson, David A. (2014) Soil observatory lets researchers dig deep. *Nature* 509: 427
 36. Rowe, E. C., Smart, S. M., Emmett, B. A. (2014) Phosphorus availability explains patterns in a productivity indicator in temperate semi-natural vegetation. *Environmental Science Processes and Impacts* 16: 2156- 2164
 37. Emmett, B.A.. 2013 An integrated ecological, social and physical approach to monitoring environmental change and land management effects: the Wales Axis II Monitoring and Evaluation Programme. In: Boatman, Nigel; Green, Mike; Marshall, Jon; Musters, Kees; Peach, Will; Peel, Steve; Siriwardena, Gavin; Smith, Barbara, (eds.) *Environmental Management on Farmland*. Wellesbourne, UK, Association of Applied Biologists, 31-39. Aspects of Applied Biology, 118.
 38. Maskell, L.C., Crowe, A., Dunbar, M.J., Emmett, B., Henrys, P., Keith, A.M., Norton, L.R., Scholefield, P., Clark, D.B., Simpson, I.C. & Smart, S.M. (2013) Exploring the ecological constraints to multiple ecosystem service delivery and biodiversity. *Journal of Applied Ecology*, **50**, 561-571.
 39. Mills, R.T.E., Dewhurst, N., Sowerby, A., Emmett, B.A. & Jones, D.L. (2013) Interactive effects of depth and temperature on CH₄ and N₂O flux in a shallow podzol. *Soil Biology & Biochemistry*, **62**, 1-4.
 40. Quilliam, R.S., Rangecroft, S., Emmett, B.A., Deluca, T.H. & Jones, D.L. (2013) Is biochar a source or sink for polycyclic aromatic hydrocarbon (PAH) compounds in agricultural soils? *Global Change Biology Bioenergy*, **5**, 96-103.
 41. Reynolds, B., Chamberlain, P.M., Poskitt, J., Woods, C., Scott, W.A., Rowe, E.C., Robinson, D.A., Frogbrook, Z.L., Keith, A.M., Henrys, P.A., Black, H.I.J. & Emmett, B.A. (2013) Countryside Survey: National "Soil Change" 1978-2007 for Topsoils in Great Britain-Acidity, Carbon, and Total Nitrogen Status. *Vadose Zone Journal*, **12**.
 42. Robinson, D.A., Hockley, N., Cooper, D.M., Emmett, B.A., Keith, A.M., Lebron, I., Reynolds, B., Tipping, E., Tye, A.M., Watts, C.W., Whalley, W.R., Black, H.I.J., Warren, G.P. & Robinson, J.S. (2013) Natural capital and ecosystem services, developing an appropriate soils framework as a basis for valuation. *Soil Biology & Biochemistry*, **57**, 1023-1033.
 43. Tipping, E. Rowe, E.E., Evans, C.D., Mills, R.T.E., Emmett, B.A., Chaplow, J.S., and Hall, J.R. 2012. N14C: A plant–soil nitrogen and carbon cycling model to simulate terrestrial ecosystem responses to atmospheric nitrogen deposition. *Ecological Modelling*, 247, 11– 26
 44. Richard S. Quilliam, Sally Rangecroft, Bridget A. Emmett, Thomas H. Deluca and Davey L. Jones, 2012. Is biochar a source or sink for polycyclic aromatic hydrocarbon (PAH)

- compounds in agricultural soils? *Global Change Biology Bioenergy*, DOI: 10.1111/gcbb.12007
45. L.R. Norton, L.C. Maskell, S.S. Smart, M.J. Dunbar, B.A. Emmett, P.D. Carey, P. Williams, A. Crowe, K. Chandler, W.A. Scott, and C.M. Wood, 2012. Measuring stock and change in the GB countryside for policy: Key findings and developments from the Countryside Survey 2007 field survey. *Journal of Environmental Management*, 113, 117-127.
 46. Beier, C., Beierkuhnlein, C., Wohlgemuth, T., Penuelas, J., Emmett, B., Korner, C., de Boeck, H., Christensen, J.H., Leuzinger, S., Janssens, I.A. and Hansen, K. 2012. Precipitation manipulation experiments - challenges and recommendations for the future. *Ecology Letters*, 15, 899-911.
 47. Blanes, M.C., Emmett, B.A., Vinegla, B. and Carreira, J.A. 2012. Alleviation of P limitation makes tree roots competitive for N against microbes in a N-saturated conifer forest: A test through P fertilization and N-15 labelling. *Soil Biology & Biochemistry*, 48, 51-59.
 48. Carter, M.S., Larsen, K.S., Emmett, B.A., Estiarte, M., Field, C., Leith, I.D., Lund, M., Meijide, A., Mills, R.T.E., Niinemets, U., Penuelas, J., Portillo-Estrada, M., Schmidt, I.K., Selsted, M.B., Sheppard, L.J., Sowerby, A., Tietema, A. and Beier, C. 2012. Synthesizing greenhouse gas fluxes across nine European peatlands and shrublands - responses to climatic and environmental changes. *Biogeosciences*, 9, 3739-3755.
