

neonSoilFlux: An R Package for Continuous Sensor-Based Estimation of Soil CO₂ Fluxes

John Zobitz¹ Edward Ayres² Zoey Werbin³ Ridwan Abdi¹
Natalie Ashburner-Wright⁵ Lillian Brown⁵
Ryan Frink-Sobierajski⁵ Lajntxiag Lee¹ Dijonë Mehmeti¹
Christina Tran⁵ Ly Xiong¹ Naupaka Zimmerman^{4,5}

¹ Augsburg University, 2211 Riverside Avenue, Minneapolis, MN 55454

² National Ecological Observatory Network, Battelle, 1685 38th Street, Suite 100, Boulder, CO 80301

³ Boston University, 5 Cummington Street, Boston, MA 02215

⁴ University of Kansas, 1450 Jayhawk Boulevard, Lawrence, KS 66045

⁵ University of San Francisco, 2130 Fulton Street, San Francisco, CA 94117

Acknowledgments

John Zobitz acknowledges Kathleen O'Rourke for code development. Naupaka Zimmerman thanks technical staff at USF for support with field gear assembly and shipping. We thank the NEON field staff and assignable assets teams for facilitating each of the six NEON site visits.

17 We are grateful to LI-COR technical staff for helpful discussions about optimal soil chamber
18 sampling methods. This work was supported by NSF DEB grant #2017829 awarded to John
19 Zobitz, and NSF DEB grant #2017860 awarded to Naupaka Zimmerman. This material is
20 based in part upon work supported by the National Ecological Observatory Network (NEON),
21 a program sponsored by the U.S. National Science Foundation (NSF) and operated under
22 cooperative agreement by Battelle. We also thank the reviewers and subject editor for their
23 constructive feedback.

24 **Conflict of Interest Statements**

25 None of the authors have a financial, personal, or professional conflict of interest related to this
26 work.

27 **Author Contributions**

28 Conceptualization: John Zobitz, Naupaka Zimmerman; Methodology: Edward Ayres, John
29 Zobitz, Naupaka Zimmerman; Software: John Zobitz, Naupaka Zimmerman, Zoey Werbin,
30 Edward Ayres, Dijonë Mehmeti, Ridwan Abdi, Ly Xiong, Lajntxiag Lee; Validation: John
31 Zobitz, Naupaka Zimmerman; Formal Analysis: John Zobitz, Naupaka Zimmerman, Dijonë
32 Mehmeti, Ridwan Abdi, Ly Xiong, Lajntxiag Lee; Investigation: John Zobitz, Naupaka Zim-
33 merman, Ryan Frink-Sobierajski, Christina Tran, Natalie Ashburner-Wright, Lillian Brown;
34 Resources: John Zobitz, Naupaka Zimmerman; Data curation: John Zobitz, Naupaka Zimmer-
35 man, Dijonë Mehmeti, Ly Xiong; Writing – original draft: John Zobitz, Naupaka Zimmerman;
36 Writing – review and editing: John Zobitz, Naupaka Zimmerman, Zoey Werbin, Edward Ayres,
37 Christina Tran, Dijonë Mehmeti, Ly Xiong; Visualization: John Zobitz, Naupaka Zimmerman,

38 Dijonë Mehmeti, Ridwan Abdi, Ly Xiong; Supervision: John Zobitz, Naupaka Zimmerman;
39 Project Administration: John Zobitz, Naupaka Zimmerman; Funding Acquisition: John Zobitz,
40 Naupaka Zimmerman.

41 **Data Availability**

42 Field-collected data, `neonSoilFlux` calculated outputs, and manuscript-generating code are
43 archived via Zenodo: <https://doi.org/10.5281/zenodo.17516319> (Zobitz & Zimmerman, 2025).
44 All analyses in this manuscript were based on the version of `neonSoilFlux` tagged v2.9.0 on
45 the package's GitHub repository <https://github.com/jmzobitz/neonSoilFlux>. This version
46 of the package is also archived at Zenodo under the following DOI: [https://doi.org/10.5281/](https://doi.org/10.5281/zenodo.17624494)
47 [zenodo.17624494](https://doi.org/10.5281/zenodo.17624494).

48 Zobitz, J., & Zimmerman, N. (2025). *Supporting Code and Data for neonSoilFlux: An R*
49 *Package for Continuous Sensor-Based Estimation of Soil CO₂ Fluxes*. Zenodo. [https:](https://doi.org/10.5281/zenodo.17516319)
50 [//doi.org/10.5281/zenodo.17516319](https://doi.org/10.5281/zenodo.17516319)