**Anna B. Harper**

Associate Professor

Geography Department

University of Georgia, USA

**Academic Qualifications**

ASPIRE Fellowship: Postgraduate Certificate in Academic Practice, University of Exeter, UK (May 2019)

Ph.D., Atmospheric Science**,** Colorado State University (CSU), USA, *Dissertation: “*Drought tolerance and implications for vegetation-climate interactions in the Amazon forest” (Advisor: Scott Denning, May 2012)

M.S., Atmospheric Science, CSU, *Thesis:* “The relationship between surface biophysics and the hydrologic cycle in the Amazon rainforest” (Advisor: Scott Denning, December 2008)

B.S., Geology and B.A., Magazine Journalism, with honors, Magna cum Laude, University of Georgia (May 2002)

**Positions held**

**Associate Professor in Earth system modelling and artificial intelligence,** Department of Geography, University of Georgia, USA (August 2023-present)

**Senior Lecturer in Climate Science**, Department of Mathematics and Statistics, University of Exeter (2016-2023)

**Engineering and Physical Sciences Research Council (EPSRC) Living with Environmental Change Independent Research Fellow**, University of Exeter (2016-2019) Independent research fellowship awarded based on competitive grant proposal and interview selection process.

**Associate Research Fellow**: Contributing to UK Earth System Model development, University of Exeter/ UK Met Office (2014-2016)

**Associate Research Fellow**: Project: Dynamic global vegetation modelling for climate modelling (2012-2014)

**Research and Publications**

**Research grants**(£8.44m total; £966,972 as PI or institutional lead)

1. **Circular economy of timber buildings** funded by UK Natural Environment Research Council (NERC) GW4+ community builder (Exeter PI, 2022, £8000)
2. **Improving the coupled carbon-water cycle for Earth System Models** internally funded collaboration between Exeter and Duke University (PI, 2022-2023, £3200)
3. **NetZeroPlus** project funded by UK Biotechnology and Biological Sciences Research Council (BBSRC) (Co-I, 2021-2025)
   * £4,300,406 Full Economic Cost (FEC)
   * I led a Work Package (WP) focusing on modelling of greenhouse gas removal in the UK through existing and new woodlands.
   * Project aims to deliver decision support to UK’s aim of planting 30,000 ha per year, assessing multiple benefits delivered by treescapes and provide estimates of potential GGR by new woodlands.
4. **ESM2025** project funded by EU Horizon 2020 (Co-I, 2021-2025)

* £614,094 to Exeter
* I was the PI for the University of Exeter, coordinating our contribution across three Work Packages.
* I led a WP on improving land use representation in Integrated Assessment Models and Earth System Models.

1. **Brazilian ecosystem resilience in next-generation vegetation dynamics scheme** funded by Newton Fund (Co-I, 2021-2022, £243,659 FEC)
2. **Drought and peatland fires in Indonesian Borneo** (“KaLi”) project funded by UKRI Global Challenges Research Fund (Co-I, 2020-2023, £1,655,329 FEC)

* I contribute to work understanding the land-atmosphere interactions resulting from deforestation on the island of Borneo.

1. **Dynamic modelling of ecosystem-based pathways for 1.5°C** funded by Rockefeller Foundation (PI, 2020, £39,895 FEC)
2. **JULES Emulator of ecosystem services (JEM)** funded by UK Research and Innovation Landscape Decisions program (PI, 2019-2020, £62,920 FEC)
3. **Developing impacts modelling capability and understanding - Ecosystem responses to extremes** funded by Newton Fund (Co-I, 2019-2021, £203,839 FEC)
4. **Feasibility of Afforestation and BECCS for Greenhouse Gas Removal (FAB-GGR)** funded by NERC (Co-I, 2017-2021, £572,501 FEC)
5. **Identifying potential tipping points in the benefits derived from the UK’s land ecosystems** funded by NERC (Co-I, 2017-2019, £374,223 FEC)
6. **Public Engagement with Science grant** funded by British Science Association (PI, 2017, £500)
7. **Climate, Land-Use, and Ecosystem Services at 1.5°C (CLUES1.5)** funded by NERC (Co-I, 2016-2017, £122,994 FEC)
8. **Negative Emission Technologies and the food-energy-water nexus** independent research fellowship funded by EPSRC (PI, 2016-2019, £237,947)

**Publications** (Total: 66, Web of Science H-Index: 27. \*indicates publications by students or postdocs I directly supervised)