 49. Holmstrup, M., Sorensen, J.G., Maraldo, K., Schmidt, I.K., Mason, S., Tietema, A., Smith, A.R., Emmett, B.A., Schmelz, R.M., Bataillon, T., Beier, C. and Ehlers B.K. 2012. Increased frequency of drought reduces species richness of enchytraeid communities in both wet and dry heathland soils. *Soil Biology & Biochemistry*, 53, 43-49.
 50. Jones, R., Causton, D., Emmett, B., Mur, L. and Gwynn-Jones, D. 2012. Latent soil effects of grazing and ammonium deposition on *Deschampsia flexuosa* tillers inserted and grown in heather moorland soil. *Environmental and Experimental Botany*, 81, 72-78.
 51. Phoenix, G.K., Emmett, B.A., Britton, A.J., Caporn, S.J.M., Dise, N.B., Helliwell, R., Jones, L., Leake, J.R., Leith, I.D., Sheppard, L.J., Sowerby, A., Pilkington, M.G., Rowe, E.C., Ashmorek, M.R. and Power, S.A. 2012. Impacts of atmospheric nitrogen deposition: responses of multiple plant and soil parameters across contrasting ecosystems in long-term field experiments. *Global Change Biology*, 18, 1197-1215.
 52. Rowe, E.C., Emmett, B.A., Frogbrook, Z.L., Robinson, D.A. and Hughes, S. 2012. Nitrogen deposition and climate effects on soil nitrogen availability: Influences of habitat type and soil characteristics. *Science of the Total Environment*, 434, 62-70.
 53. Robinson, D.A., Hockley, N., Dominati, E., Lebron, I., Scow, K.M., Reynolds, B., Emmett, B.A., Keith, A.M., de Jonge, L.W., Schjonning, P., Moldrup, P., Jones, S.B. and Tuller, M. 2012. Natural Capital, Ecosystem Services, and Soil Change: Why Soil Science Must Embrace an Ecosystems Approach. *Vadose Zone Journal*, 11, DOI: 10.2136/vzj2011.0051
 54. Templer, P.H., Mack, M.C., Chapin, F.S., Christenson, L.M., Compton, J.E., Crook, H.D., Currie, W.S., Curtis, C.J., Dail, D.B., D'Antonio, C.M., Emmett, B.A., Epstein, H.E., Goodale, C.L., Gundersen, P., Hobbie, S.E., Holland, K., Hooper, D.U., Hungate, B.A., Lamontagne, S., Nadelhoffer, K.J., Osenberg, C.W., Perakis, S.S., Schleppei, P., Schimel, Schmidt, J.I.K., Sommerkorn, M., Spoelstra, J., Tietema, A., Wessel, W.W. and Zak, D.R. 2012. Sinks for nitrogen inputs in terrestrial ecosystems: a meta-analysis of N-15 tracer field studies. *Ecology*, 93, 1816-1829.
 55. Stevens, C.J., Smart, S.M., Henrys, P.A., Maskell, L.C. Crowe, A., Simkin, J., Cheffings, C.M., Whitfield, C., Gowing, D.J.G., Rowe, E.C., Dore, A.J. and Emmett, B.A. 2012. Terricolous lichens as indicators of nitrogen deposition: Evidence from national records. *Ecological Indicators*, 20, 196-203.
 56. Henrys, P.A., Stevens, C.J., Smart, S.M., Maskell, L.C., Walker, K.J., Preston, C.D., Crowe, A., Rowe, E.C., Gowing, D.J. and Emmett, B.A. 2011. Impacts of nitrogen deposition on vascular plants in Britain: an analysis of two national observation networks. *Biogeosciences*, 8, 3501-3518.
 57. Lellei-Kovacs, E., Kovacs-Lang, E., Botta-Dukat, Z., Kalapos, T., Emmett, B. and Beier, C. 2011. Thresholds and interactive effects of soil moisture on the temperature response of soil respiration. *European Journal of Soil Biology*, 47, 247-255.
 58. Mills, R., Glanville, H., McGovern, S., Emmett, B.A. and Jones, D.L. 2011. Soil respiration across three contrasting ecosystem types: comparison of two portable IRGA systems. *Journal of Plant Nutrition and Soil Science*, 174, 532-535.
 59. Pardo, L.H., Fenn, M.E., Goodale, C.L., Geiser, L.H., Driscoll, C.T., Allen, E.B., Baron, J.S., Bobbink, R., Bowman, W.D., Clark, C.M., Emmett, B.A., Gilliam, F.S., Greaver, T.L.,

- Hall, S.J., Lilleskov, E.A., Liu, L.L., Lynch, J.A., Nadelhoffer, K.J., Perakis, S.S., Robin-Abbott, M.J., Stoddard, J.L., K. C. Weathers, K.C. and Dennis, R.L. 2011. Effects of nitrogen deposition and empirical nitrogen critical loads for ecoregions of the United States. *Ecological Applications*, 21, 3049-3082.
