

Low availability of code in ecology: call for urgent action

Transparency is a core scientific value and crucial for efficient and trustworthy science. A key component of current efforts to enhance the openness and reproducibility of ecological research is improving the availability and the quality of software code. With advances in computing over recent decades, analytical code is now an integral component of most research efforts yet current publication practices do not seem to have kept pace, despite the archiving facilities available via the Web. This is unfortunate, since failure to disclose research methods is at odds with the fundamental principles of science. Indeed, public availability of code facilitates understanding and interpretation of research findings, as well as delivering wider community benefits in the form of greater efficiency and accelerated knowledge accumulation. Recently, many scientific journals have introduced guidelines that explicitly mandate code sharing by authors, but their efficacy is yet to be assessed.

We have quantitatively reviewed the current extent of analytical code availability and quality in ecology, to (a) identify outstanding issues, and (b) set achievable targets for effective code sharing and reuse in the future. For a sample of 200 ecological studies published under active code sharing policies, we evaluated four key principles essential to good code sharing practices and code reuse: replicability, extensibility, accessibility and discoverability of code. The results revealed that within ecology open coding practice remains in its infancy: only 19% of papers published in the journals with a code sharing policy made their code available. This worrying result calls for an immediate action from both journals and the authors. While the availability of code was low, the quality of the available code was good, suggesting that increased adoption of code sharing would greatly increase the replicability of published research. We recommend further improvements on the part of both scientists and journals to facilitate code reuse in future and enable ecology to fully embrace the benefits of open science practices.