1. \*Argles, A.P.K., Robertson, E., **Harper, A.B.**, Morison, J.I.L., Xenakis, G., Hastings, A., McCalmont, J., Moore, J.R., Bateman, I.J., Gannon, K., Betts, R.A., Bathgate, S., Thomas, J., Heard, M., Cox, P.M.: Modelling the impact of forest management and CO2-fertilisation on growth and demography in a Sitka spruce plantation, *Scientific Reports*, https://doi.org/10.1038/s41598-023-39810-2, 2023.
2. Davies-Barnard, T., Catto, J.L., **Harper, A.B.,** Imron, M.A.;  van Veen, F.J.F.: Future fire risk under climate change and deforestation scenarios in tropical Borneo, *Environ. Res. Lett.,* https://doi.org/10.1088/1748-9326/acb225, 2022.
3. \*Littleton, E.W., Shepherd, A., **Harper, A.B.**, Hastings, A.F.S., Vaughan, N.E., Doelman, J., van Vuuren, D.P., and Lenton, T.M.: Uncertain effectiveness of bioenergy expansion for climate change mitigation explored using land surface, agronomic, and integrated assessment models, *Global Change Biology- Bioenergy,* https://doi.org/10.1111/gcbb.12982, 2022.
4. \*Vitali, R., Burke, E.J., Chadburn, S.E., Keuper, F., and **Harper, A.B.**: Simulating increase in plant productivity in response to nitrogen fertilization using the JULES land surface model at an Arctic site, *Nitrogen*, https://doi.org/10.3390/nitrogen3020018, 2022.
5. \*Baker, E., **Harper, A.B.**, Williamson, D., and Challenor, P.: Emulation of high-resolution land surface models using sparse Gaussian processes with application to JULES, *Geosci. Model Dev*, https://doi.org/10.5194/gmd-2021-205, 2022.
6. \*Littleton, E.W., Dooley, K., Webb, G., **Harper, A.B.,** Powell, T., Nicholls, Z., et al.: Dynamic modelling shows substantial contribution of ecosystem restoration to climate change mitigation, *Environ. Res. Lett.*, https://doi.org/10.1088/1748-9326/ac3c6c, 2021.
7. \*Jones, S., Rowland, L., Cox, P., Hemming, D., Wiltshire, A., Williams, K., and **Harper, A.B.**: The impact of a simple representation of non-structural carbohydrates on the simulated response of tropical forests to drought, *Biogeosciences*, https://doi.org/10.5194/bg-17-3589-2020, 2020.
8. **Harper A.B.**, Powell, T., Cox, P.M., House, J., Huntingford, C., Lenton, T.M., Sitch, S., Burke, E., Chadburn, S.E., Collins, W.C., Comyn-Platt, E., Daioglou, V., Doelman, J.C., Hayman, G., Robertson, E., van Vuuren, D., Wiltshire, A., Webber, C.P., Bastos, A., Boysen, L., Ciais, P., Devaraju, N., Jain, A.K., Krause, A., Poulter, B., Shu, S.: Land-use emissions play a critical role in land-based mitigation for Paris climate targets, *Nature Communications*, doi:10.1038/s41467-018-05340-z, 2018.
9. Bateman, I.J., Anderson, K., Argles, A., Belcher, C., Betts, R.A., Binner, A., Brazier, R.E., Cho, F.H.T.,. Collins, R.M., Day, B.H., Duran-Rojas, C., Eisenbarth, S., Gannon, K., Gatis, N., Groom, B., Hails, R., **Harper, A.B.,** Harwood, A., Hastings, A., Heard, M.S., Hill, T.C., Inman, A., Lee, C.F., Luscombe, D.J., MacKenzie, A.R., Mancini, M.C., Morison, J.I.L., Morris, A., Quine, C.P., Snowdon,P., Tyler, C.R., Vanguelova, E.I., Wilkinson, M., Williamson, D., Xenakis, G.: A review of planting principles to identify the right place for the right tree for 'net zero plus' woodlands: Applying a place-based natural capital framework for sustainable, efficient and equitable (SEE) decisions. *People and Nature*, doi: 10.1002/pan3.10331, 2022.
10. Ntimugura, F., Vinai, R., Dalzell, M., **Harper, A.B**., Walker, P.: Mechanical properties and microstructure of slag and fly ash alkali-activated lightweight concrete containing miscanthus particles. *Materials Letters*, doi: 10.1016/j.matlet.2022.131696, 2022.
11. \*Littleton, E.W., Shepherd, A., **Harper, A.B.**, Hastings, A.F.S., Vaughan, N.E., Doelman, J., van Vuuren, D.P., and Lenton, T.M.: Uncertain effectiveness of bioenergy expansion for climate change mitigation explored using land surface, agronomic, and integrated assessment models, *Global Change Biology- Bioenergy,* https://doi.org/10.1111/gcbb.12982, 2022.
12. Vitali, R., Burke, E.J., Chadburn, S.E., Keuper, F., and **Harper, A.B.**: Simulating increase in plant productivity in response to nitrogen fertilization using the JULES land surface model at an Arctic site, *Nitrogen*, https://doi.org/10.3390/nitrogen3020018, 2022.
13. Kondo, M., Sitch, S., Ciais, P., Achard, F., Kato, E., Pongratz, J., et al.: Are land-use change emissions in Southeast Asia decreasing or increasing? *Global Biogeochemical Cycles*, doi: 10.1029/2020GB006909, 2022.
14. Young, P.J., **Harper, A.B.,** Huntingford, C., Paul, N.D., Morgenstern, O., Newman, P.A., Oman, L.D., Madronich, S., and Garcia, R.R.: The Montreal Protocol protects the terrestrial carbon sink, *Nature*, https://doi.org/10.1038/s41586-021-03737-3, 2021.