60. Payne, R.J., Stevens, C.J., Dise, N.B., Gowing, D.J., Pilkington, M.G., Phoenix, G.K., Emmett, B.A. and Ashmore, M.R. 2011. Impacts of atmospheric pollution on the plant communities of British acid grasslands. *Environmental Pollution*, 159, 2602-2608.
61. Rowe, E.C., Emmett, B.A., Smart, S.M. and Frogbrook, Z.L. 2011. A new net mineralizable nitrogen assay improves predictions of floristic composition. *Journal of Vegetation Science*, 22, 251-261.
62. Simfukwe, P., Hill, P.W., Emmett, B.A. and Jones, D.L. 2011. Soil classification provides a poor indicator of carbon turnover rates in soil. *Soil Biology & Biochemistry*, 43, 1688-1696.
63. Silvertown, J., Tallowin, J., Stevens, C., Power, S.A., Morgan, V., Emmett, B.A., Hester, A., Grime, P.J., Morecroft, M., Buxton, R., Poulton, P., Jinks, R. and Bardgett, R. 2010. Environmental myopia: a diagnosis and a remedy. *Trends in Ecology & Evolution*, 25, 556-561.
64. Sowerby, A., Emmett, B.A., Williams, D., Beier C. and Evans, C.D. 2010. The response of dissolved organic carbon (DOC) and the ecosystem carbon balance to experimental drought in a temperate shrubland. *European Journal of Soil Science*, 61, 697-709.
65. Berg, B., Davey, M.P., De Marco, A., Emmett, B., Faituri, M., Hobbie, S., Johansson, M.-B., Liu, C., McClagherty, C., Norell, L., Rutigliano, A. and De Santo, V. 2010. Factors influencing limit values for pine needle litter decomposition – a synthesis for boreal and temperate pine forest systems. *Biogeochemistry*, 100, 57-73.
66. Smart, S.M., Scott, W.A., Whittaker, J., Hill, M.O., Roy, D.B., Critchley, C.N., Marina, L., Evans, C., Emmett, B.A., Rowe, E.C., Crowe, A., Le Duc, M. and Marrs, H. 2010. Empirical realised niche models for British higher and lower plants – development and preliminary testing. *Journal of Vegetation Science*, 21, 643-656.
67. Armsworth, P.R., Armsworth, A.N., Compton, Cottle, P., Davies, I., Emmett, B.A., Fandrich, V., Foote, M., Gaston, K.J., Gardiner, P., Hess, T., Hopkins, J., Horsley, N., Leaver, N., Maynard, T. and Shannon, D. 2010. The ecological research needs of business. *Journal of Applied Ecology*, 47, 235-243.
68. Bobbink, R., Hicks, K., Galloway, J., Spranger, T., Alkemade, R., Ashmore, M., Bustamante, M., Cinderby, S., Davidson, E., Dentener, F., Emmett, B., Erisman, J.-W., Fenn, M., Gilliam, F., Nordin, A., Pardo, L. and de Vries, W. 2010. Global assessment of nitrogen deposition effects on terrestrial plant diversity: a synthesis. *Ecological Applications*, 20, 30-59.
69. Mänd, P., Hallik, L., Peñuelas, J., Nilson, T., Duce, P., Emmett, B.A., Beier, C., Estiarte, M., Garadnai, J., Kalapos, T., Kappel Schmidt, I., Kovács-Láng, E., Prieto, P., Tietema, A., Westerveld, J.W. and Kull, O. 2010. Responses of the reflectance indices PRI and NDVI to experimental warming and drought in European shrublands along a north-south climatic gradient. *Remote Sensing of Environment*, 114, 626-636.
70. Beier, C., Emmett, B., Tietema, A., Schmidt, I.K., Penuelas, J., Kovacs Lang, E., Duce, P., De Angelis, P., Gorissen, A., Estiarte, M., de Dato, G.D., Sowerby, A., Kroel-Dulay, G., Dyer, J., Jones, G.E., Kull, O., Petersen, H., Gjelstrup, P. and Spano, D. 2009. Carbon balances for 6 contrasting shrublands in Europe. *Global Biogeochemical Cycles*. 23, 10.2136/vzj2011.0051
71. Prieto, P., Penuelas, J., Niimets, U., Ogaya, R., Schmidt, I.K., Beier, C., Tietema, A., Sowerby, A., Emmett, B.A., Lang, E.K, Kroel-Dulay, G., Lhotsky, B., Cesaraccio, C., Pellizzaro, G., de Dato, G., Sirca, C. and Estiarte, M. 2009. Changes in the onset of spring growth in shrubland species in response to experimental warming along a north-south gradient in Europe. *Global Ecology and Biogeography*, 18, 473-484
72. Sowerby, A., Emmett, B.A., Tietema, A. and Bier, C. 2008. Contrasting effects of repeated summer drought on soil carbon efflux in hydric and mesic heathland soils. *Global Change Biology*, 14, 2388-2404.
