Mapping the Open Source Ecosystem for Climate Science and Sustainable Technology

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The climate crisis poses a severe threat to the natural systems that support modern civilization, disrupting essential cycles that provide freshwater, fertile soils, and stable weather patterns. These disruptions are projected to lead to widespread biodiversity loss and to upset local and global economies (IPBES 2019). To ensure that the scientific basis of these projections is transparent and credible, researchers globally are increasingly making climate data and models openly available. This openness supports informed decision-making and helps safeguard sustainable development from being compromised by short-term political or economic agendas.

Despite this progress in open science, the broader application of open source software and open data in climate and sustainability-related technologies remains limited. National governments, international organizations, academia, industry, and civil society have all played roles in both contributing to the crisis and proposing solutions. However, fragmented, proprietary approaches persist. Open source offers a powerful alternative—lowering costs, enhancing verifiability, and enabling collaboration across disciplines and sectors.

In this talk, I'll introduce OpenSustain.tech, the most comprehensive dataset of over 2,500 open source projects directly addressing the climate crisis (Augspurger et al. 2023). I'll detail the transparent methodology used to curate this collection, including human expert review across multiple fields, and talk a bit about the network of transitive dependencies among these projects, extending previous work in mapping the climate-focused open source ecosystem.

I'll talk about which projects are written in Python, and discuss which projects seem to be most relevant to the climate crisis. Finally, I'll discuss the strategic importance of open source and Python in advancing climate solutions.

References

Augspurger, Tobias, Eirini Malliaraki, Josh Hopkins, and Dan Brown. 2023. "The Open Source Sustainability Ecosystem." The Linux Foundation. Accessed January 13, 2026 at https://zenodo.org/records/7771633. https://doi.org/10.5281/zenodo.7771633

IPBES. "Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services." Zenodo, November 25, 2019. https://doi.org/10.5281/zenodo.3553579.

YouTube: https://www.youtube.com/watch?v=kr8BP7eBCsI.