15. **Harper, A.B.,** Williams, K.E., McGuire, P.C., Duran Rojas, M.C., Hemming, D., Verhoef, A., Huntingford, C., Rowland, L., Marthews, T., Breder Eller, C., Mathison, C., Nobrega, R.L.B., Gedney, N., Vidale, P.L., Otu-Larbi, F., Pandey, D., Garrigues, S., Wright, A., Slevin, D., De Kauwe, M.G., Blyth, E., Ardö, J., Black, A., Bonal, D., Buchmann, N., Burban, B., Fuchs, K., de Grandcourt, A., Mammarella, I., Merbold, L., Montagnani, L., Nouvellon, Y., Restrepo-Coupe, N., and Wohlfahrt, G.:Improvement of modeling plant responses to low soil moisture in JULESvn4.9 and evaluation against flux tower measurements, *Geosci. Model Dev*., https://doi.org/10.5194/gmd-14-3269-2021, 2021.
16. Ntimugura, F., Vinai, R., **Harper, A.B.,** Walker, P.: Environmental performance of miscanthus-lime lightweight concrete using life cycle assessment: Application in external wall assemblies. *Sustainable Materials and Technologies*, doi: 10.1016/j.susmat.2021.e00253, 2021.
17. Ntimugura, F., Vinai, R., **Harper, A.B.,** Walker, P.: Mechanical, thermal, hygroscopic and acoustic properties of bio-aggregates - lime and alkali - activated insulating composite materials: A review of current status and prospects for miscanthus as an innovative resource in the South West of England. *Sustainable Materials and Technologies*, doi: 10.1016/j.susmat.2020.e00211, 2021.
18. Hayman, G.D., Comyn-Platt, E., Huntingford, C., **Harper, A.B.,** Powell, T., Cox, P.M., Collins, W., Webber, C., Lowe, J., Sitch, S., House, J.I., Doelman, J.C., van Vuuren, D.P., Chadburn, S.E., Burke, E., and Gedney, N.: Regional variation in the effectiveness of methane-based and land-based climate mitigation options, *Earth Syst. Dynam*., https://doi.org/10.5194/esd-12-513-2021, 2021.
19. Wiltshire, A.J., Burke, E.J., Chadburn, S.E., Jones, C.D., Cox, P.M., Davies-Barnard, T Friedlingstein, P., **Harper, A.B.,** Liddicoat, S., Sitch, S., and Zaehle, S.: JULES-CN: a coupled terrestrial carbon–nitrogen scheme (JULES vn5.1), *Geosci. Model Dev*., https://doi.org/10.5194/gmd-14-2161-2021, 2021.
20. Pugh, T.A.M., Rademacher, T.T., Shafer, S. L., Steinkamp, J., Barichivich, J., Beckage, B., Haverd, V., **Harper, A.B.,** Heinke, J., Nishina, K., Rammig, A., Sato, H., Arneth, A., Hantson, S., Hickler, T., Kautz, M., Quesada, B., Smith, B., and Thonicke, K.: Understanding the uncertainty in global forest carbon turnover, *Biogeosciences*, 10.5194/bg-2019-491, 2020.
21. \*Littleton, E.W., **Harper, A.B.,** Vaughan, N.E., Oliver, R.J., Duran-Rojas, M.C., Lenton, T.M.: JULES-BE: representation of bioenergy crops and harvesting in the Joint UK Land Environment Simulator vn5.1, *Geoscientific Model Development*, 10.5194/gmd-13-1123-2020, 2020.
22. Argles, A.P.K., Moore, J.R., Huntingford, C., Wiltshire, A.J., **Harper, A.B.,** Jones, C.D., and Cox, P.M.: Robust Ecosystem Demography (RED version 1.0): a parsimonious approach to modelling vegetation dynamics in Earth system models, *Geosci. Model Dev.,* https://doi.org/10.5194/gmd-13-4067-2020, 2020.
23. Ritchie, P.D.L. and Smith, G.S., Davis, K.J., Fezzi, C., Halleck-Vega, S., **Harper, A.B.**, Boulton, C.A., Binner, A.R., Day, B.H., Gallego-Sala, A.V., Mecking, J.V., Sitch, S.A., Lenton, T.M., Bateman, I.J.: Shifts in national land use and food production in Great Britain after a climate tipping point, *Nature Food*, 10.1038/s43016-019-0011-3, 2020.
24. Eller, C., Rowland, L., Mencuccini, M., Rosas, T., Medlyn, B., Williams, K., **Harper, A.B.,** Wagner, Y., Klein, T., Teodoro, G., Oliveira, R., Matos, I., Rosado, B., Fuchs, K., Wohlfahrt, G., Montagnani, L., Meir, P., Sitch, S., Cox, P: Stomatal optimisation based on xylem hydraulics (SOX) improves land surface model simulation of vegetation responses to climate, *New Phytologist*, 10.1111/nph.16419, 2020.
25. Paschalis, A., Fatichi, S., Zscheischler, J., Ciais, P.,Bahn, M., Boysen, L., Chang, J., De Kauwe, M., Estiarte, M., Goll D., Hanson, P.J., **Harper, A.B.,** Hou, E., Kigel, J., Knapp, A.K., Larsen, K.S., Li, W., Lienert, S., Luo, Y., Meir, P., Nabel, J.E.M.S., Ogaya, R., Parolari, A.J., Peng, C., Peñuelas, J., Pongratz, J., Rambal, S., Schmidt, I.K., Shi, H., Sternberg, M., Tian, H., Tschumi, E., Ukkola, A., Vicca, S., Viovy, N., Wang, Y-P., Wang, Z., Williams, K., Wu, D., Zhu, Q.: Rainfall-manipulation experiments as simulated by terrestrial biosphere models: where do we stand?, *Global Change Biology*, https://doi.org/10.1111/gcb.15024, 2020.
26. Wiltshire, A.J., Duran-Rojas, C., Edwards, J., Gedney, N., **Harper, A.B.,** Hartley, A., Hendry, M., Robertson, E., Smout-Day, K.: JULES-GL7: The Global Land Configuration of the Joint UK Land Environment Simulation version 7.0 and 7.2 *Geosci. Mod. Dev.*, 10.5194/gmd-13-483-2020, 2020.
27. Li, W., Ciais, P., Stehfest, E., van Vuuren, D., Popp, A., Arneth, A., Di Fulvio, F., Doelman, J., Humpenöder, F., **Harper, A.B.,** Park, T., Makowski, D., Havlik, P., Obersteiner, M., Wang, J., Krause, A., and Liu, W.: Mapping the yields of lignocellulosic bioenergy crops from observations at the global scale, *Earth Syst. Sci. Data*, https://doi.org/10.5194/essd-12-789-2020, 2020.