73. Luo, Y.Q., Gerten, D., Le Maire, G., Parton, W.J., Weng, E.S., Zhou, X.H., Keough, C., Beier, C., Ciais, P., Cramer, W., Dukes, J.S., Emmett, B., Hanson, P.J., Knapp, A., Linder, S., Nepstad, D. and Rustad, L. 2008. Modeled interactive effects of precipitation, temperature, and [CO₂] on ecosystem carbon and water dynamics in different climatic zones. *Global Change Biology*, 14, 1986-1999.
74. Evans, C.D., Goodale, C.L., Caporn, S.J.M., Dise, N.B., Emmett, B.A., Fernandez, I.J., Field, C.D., Findlay, S.E.G., Lovett, G.M., Meeseburg, H., Moldan, F., Sheppard, L.J.,

2008. Does elevated nitrogen deposition or ecosystem recovery from acidification drive increased dissolved organic carbon loss from upland soil? A review of evidence from field nitrogen addition experiments. *Biogeochemistry*, 91, 13-35.
75. Beier, C., Emmett, B.A., Peñuelas, J., Schmidtd, I.K., Tietema, A., Estiarte, M., Gundersen, P., Llorens, L., Riis-Nielsen, T., Sowerby, A. and Gorissen, A. 2008. Carbon and nitrogen cycles in European ecosystems respond differently to global warming. *Science of the Total Environment*, 407, 692-697.
76. Rowe, E.C., Smart, S.M., Kennedy, V.H., Emmett, B.A. and Evans, C.D. 2008. Nitrogen deposition increases the acquisition of phosphorus and potassium by heather *Calluna vulgaris*. *Environmental Pollution*, 155, 201-207.
77. Toberman, H., Evans, C.D., Freeman, C., Fenner, N., White, M., Emmett, B.A. and Artz, R.R.E. 2008. Summer drought effects upon soil and litter extracellular phenol oxidase activity and soluble carbon release in an upland *Calluna* heathland. *Soil Biology & Biochemistry*, 40, 1519-1532.
78. Estiarte, M., Penuelas, J., Sardans, J., Emmett, B.A., Sowerby, A., Beier, C., Schmidt, I.K., Tietema, A., Van Meeteren, M.J.M., Kovacs Lang, E., Mathe, P., De Angelis, P., De Dato, G. 2008. Root-surface phosphatase activity in shrublands across a European gradient: Effects of warming. *Journal of Environmental Biology*, 29, 25-29.
79. Pilkington, M.G., Caporn, S.J.M., Carroll, J.A., Cresswell, N., Lee, J.A., Emmett, B.A., and Bagchi, R. 2007. Phosphorus supply influences heathland responses to atmospheric nitrogen deposition. *Environmental Pollution*, 148, 191-200.
80. Penuelas, J., Prieto P., Beier, C., Cesaraccioz, C., De Angelis, P., DeDato, G., Emmett, B.A., Estiarte, M., Garadnai, J., Gorissen, A., KovacsLang, E., Kroel-Dulay, G., Llorens, L., Pellizzaro, G., Riis-Nielsen, T., Schmidt, I.K., Sirca, C., Sowerby, A., Spano, D and Tietema, A. 2007. Response of plant species richness and primary productivity in shrublands along a north-south gradients in Europe to seven years of experimental warming and drought: reductions in primary productivity in the heat and drought year of 2003. *Global Change Biology*, 13, 2563-2581.
81. Pilkington, M.G., Caporn, S.J.M., Carroll, J.A., Cresswell, N., Phoenix, G.K., Lee, J.A., Emmett, B.A. and Sparks, T. 2007. Impacts of burning and increased nitrogen deposition on nitrogen pools and leaching in an upland moor. *Journal of Ecology*, 95, 1195-1207.
82. Sutton, M.A., Nemix, E., Erisman, J.W., Beier, C., Butterbach Bahl, K., Cellier, P., de Vries, W., Cotrufo, F., Skiba, U., Di Marco, C., Jones, S., Laville, P., Soussana, J.F., Loubet, B., Twigg, M., Famulari, D., Whitegead, J., Gallagher, M.W., Neftel, A., Flechard, C.R., Herrmann, B., Calanca, P.L., Schjoerring, J.K., Daemmgen, U., Horvath, L., Tang, Y.S., Emmett, B.A., Tietema, A., Penuelas, J., Kesik, M., Brueggemann, N., Pilegaard, K., Vesala, T., Campbell, C.L., Olesen, J.E., Dragosits, U., Theobald, M.R., Levy, P., Mobbs, D.C., Milne, R., Viovy, N., Vuichard, N., Smith, J.U., Smith, P., Bergamaschi, P., Fowler, D. and Reis, S. 2007. Challenges in quantifying biosphere –atmosphere exchange of nitrogen species. *Environmental Pollution*, 150, 125-139.
83. Menchaca, L.B., Smith B.M., Connolly, J., Conrad, M., and Emmett, B. 2007. A method to determine plant water source using transpired water samples. *Hydrology and Earth System Sciences Discuss*, 4, 863-880.
84. Emmett, B.A. 2007. Nitrogen saturation of terrestrial ecosystems: some recent findings and their implications for our conceptual framework. *Water Air and Soil Pollution: Focus*, 7, 99-109.
85. Davey, M.P., Berg, B., Emmett, B.A. and Rowland, P. 2007. Decomposition of oak litter is related to initial litter Mn concentrations. *Canadian Journal of Botany*, 85, 16-24.
86. Curtis, C.J., Emmett, B.A., Reynolds, B. and Shilland, J. 2006. How important is N₂O production in removing atmospherically deposited nitrogen from UK moorland catchments? *Soil Biology & Biochemistry*, 38, 2081-2091.
87. Rowe, E.C., Evans, C.D., Emmett, B.A., Reynolds, B., Helliwell, R.C., Coull, M.C., and Curtis, C.J. 2006. Vegetation type affects the relationship between soil carbon to nitrogen ratio and nitrogen leaching. *Water Air and Soil Pollution*, 177, 335-347.
88. Pardo, L.H., Templer, P.H., Goodale, C.L., Duke, S., Groffman, P.M., Adams, M.B., Boeckx, P., Boggs, J., Campbell, J., Colman, B., Compton, J., Emmett, B., Gundersen, P., Kjønnaas, J., Lovett, G., Mack, M., Magill, A., Mbila, M., Mitchell, M.J., McGee, G., McNulty, S., Nadelhoffer, K., Ollinger, S., Ross, D., Rueth, H., Rustad, L., Schaberg, P., Schiff, S., Schleppei, P., Spoelstra, J. and Wessel, W. 2006. Regional Assessment of N Saturation using Foliar and Root d¹⁵N. *Biogeochemistry*, 80, 143-171.
89. Gidman, E.A., Stevens, C.J., Goodacre, R., Broadhurst, D., Emmett, B., and Gwynn-Jones, D. 2006. Using metabolic fingerprinting of plants for evaluating nitrogen deposition

- impacts on the landscape level. *Global Change Biology*, 12, 1460-1465.
90. Evans, C.D., Reynolds, B., Jenkins, A., Helliwell, R.C., Curtis, C.J., Ferrier, R.C., Goodale, C.L., Emmett, B.A., Pilkington, M., Caporn, S.J.M., Carroll, J.A., Norris, D., Davies, J., & Coull, M.C. 2006. Evidence that soil carbon pool determines susceptibility of semi-natural ecosystems to nitrogen saturation. *Ecosystems*, 9, 453-462.
 91. Gidman, E.A., Goodacre, R., Emmett, B., Wilson, D.B., Carroll, J.A., Caporn, S.J.M., Cresswell, N., Gwynn-Jones, D. 2005. Metabolic fingerprinting for bio-indication of nitrogen responses in *Calluna vulgaris* heath communities. *Metabolomics*, 1, 279-285.
 92. Sowerby, A., Emmett, B., Beier, C., Tietema, A., Penuelas, J., Estiarte, M., van Meeteren, M.J.M., Hughes, S. and Freeman, C. 2005. Microbial community changes in heathland soil communities along a geographical gradient: interaction with climate change manipulations. *Soil Biology & Biochemistry*, 37, 1805-1813.
 93. Curtis, C., Emmett, B.A., Grant, H., Kernan, M., Reynolds, B., & Shilland, E. 2005. Nitrogen saturation in UK moorlands: the critical role of bryophytes and lichens in determining retention of atmospheric N deposition. *Journal of Applied Ecology*, 42, 507-517.
 94. Pilkington, M.G., Caporn, S.J.M., Carroll, J.A., Cresswell, N., Lee, J.A., Reynolds, B. and Emmett, B.A. 2005. Effects of increased deposition of atmospheric nitrogen on an upland moor: Nitrogen budgets and nutrient accumulation. *Environmental Pollution*, 138, 473-484.
 95. Pilkington, M.G., Caporn, S.J.M., Carroll, J.A., Cresswell, N., Ashenden, T.W., Brittain, S.A., Reynolds, B., & Emmett, B.A. 2005. Effects of increased deposition of atmospheric nitrogen on an upland moor: leaching of N species and soil solution chemistry. *Environmental Pollution*, 135, 29-40.
 96. Pilkington, M.G., Caporn, S.J.M., Carroll, J.A., Cresswell, N., Lee, J.A., Emmett, B.A., & Johnson, D. 2005. Effects of increased deposition of atmospheric nitrogen on an upland *Calluna* moor: N and P transformations. *Environmental Pollution*, 135, 469-480.
 97. Beier, C., Emmett, B., Gunderson, P., Tietema, A., Penuelas, J., Estiarte, M., Gordon, C., Gorissen, A., Llorens, L., Roda, F., & Williams, D. 2004. Novel approaches to study climate change effects on terrestrial ecosystems in the field: drought and passive nighttime warming. *Ecosystems*, 7, 583-597.
 98. Carroll, Z.L., Bird, S.B., Emmett, B.A., Reynolds, B., & Sinclair, F.L. 2004. Can tree shelterbelts on agricultural land reduce flood risk? *Soil Use and Management*, 20, 357-359.