28. Sellar, A., Jones, C.G., Mulcahy, J.P., Tang, Y., Yool, A., Wiltshire, A., Fiona M. O'Connor, Marc Stringer, Richard Hill, Julien Palmieri, Stephanie Woodward, Lee de Mora, Till Kuhlbrodt, Steven T. Rumbold, Douglas I. Kelley, Rich Ellis, Colin E. Johnson, Jeremy Walton, Nathan Luke Abraham, Martin B. Andrews, Timothy Andrews, Alex T. Archibald, Ségolène Berthou, Eleanor Burke, Ed Blockley, Ken Carslaw, Mohit Dalvi, John Edwards, Gerd A. Folberth, Nicola Gedney, Paul T. Griffiths, **Anna B. Harper**, Maggie A. Hendry, Alan J. Hewitt, Ben Johnson, Andy Jones, Chris D. Jones, James Keeble, Spencer Liddicoat, Olaf Morgenstern, Robert J. Parker, Valeriu Predoi, Eddy Robertson, Antony Siahaan, Robin S. Smith, Ranjini Swaminathan, Matthew T. Woodhouse, Guang Zeng, Mohamed Zerroukat: UKESM1: Description and evaluation of the UK Earth System Model, *Journal of Advances in Modeling Earth Systems,* doi: 10.1029/2019MS001739, 2019.
29. \*Ritchie, P.D.L., **Harper, A.B.,** Smith, G.S., Kahana, R., Kendon, E.J., Lewis, H., Fezzi C, Halleck-Vega S, Boulton CA, Bateman IJ.: Large changes in Great Britain’s vegetation and agricultural land-use predicted under unmitigated climate change, *Environmental Research Letters*, doi: 10.1088/1748-9326/ab492b, 2019.
30. Baker, I. T., Denning, A.S., Dazlich, D.A., **Harper, A.B.,** Branson, M.D., Randall, D.A., Phillips MC, Haynes KD, Gallup SM.: Surface-Atmosphere Coupling Scale, the Fate of Water, and Ecophysiological Function in a Brazilian Forest, *Journal of Advances in Modeling Earth Systems*, 10.1029/2019ms001650, 2019.
31. Byrne, B., Jones, D.B.A., Strong, K., Polavarapu, S.M., **Harper, A.B.,** Baker, D.F., and Maksyutov, S.: On what scales can GOSAT flux inversions constrain anomalies in terrestrial ecosystems?, *Atmospheric Chemistry and Physic*, 10.5194/acp-19-13017-2019, 2019.
32. Walker, A.P., De Kauwe, M.G., Medlyn, B.E., Zaehle, S., Iversen, C.M., Asao, S., Guenet, B., **Harper, A.B.**, Hickler, T, Hungate, B.A., Jain, A.K., Luo, Y., Lu, X., Lu, M., Luus, K., Megonigal, J.P., Oren, R., Ryan, E., Shu, S., Talhelm, A., Wang, Y-P, Warren, J.M., Werner, C., Xia, J., Yang, B., Zak, D.R., Norby, R.J.: Decadal biomass increment in early secondary succession woody ecosystems is increased by CO2 enrichment, *Nature Communications*, 10.1038/s41467-019-08348-1, 2019.
33. Burton, C., Betts, R., Cardoso, M., Feldpausch, T.R., **Harper, A.B.,** Jones, C.D., Kelley DI, Robertson E, Wiltshire A.: Representation of fire, land-use change and vegetation dynamics in the Joint UK Land Environment Simulator vn4.9, *Geosci. Mod. Devel.*, doi: 10.5194/gmd-12-179-2019, 2019.
34. Williams, K.E., **Harper, A.B.,** Huntingford, H., Mercado, L.M., Mathison, C.T., Falloon, P.D., Cox, P.M., Kim, J.: How can the First ISLSCP Field Experiment contribute to present-day efforts to evaluate water stress in JULESv5.0? *Geosci. Mod. Dev.*, 10.5194/gmd-12-3207-2019, 2019.
35. **Harper A.B.**, Wiltshire, A.J., Cox, P.M, Friedlingstein, P., Jones, C.D., Mercado, L.M., Sitch, S., Williams, K., Duran-Rojas, C.: Vegetation distribution and terrestrial carbon cycle in a carbon cycle configuration of JULES4.6 with new plant functional types, *Geosci. Model Dev.*, doi:10.5194/gmd-11-2857-2018, 2018.
36. Comyn-Platt E., Hayman, G., Huntingford, C., Chadburn, S.E., Burke, E.J., **Harper, A.B.,** Collins WJ, Webber CP, Powell T, Cox PM: Carbon budgets for 1.5 and 2°C targets lowered by natural wetland and permafrost feedbacks, *Nature Geosci*, doi:10.1038/s41561-018-0247-9, 2018.
37. Collins, W.J., Webber, C.P., Cox, P.M., Huntingford, C., Lowe, J., Sitch, S., Chadburn SE, Comyn-Platt E, **Harper A.B.**, Hayman G.: Increased importance of methane reduction for a 1.5 degree target, *Env. Res. Lett.*, doi: 10.1088/1748-9326/aab89c, 2018.
38. Byrne, B., Wunch, D., Jones, D.B.A., Strong, K., Deng, F., Baker, I., Köhler P, Frankenberg C, Joiner J, Arora VK, Badawy, B., **Harper, A.B.**, Warneke, T., Petri, C., Kivi, R., Roehl, C.M.: Evaluating GPP and Respiration Estimates Over Northern Midlatitude Ecosystems Using Solar-Induced Fluorescence and Atmospheric CO2 Measurements, *Journal of Geophysical Research: Biogeosciences*, doi:10.1029/2018JG004472, 2018.
39. Kondo, M., Ichii, K., Patra, P.K., Poulter, B., Calle, L., Koven, C., Pugh, T.A.M., Kato, E., **Harper, A.B.,** Zaehle, S., Wiltshire, A.: Plant Regrowth as a Driver of Recent Enhancement of Terrestrial CO2 Uptake, *Geophys. Res. Lett.*, 10.1029/2018gl077633, 2018.
40. Wu, D., Ciais, P., Viovy, N., Knapp, A. K., Wilcox, K., Bahn, M., Smith, M. D., Vicca, S., Fatichi, S., Zscheischler, J., He, Y., Li, X., Ito, A., Arneth, A., **Harper, A.B.,** Ukkola, A., Paschalis, A., Poulter, B., Peng, C., Ricciuto, D., Reinthaler, D., Chen, G., Tian, H., Genet, H., Mao, J., Ingrisch, J., Nabel, J. E. S. M., Pongratz, J., Boysen, L. R., Kautz, M., Schmitt, M., Meir, P., Zhu, Q., Hasibeder, R., Sippel, S., Dangal, S. R. S., Sitch, S., Shi, X., Wang, Y., Luo, Y., Liu, Y., Piao, S.: Asymmetric responses of primary productivity to altered precipitation simulated by ecosystem models across three long-term grassland sites, *Biogeosciences*, https://doi.org/10.5194/bg-15-3421-2018, 2018.