 99. Curtis, C.J., Emmett, B.A., Reynolds, B.A., & Shilland, J. 2004. Nitrate leaching from moorland soils: Can soil C:N ratios indicate N saturation? *Water Air and Soil Pollution: Focus*, 4 (2-3), 359-369.
 100. Emmett, B.A., Beier, B., Estiarte, M., Tietema, A., Kristensen, H.L., Williams, D., Penuelas, J., Schmidt, I., & Sowerby, A. 2004. The response of soil processes to climate change: results from manipulation studies of shrublands across an environmental gradient. *Ecosystems*, 7, 625-637.
 101. Gidman, E., Goodacre, R., Emmett, B., Sheppard, L.J., Leith, I.D., & Gwynn-Jones, D. 2004. Applying metabolic fingerprinting to ecology: The use of Fourier-transform infrared spectroscopy for the rapid screening of plant responses to N deposition. *Water Air and Soil Pollution Focus*, 4 (6), 251-258.
 102. Gorissen, A., Tietema, A., Joosten, N.N., Estiarte, M., Penuelas, J., Sowerby, S., Emmett, B.A., & Beier, C. 2004. Climate change affects carbon allocation to the soil in shrublands. *Ecosystems*, 7, 650-661.
 103. Jones, M.L.M., Wallace, H.L., Norris, D., Brittain, S.A., Haria, S., Jones, R.E., Rhind, P.M., Reynolds, B.R., & Emmett, B.A. 2004. Changes in vegetation and soil characteristics in coastal sand dunes along a gradient of atmospheric nitrogen deposition. *Plant Biology*, 6, 598-605.
 104. Llorens, L., Penuelas, J., Beier, C., Emmett, B., Estiarte, M., & Tierema, A. 2004. Effects of an experimental increase of temperature and drought on the photosynthetic performance of two Ericaceous shrub species along a North-South European gradient. *Ecosystems*, 7, 613-624.
 105. Penuelas, J., Gordon, C., Llorens, L., Nielson, T., Tietema, T., Beier, C., Bruna, P., Emmett, B., Estiarte, M., & Gorissen, A. 2004. Nonintrusive field experiments show different plant responses to warming and drought among sites, seasons, and species in a North-South European gradient. *Ecosystems*, 7, 598-612.
 106. Schmidt, I.K., Tietema, A., Williams, D., Gunderson, P., Beier, C., Emmett, B.A., & Estiarte, M. 2004. Soil solution chemistry and element fluxes in three European heathlands and their responses to warming and drought. *Ecosystems*, 7, 638-649.
 107. Wessel, W.W., Tietema, A., Beier, C., Emmett, B.A., Penuelas, J., & Riis-Neilsen, T.

2004. A qualitative ecosystem assessment for different shrublands in Western Europe under impact of climate change. *Ecosystems*, 7, 662-671.
108. Williams, D., Emmett, B.A., Brittain, S.A., Reynolds, B., Stevens, P., & Benham, D. 2004. The GANE Roof Project: The impact of reduced N & S deposition and experimental warming in an acid grassland. *Water, Air and Soil Pollution: Focus*, 4 (6), 187-196.
109. Gidman, E., Goodacre, R., Emmett, B.A., Smith, A.R., & Gwynn-Jones, D. 2003. Investigating plant-plant interference by metabolic fingerprinting. *Phytochemistry*, 63, 705-710.
110. Jensen, K.D., Beier, C., Michelsen, A., & Emmett, B.A. 2003. Effects of experimental drought on microbial processes in two temperate heathlands at contrasting water conditions. *Applied Soil Ecology*, 24, 165-176.
111. Sheppard, L.J., Rosengren, U., & Emmett, B.A. 2003. Do nitrogen additions change the sensitivity of detached shoots from Sitka and Norway spruce to freezing temperatures? Evidence from three field manipulation studies. *Scandinavian Journal of Forest Research*, 18, 487-498.
112. Llorens, L., Penuelas, J., & Emmett, B. 2002. Developmental instability and gas exchange responses of a heathland shrub to experimental drought and warming. *International Journal of Plant Sciences*, 163, 959-967.
113. Emmett, B.A. 1999. The impact of nitrogen on forest soils and feedbacks on tree growth. *Water, Air & Soil Pollution*, 116, 65-74.
114. Nadelhoffer, K.J., Emmett, B.A., Gundersen, P., Kjonaas, O.J., Koopmans, C.J., Schleppi, P., Tietema, A., & Wright, R.F. 1999. Nitrogen deposition makes a minor contribution to carbon sequestration in temperate forests. *Nature*, 398, 145-148.
115. Nadelhoffer, K.J., Emmett, B.A., Gundersen, P., Koopmans, C.J., Schleppi, A., Tietema, A., & Wright, R.F. 1999. Nitrogen carbon sequestration - reply. *Nature*, 400, 630.
116. Boxman, A.W., Blanck, K., Brandrud, T.E., Emmett, B.A., Gundersen, P., Hogervorst, R.F., Kjonaas, O.J., Persson, H., & Timmermann, V. 1998. Vegetation and soil biota response to experimentally-changed nitrogen inputs in coniferous forest ecosystems of the NITREX project. *Forest Ecology and Management*, 101, 65-79.