41. Kondo, M., Ichii, K., Patra, P.K., Canadell, J.G., Poulter, B., Sitch, S., Calle, L., Liu, Y.Y., van Dijk, A.I.J.M, Saeki, T., Saigusa, N., Friedlingstein, P., Arneth, A., **Harper, A.B**., Jain, A.K., Kato, E., Koven, C., Li, F., Pugh, T.A.M., Zaehle, S., Wiltshire, A., Chevallier, F., Maki, T., Nakamura, T., Niwa, Y., Rodenbeck, C.: Land use change and El Niño-Southern Oscillation drive decadal carbon balance shifts in Southeast Asia, *Nature Communications*, doi: 10.1038/s41467-018-03374-x, 2018.
42. Nakhavali, M., Friedlingstein, P., Lauerwald, R., Tang, J., Chadburn, S., Camino-Serrano, M., Guenet, B., **Harper, A.B**., Walmsley, D., Peichl, M., and Gielen, B.: Representation of dissolved organic carbon in the JULES land surface model (vn4.4\_JULES-DOCM), *Geosci. Mod. Devel.*, doi: 10.5194/gmd-11-593-2018, 2018.
43. Mercado, L.M., Medlyn, B.E., Huntingford, C., Oliver, R.J., Clark, D.B., Sitch, S., Zelazowski, P., Kattge, J., **Harper, A.B.,** and Cox, P.M.: Large sensitivity in land carbon storage due to geographical and temporal variation in the thermal response of photosynthetic capacity, *New Phytologist*, doi: 10.1111/nph.15100, 2018.
44. Good, P., Bamber, J., Halladay, K., **Harper, A.B.,** Jackson, L. C., Kay, G., Kruijt, B., Lowe, J. A., Phillips, O. L., Ridley, J., Srokosz, M., Turley, C., & Williamson, P.: Recent progress in understanding climate thresholds: Ice sheets, the Atlantic meridional overturning circulation, tropical forests and responses to ocean acidification*, Progress in Physical Geography,* doi: 10.1177/0309133317751843, 2018.
45. Suggitt, A.J., Philip J. Platts, Izabela M. Barata, Jonathan J. Bennie, Malcolm D. Burgess, Nadia Bystriakova, Simon Duffield, Steven R. Ewing, Phillipa K. Gillingham, **Anna B. Harper**, Andrew J. Hartley, Hemming, D.L, Maclean, I.M.D., Maltby, K., Marshall, H.H., Mike D. Morecroft, James W. Pearce-Higgins, Paul Pearce-Kelly, Albert B. Phillimore, Jeff T. Price, Ayesha Pyke, James E. Stewart, Rachel Warren, Jane K. Hill: Conducting robust ecological analyses with climate data, *Oikos*, doi: 10.1111/oik.04203, 2017.
46. Hopcroft, P., Valdes, P.J., **Harper, A.B.,** Beerling, D.J.: Multi vegetation model evaluation of the Green Sahara climate regime, *Geophys. Res. Lett.,* doi: 10.1002/2017gl073740, 2017.
47. Huntingford, C., Yang, H., **Harper, A.B.,** Cox, P. M., Gedney, N., Burke, E. J., Lowe, J. A., Hayman, G., Collins, W. J., Smith, S. M., and Comyn-Platt, E.: Flexible parameter-sparse global temperature time profiles that stabilise at 1.5 and 2C, *Earth System Dynamics*, doi: 10.5194/esd-8-617-2017, 2017.
48. Williams, K., Gornall, J., **Harper, A.B.,** Wiltshire, A., Hemming, D., Quaife, T., Arkebauer, T., and Scoby, D.: Evaluation of JULES-crop performance against site observations of irrigated maize from Mead, Nebraska, *Geosci. Mod. Devel.*, doi: 10.5194/gmd-10-1291-2017, 2017.
49. Huntingford, C., Atkin, O.K., Martinez-de-la-Torre, A., Mercado, L.M., Heskel, M.A., **Harper, A.B.,** Bloomfield, K.J., O’Sullivan, O.S., Reich, P.B., Wythers, K.R., Butler, E.E., Chen, M., Griffin, K.L., Meir, P., Tjoelker, M.J., Turnbull, M.H., Sitch, S., Wiltshire, A., and Malhi, Y.: Implications of improved representations of plant respiration in a changing climate, *Nature Communications*, doi: 10.1038/s41467-017-01774-z, 2017.
50. Li, W., Ciais, P., Peng, S., Yue, C., Wang, Y., Thurner, M., Saatchi, S. S., Arneth, A., Avitabile, V., Carvalhais, N., **Harper, A. B**., Kato, E., Koven, C., Liu, Y. Y., Nabel, J. E. M. S., Pan, Y., Pongratz, J., Poulter, B., Pugh, T. A. M., Santoro, M., Sitch, S., Stocker, B. D., Viovy, N., Wiltshire, A., Yousefpour, R., and Zaehle, S.: Land-use and land-cover change carbon emissions between 1901 and 2012 constrained by biomass observations, *Biogeosciences*, doi: 10.5194/bg-14-5053-2017, 2017.
51. De Kauwe, M., Medlyn, B.E., Walker, A.P., Zaehle, S., Asao, S., Guenet, B., **Harper, A.B.,** Thomas Hickler, Atul K. Jain,Yiqi Luo,Xingjie Lu,Kristina Luus,William J. Parton,Shijie Shu,Ying-Ping Wang,Christian Werner,Jianyang Xia,Elise Pendall,Jack A. Morgan,Edmund M. Ryan,Yolima Carrillo,Feike A. Dijkstra,Tamara J. Zelikova,Richard J. NorbyChallenging terrestrial biosphere models with data from the long-term multifactor Prairie Heating and CO2 Enrichment experiment, *Global Change Biology*, doi: 10.1111/gcb.13643, 2017.
52. Ryan, E.M., Kiona Ogle, Drew Peltier, Anthony P. Walker, Martin G. De Kauwe, Belinda E. Medlyn, David G. Williams, William Parton, Shinichi Asao, Bertrand Guenet, **Anna B. Harper**, Xingjie Lu, Kristina A. Luus, Sönke Zaehle, Shijie Shu, Christian Werner, Jianyang Xia, Elise Pendall: Gross primary production responses to warming, elevated CO2, and irrigation: quantifying the drivers of ecosystem physiology in a semiarid grassland, *Global Change Biology*, doi: 10.1111/gcb.13602, 2017.
53. **Harper, A.B.,** Cox, P. M., Friedlingstein, P., Wiltshire, A. J., Jones, C. D., Sitch, S., Mercado, L. M., Groenendijk, M., Robertson, E., Kattge, J., Bönisch, G., Atkin, O. K., Bahn, M., Cornelissen, J., Niinemets, Ü., Onipchenko, V., Peñuelas, J., Poorter, L., Reich, P. B., Soudzilovskaia, N. A., and Bodegom, P. V.: Improved representation of plant functional types and physiology in the Joint UK Land Environment Simulator (JULES v4.2) using plant trait information, *Geosci. Model Dev*., doi:10.5194/gmd-9-2415-2016, 2016.
54. Good, P., **Harper, A.B.,** Meesters, A., Robertson, E., Betts, R.: Are strong fire–vegetation feedbacks needed to explain the spatial distribution of tropical tree cover? *Global Ecology and Biogeography*, doi: 10.1111/geb.12380, 2016.
55. Mangeon, S., Voulgarakis, A., Gilham, R., **Harper, A.B.,** Sitch, S., and Folberth, G.: INFERNO: a fire and emissions scheme for the UK Met Office's Unified Model, *Geosci. Model Dev.,* doi:10.5194/gmd-9-2685-2016, 2016.
56. Murray-Tortarolo, G., Friedlingstein, P., Sitch, S., Jaramillo, V. J., Murguía-Flores, F., Anav, A., Liu, Y., Arneth, A., Arvanitis, A., **Harper, A.B**., 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,* doi:10.5194/bg-13-223-2016, 2016.
57. Calle, L., Canadell, J.G., Patra, P., Ciais, P., Ichii, K., Tian, H., Kondo, M., Piao, S., Arneth, A., **Harper, A.B**., Ito, A., Kato, E., Koven, C., Sitch, S., Stocker, B.D., Vivoy, N., Wiltshire, A., Zaehle, S. and Poulter, B.: Regional carbon fluxes from land use and land cover change in Asia, 1980–2009, *Environ. Res. Lett,* doi: 10.1088/1748-9326/11/7/074011, 2016.
58. Osborne J.M., Lambert F.H., Groenendijk M., **Harper A.B.,** Koven, C.D., Poulter, B., Pugh, T.A.M., Sitch, S., Stocker, B.D., Wiltshire, A., and Zaehle, S.: Reconciling Precipitation with Runoff: Observed Hydrological Change in the Midlatitudes. *Journal of Hydrometeorology,* doi: 10.1175/JHM-D-15-0055.1, 2015.
59. Anav A.P., Friedlingstein P, Beer C, Ciais P, **Harper A.B.**, Jones, C., Murray-Tortarolo, G., Papale, D., Parazoo, N.C., Peylin, P., Piao, S., Sitch, S., Viovy, N., Wiltshire, A., Zhao, M.: Spatiotemporal patterns of terrestrial gross primary production: A review. *Reviews of Geophysics,* doi:10.1002/2015RG000483, 2015.
60. Rowland L., **Harper A.B.,** Christoffersen, B. O., Galbraith, D. R., Imbuzeiro, H. M. A., Powell, T. L., Doughty, C., Levine, N. M., Malhi, Y., Saleska, S. R., Moorcroft, P. R., Meir, P., and Williams, M.: Modelling climate change responses in tropical forests: similar productivity estimates across five models, but different mechanisms and responses, *Geosci. Model Dev.*, doi:10.5194/gmd-8-1097-2015, 2015.
61. Parazoo N.C., Barnes E., Worden J., **Harper A.B.**, Bowman, K.B., Frankenberg, C., Wolf, S., Litvak, M., Keenan, T.F.: Influence of ENSO and the NAO on terrestrial carbon uptake in the Texas-northern Mexico region, *Global Biogeochem. Cycles*, doi:10.1002/2015GB005125, 2015.
62. **Harper A.B.,** Baker I.T., Denning A.S., Randall D.A., Dazlich D., and Branson M.: Impact of Evapotranspiration on Dry Season Climate in the Amazon Forest. *Journal of Climate*, doi: 10.1175/JCLI-D-13-00074.1, 2014.
63. Le Quéré, C., Peters, G. P., Andres, R. J., Andrew, R. M., Boden, T. A., Ciais, P., Friedlingstein, P., Houghton, R. A., Marland, G., Moriarty, R., Sitch, S., Tans, P., Arneth, A., Arvanitis, A., Bakker, D. C. E., Bopp, L., Canadell, J. G., Chini, L. P., Doney, S. C., **Harper, A.B**., 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., Maignan, F., 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., Takahashi, T., Tilbrook, B., van Heuven, S., Viovy, N., Wanninkhof, R., Wiltshire, A., and Zaehle, S.: Global carbon budget 2013, *Earth Syst. Sci. Data*, doi: 10.5194/essd-6-235-2014, 2014.
64. Powell T.L., Galbraith D.R., Christoffersen B.O., **Harper A.B.**, Imbuzeiro, H.M.A., Rowland,L., Almeida, S., Brando, P.M., da Costa, A.C.L., Costa, M.H., Levine, N.M., Malhi, Y., Saleska, S.R., Sotta, E., Williams, M., Meir, P., Moorcroft, P.R.: Confronting model predictions of carbon fluxes with measurements of Amazon forests subjected to experimental drought. *New Phytologist,* doi: 10.1111/nph.12390, 2013.
65. Baker I.T., **Harper A.B.,** da Rocha, H.R., Denning, A.S., Araújo, A.C., Borma, L.S., Freitas, H.C., Goulden, M.L., Manzi, A.O., Miller, S.D., Nobre, A.D., Restrepo-Coupe, N., Saleska, S.R., Stöckli, R., von Randow, C., Wofsy, S.C.: Surface ecophysiological behavior across vegetation and moisture gradients in Amazonia. *Agricultural and Forest Meteorology,* DOI: 10.1016/j.agrformet.2012.11.015*,* 2013.
66. **Harper A.B.,** Denning AS, Baker IT, Randall DA, Prihodko L.: Role of deep soil moisture in modulating climate in the Amazon rainforest. *Geophysical Research Letters,* doi: 10.1029/2009GL042302, 2010.