117. Bredemeier, M., Blanck, K., Xu, Y.J., Tietema, A., Boxman, A.W., Emmett, B.A., Moldan, F., Gundersen, P., Schleppi, P., & Wright, R.F. 1998. Input-output budgets at the NITREX sites. *Forest Ecology and Management*, 101, 57-64.
118. Emmett, B.A., Boxman, D., Bredemeier, M., Gundersen, P., Kjonaas, O.J., Moldan, F., Schleppi, P., Tietema, A., & Wright, R.F. 1998. Predicting the effects of atmospheric nitrogen deposition in conifer stands: evidence from the NITREX ecosystem-scale experiments. *Ecosystems*, 1, 352-360.
119. Emmett, B.A., Kjonaas, O.J., Gundersen, P., Koopmans, C., Tietema, A., & Sleep, D. 1998. Natural abundance of ^{15}N in forests across a nitrogen deposition gradient. *Forest Ecology & Management*, 101, 9-18.
120. Emmett, B.A., Reynolds, B., Silgram, M., Sparks, T.H., & Woods, C. 1998. The consequences of chronic nitrogen additions on N cycling and soilwater chemistry in a N saturated Sitka spruce stand, North Wales. *Forest Ecology & Management*, 101, 165-175.
121. Gundersen, P., Emmett, B.A., Kjonaas, O.J., Koopmans, C.J., & Tietema, A. 1998. Impact of nitrogen deposition on nitrogen cycling in forests: a synthesis of NITREX data. *Forest Ecology & Management*, 101, 37-55.
122. Reynolds, B., Wilson, E.J., & Emmett, B.A. 1998. Evaluating critical loads of nutrient nitrogen and acidity for terrestrial systems using ecosystem-scale experiments (NITREX). *Forest Ecology & Management*, 101, 81-94.
123. Sutton, M.A., Milford, C., Dragosits, U., Place, C.J., Singles, R.J., Smith, R.I., Pitcairn, C.E.R., Fowler, D., Hill, J., ApSimon, H.M., Ross, C., Hill, R., Jarvis, S.C., Pain, B.F., Phillips, V.C., Harrison, R., Moss, D., Webb, J., Espenhahn, S.E., Lee, D.S., Hornung, M., Ulyett, J., Bull, K.R., Emmett, B.A., Lowe, J., & Wyers, G.P. 1998. Dispersion, deposition and impacts of atmospheric ammonia: quantifying local budgets and spatial variability. *Environmental Pollution*, 102, 349-361.
124. Tietema, A., Boxman, A.W., Bredemeier, M., Emmett, B.A., Moldan, F., Gundersen, P., Schleppi, P., & Wright, R.F. 1998. Nitrogen saturation experiments (NITREX) in coniferous forest ecosystems in Europe: a summary of results. *Environmental Pollution*, 102, 433-437.
125. Tietema, A., Emmett, B.A., & Cosby, B.J. 1998. Applying MERLIN for modelling nitrate leaching in a nitrogen saturated Douglas fir forest in the Netherlands after decreased atmospheric nitrogen input. *Hydrology & Earth System Sciences*, 2, 431-438.
126. Tietema, A., Emmett, B.A., Gundersen, P., Kjonaas, O.J., & Koopmans, C.J. 1998. The fate of ^{15}N -labelled nitrogen deposition in coniferous forest ecosystems. *Forest*

- Ecology & Management*, 101, 19-27.
127. Wright, R.F., Emmett, B.A., & Jenkins, A. 1998. Acid deposition, land_use change and global change: MAGIC7 model applied to Aber, UK (NITREX project) and Risdalsheia, Norway (RAIN and CLIMEX projects). *Hydrology & Earth System Sciences*, 2, 385-398.
 128. Cosby, B.J., Ferrier, R.C., Jenkins, A., Emmett, B.A., Wright, R.F., & Tietema, A. 1997. Modelling the ecosystem effects of nitrogen deposition: Model of Ecosystem Retention and Loss of Inorganic Nitrogen (MERLIN). *Hydrology and Earth System Sciences*, 1, 137-158.
 129. Emmett, B.A., Cosby, B.J., Ferrier, R.C., Jenkins, A., Tietema, A., & Wright, R.W. 1997. Modelling the ecosystem effects of nitrogen deposition: simulation of nitrogen saturation in a Sitka spruce forest, Aber, Wales, UK. *Biogeochemistry*, 38, 129-148.
 130. Newsham, K.K., Low, M.N.R., McLeod, A.R., Greenslade, P.D., & Emmett, B.A. 1997. Ultraviolet-B radiation influences the abundance and distribution of phylloplane fungi on pedunculate oak (*Quercus robur*). *New Phytologist*, 136, 287-297.
 131. Newsham, K.K., McLeod, A.R., Roberts, J.D., Greenslade, P.D., & Emmett, B.A. 1997. Direct effects of elevated UV-B radiation on the decomposition of *Quercus robur* leaf litter. *Oikos*, 79, 592-602.