**ii) Official reports**

1. Poulter, B., Davis, K.J., Hoffman, F.M., Davis, S., Dietze, M., Dukes, J.S., Evans, M., **Harper, A.B.,** Bond-Lamberty, B., Lombardozzi, D., Windham Myers, L., Russell, J., Werth, D., Williams, C.A., 2022: Predictions: Model Development, Evaluation and Prediction. In: *2022 North American Carbon Program Science Implementation Plan*.

**Supervision and research group**

Completed PhDs:

* Simon Jones: The role of non-structural carbohydrates in predictions of ecosystem carbon fluxes, Maths (2017-2021)
* Fabrice Ntimugura: Bio-based, low carbon and low-cost building materials, Engineering – second supervisor (2018-2022)

PhD Students (In progress):

* Tim Lam: Quantifying teleconnection pathways leading to droughts and peatland fires in Indonesian Borneo, Environmental Intelligence Center for Doctoral Training – second supervisor (2019-2023)
* Enimhien Akhabue: Modelling the resilience of ecosystem service provision in African landscapes, Geography – second supervisor (2022-)

Research Fellow supervision: I have supervised a total of seven Research Fellows across eight different projects. Eleven of my publications were led by students or postdoctoral researchers who were under my supervision (jointly or wholly) at that time.

* + T Davies-Barnard: Kali (2020-2023)
  + Emma Littleton: ESM2025 (2021-2023), Rockefeller (2019-2020), and FAB-GGR (2017-2020)
  + Hsi-Kai Chou (2023-2024, NetZeroPlus)
  + Arthur Argles: NetZeroPlus (2021-2022, moved to Met Office)
  + Evan Baker (JEM, 2019-2020)
  + Paul Ritchie (UK Tipping Points, 2017-2018)
  + Tom Powell (CLUES, 2017-2018)

Masters students: 2 in 2018, 3 in 2020, 1 in progress

Summer placement students: 6

Academic and pastoral tutoring (37 students)

**Service and Leadership**

Chair:JULES Science and Applications Committee: Represent JULES users (>200 people in UK and abroad) in management team (2015-2020)

Module lead: JULES vegetation: coordinate and review developments for plant physiology, vegetation dynamics, and fire (2015-2023)

External PhD Viva examiner: Simulating global plant biodiversity, Claire Harris, College of Medical, Veterinary, and Life Sciences, University of Glasgow (November 2019)

Internal PhD Viva examiner: Modelling vegetation demography, disturbance, and carbon storage in forests, Arthur Argles, Mathematics (July 2021)

Internal MbyRes in Geography assessor: How does plant diversity affect the resilience of forest function to disturbance in the Amazon basin?, Mathilda Hancock (February 2022)

Peer Review of Journal Articles: For 20 different journals: Nature, Nature Communications, Nature Climate Change, Science Advances, Global Change Biology – Bioenergy, Journal of Advances in Modeling Earth Systems, Geoscientific Model Development, Biogeosciences, Global Change Biology, Regional Environmental Change, Remote Sensing, New Phytologist, Environmental Research Letters, Journal of Geophysical Research – Biogeosciences, Earth System Dynamics, Journal of Climate, Forests, Agricultural and Forest Meteorology, Journal of Geophysical Research – Atmospheres, Atmospheric Chemistry and Physics

Expert Review of IPCC Report: IPCC Special Report on 1.5C

Expert Review of World Wildlife Fund *Rapid Review of Net Zero Feasibility in the UK*

Guest Editor of Special Issue for Frontiers in Big Data: Integrating Big Data with Earth System Models of Natural and Human Systems: Confronting Models with Observations to Constrain Emergent Behaviour

Associate Editor for *Elementa* journal, Ecology and Earth systems domain.

Session Chair in iLEAPS Conference, Oxford, UK, September 2017

Representative for Mathematics & Computer Science Department for the Early Career Research Network (2016-2017)

Editor-in-Chief:[*AGU Atmospheric Sciences Section Newsletter*](http://atmospheres.agu.org/newsletter/) (2007-2011)

**Recent Conferences and Workshops**

Invited seminar, University of Arizona Department of Hydrology and Atmospheric Sciences seminar series: Earth system impacts of land-based mitigation (virtual, November 2022)

Organised seminar series for Duke-Exeter network on CO2 fertilization and plant hydraulics (July 2022-ongoing)

Seminar, University of Exeter climate group internal series: The ozone hole & recovery: Implications for climate mitigation and the land carbon sink (October 2021)

Plenary talk: JULES Annual Science Meeting: “Progress in the JULES Soil Moisture Stress Process Evaluation Group” (virtual, September 2021)

Organised online workshop: “Novel modelling and analysis methods for landscape decisions” (20 attendees, April 2020)

Invited talk: Isaac Newton Institute workshop on “Progress on novel mathematics and statistics for Landscape Decisions, including priorities for further research” (Cambridge, UK, July 2019)

Invited talk: AGU Annual Meeting: “The role of the terrestrial biosphere in climate change mitigation” (Washington, DC, December 2018)

Talk: Negative CO2 Emissions Conference: “Land-based climate mitigation for Paris” (Gothenburg, Sweden, May 2018)

Plenary talk: International Carbon Dioxide Conference: “Climate, land-use, and ecosystem services for a 1.5C world” (Interlachen, Switzerland, August 2017)

Invited talk: New Phytologist Symposium: “Impact of using trait-informed plant functional types in a dynamic global vegetation model” (Exeter, UK, June 2017)

**Education and Outreach**

GEOG1125: Resources, Society, and Environment (UGA) (2023)

MTHM036: Research Methods in Mathematical Sciences (UoE) (2021, 2022)

MTH3030: Mathematics of Climate Change (UoE) (2021, 2022)

Guest Lectures:

* Climate Cause and Effect (UoE Summer School 2016, 2018, 2019);
* Introduction to Climate Change (CSC 2011M, UoE Penryn Campus, Fall 2016-2019);
* Climate change: the science and the solutions (UK Modern Church conference, July 2021);
* Climate mitigation through land management (GEOM142, Jan 2020, November 2022)

Grand Challenges:

* Academic Lead for Climate Communications Challenge, Summer 2017, 2019, 2022, 2023 (UoE)
* Climate theme had >95% satisfaction rating in 2017 and 2019, 93% satisfaction in 2022.

ECM3735/MTH3035: Mathematics Group Project Leader, Fall 2012, 2014, 2018, 2019 (UoE)

ECMM736: Research in Mathematic Sciences: “Understanding climate science and climate change projections”, Lecturer, Fall 2013, 2014, 2016 (UoE)

EV128: Global Climate Change, Spring 2009 (Colorado College, USA)