 132. Tietema, A., Beier, C., De Visser, P.H.B., Emmett, B.A., Gundersen, P., Kjonaas, O.J., & Koopmans, C.J. 1997. Nitrate leaching in coniferous forest ecosystems: the European field-scale manipulation experiments NITREX (nitrogen saturation experiments) and EXMAN (experimental manipulation of forest ecosystems). *Global Biogeochemical Cycles*, 11, 617-626.
 133. Emmett, B.A. & Reynolds, B. 1996. Nitrogen critical loads for spruce plantations in Wales: is there too much nitrogen? *Forestry*, 69, 205-214.
 134. Newsham, K.K., McLeod, A.R., Greenslade, P.D., & Emmett, B.A. 1996. Appropriate controls in outdoor UV-B supplementation experiments. *Global Change Biology*, 2, 319-324.
 135. Emmett, B.A., Brittain, S.A., Hughes, S., Gorres, J., Kennedy, V., Norris, D., Rafarel, R., Reynolds, B., & Stevens, P.A. 1995. Nitrogen additions (NaNO₃ and NH₄NO₃) at Aber forest, Wales: I. Response of throughfall and soil water chemistry. *Forest Ecology and Management*, 71, 45-59.
 136. Emmett, B.A., Brittain, S.A., Hughes, S., & Kennedy, V. 1995. Nitrogen additions (NaNO₃ and NH₄NO₃) at Aber forest, Wales: II. Response of trees and soil nitrogen transformations. *Forest Ecology and Management*, 71, 61-73.
 137. Emmett, B.A., Stevens, P.A., & Reynolds, B. 1995. Factors influencing nitrogen saturation in Sitka spruce stands in Wales, UK. *Water Air and Soil Pollution*, 85, 1629-1634.
 138. Tietema, A., Wright, R.F., Blanck, K., Boxman, A.W., Breimeier, M., Emmett, B.A., Gundersen, P., Hultberg, H., Kjonaas, O.J., Moldan, F., Roelofs, J.G.M., Schleppe, P., Stuanes, A.O., & Van Breemen, N. 1995. Nitrex: the timing of response of coniferous forest eco-systems to experimentally-changed nitrogen deposition. *Water Air and Soil Pollution*, 85, 1623-1628.
 139. Wright, R.F., Roelofs, J.G.M., Breimeier, M., Blanck, K., Boxman, A.W., Emmett, B.A., Gundersen, P., Hultberg, H., Kjonaas, O.J., Moldan, F., Tietema, A., Van Breemen, N., & Van Dijk, H.F.G. 1995. NITREX: responses of coniferous forest ecosystems to experimentally changed deposition of nitrogen. *Forest Ecology and Management*, 71, 163-169.
 140. Emmett, B.A., Hudson, J.A., Coward, P.A., & Reynolds, B. 1994. The impact of a riparian wetland on streamwater quality in a recently afforested upland catchment. *Journal of Hydrology*, 162, 337-353.
 141. Reynolds, B., Hornung, M., Emmett, B.A., & Brown, S.J. 1994. Amelioration of streamwater acidity by catchment liming - response of podzolic soils to pasture improvement. *Chemistry and Ecology*, 8, 233-248.
 142. Emmett, B.A., Reynolds, B., Stevens, P.A., Norris, D.A., Hughes, S., Gorres, J., & Lubrecht, I. 1993. Nitrate leaching from afforested Welsh catchments - interactions between stand age and nitrogen deposition. *Ambio*, 22, 386-394.
 143. Sinclair, F.L., Verinumbe, I., Jenkins, D.A., Grime, V.L., Adderley, W.P., Emmett, B., Stevens, P.A., & Hall, J.B. 1993. Evaluation of planting spaced trees in cultivated fields on vertisolic soils under low rainfall, with special reference to soil conditions and crop yield (ODA project R4850). *Agroforestry Forum*, 4, 27-28.
 144. Reynolds, B., Emmett, B.A., & Woods, C. 1992. Variations in streamwater nitrate concentrations and nitrogen budgets over 10 years in a headwater catchment in mid-Wales. *Journal of Hydrology*, 136, 155-175.
 145. Emmett, B.A., Anderson, J.M., & Hornung, M. 1991. The controls on dissolved nitrogen

CURRICULUM VITAE

PROF BRIDGET EMMETT

- losses following two intensities of harvesting in a Sitka spruce forest (N. Wales). *Forest Ecology and Management*, 41, 65-80.
146. Emmett, B.A., Anderson, J.M., & Hornung, M. 1991. Nitrogen sinks following two intensities of harvesting in a Sitka spruce forest (N. Wales) and the effect on the establishment of the next crop. *Forest Ecology and Management*, 41, 81-93.
147. Emmett, B.A. & Quarmby, C. 1991. The effect of harvesting intensity on the fate of applied ¹⁵N-ammonium to the organic horizons of a coniferous forest in N.Wales. *Biogeochemistry*, 15, 47-63.