

EDITORS WANTED Opening Reproducible Research

Copernicus Publications Virtual Special Issue with Reproducible Articles

Reproducibility is a cornerstone of research which faces challenges with heavily computer-based workflows.

How can the scholarly article and peer review process sufficiently support authors, reviewers, and readers to evaluate, scrutinise and build upon research that relies heavily on computations? To meet this challenge, Copernicus Publications and the research project Opening Reproducible Research (o2r) aim to collaborate on a virtual special issue. We want to explore the potential of current technology to **connect articles with open data and code for better science**. We invite all journals published by Copernicus Publications to participate in this endeavour and increase the understanding of the needs of and costs for authors, reviewers, readers, and publishers to open up the computations behind scientific findings and to reduce barriers that prevent scientists from publishing open and reproducible research.

The o2r team will help authors to create an ERC (see middle column) for their manuscript submission to a Copernicus journal. This packaging process alone is powerful because it increases the transparency and usefulness of the scientific contribution. The asset can include one or more figures, e.g. plots or maps, based on R (<https://www.r-project.org/>) and R Markdown (<https://rmarkdown.rstudio.com/>). During the review process, the reviewers can interact with the asset using the o2r platform, e.g. by investigating the underlying code and data, without recreating a potentially complex virtual environment. The lessons learnt during this piloting study will be a crucial contribution to the understanding of the barriers for computationally reproducible articles and give visibility to the participating journals and publications.

What are benefits for journals?

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What is needed?

The effort to become acquainted with the o2r platform is low, but the o2r team provides support at short notice. The virtual special issue is accompanied by anonymised monitoring and user studies, to which involved stakeholders will be invited, e.g. a survey or online interview. Editors find suitable reviewers (e.g. matching expertise in the software used), who in turn can increase review intensity and hopefully quality by leveraging ready-to-use interactive plots and linked text, code, and data.

Learn more & share

Join the session "Inter-journal special issue for reproducible research using R" on **Thursday, 11 April, 15:45-16:30 in room 3.29** or share this document with potentially interested colleagues using <https://o2r.info/pilots>

How does it work?

o2r is a DFG-funded research project at the University of Münster, Germany. The o2r team has developed a prototype for creating and inspecting the **Executable Research Compendium** (ERC). An ERC integrates data, software (scripts, runtime environment), text (documentation, article), and UI bindings (interaction interfaces) into a single archivable artefact. It enables a deeper understanding and easier reuse of research results by enabling the execution and manipulation of workflows. It also ensures figures are based on the submitted data and code.

Learn more about o2r at <https://o2r.info/results>



Mock-up of an integration of the ERC user interface into the Assets page of a journal. The left-hand figure is from the original article, the right-hand one is interactive: a workflow parameter can be manipulated and the plot is updated. Original article: <http://doi.org/10.5194/nhess-16-2577-2016> ERC: <https://o2r.uni-muenster.de/#/erc/5LVlQ>

Get in touch

The whole matter is too complex to cover all aspects and answer all questions on a single page. The o2r team hopes to have sparked your interest and looks forward to learning about your comments or doubts, and to convincing you and your fellow editors to join this exploration into tools for more transparent, effective, and impactful research publications.

Email: o2r.team@uni-muenster.de
Chat: <https://gitter.im/o2r-project/pilots>

o2r team member Daniel Nüst is at EGU, see special session in left column. You can also reach him directly on Twitter, [@nordholmen](https://twitter.com/nordholmen), email, d.n@wwu.de, and via SMS or messaging apps (WhatsApp, Threema, Telegram) at +49 172 90 21 351.

A reviewer still evaluates a manuscript's credibility, but they are helped by the ERC inspection user interface. ERCs leverage two **best practices for reproducibility**: containerisation technology and the notebook paradigm (combining data and code in a single text file). These building blocks of an article are preserved and are useful beyond the virtual special issues because the created reproducibility packages are publicly stored in a data repository (e.g. Zenodo, b2share). During the virtual special issue lifetime, the ERC will be displayed on the "Assets" page of an article, and afterwards the reference (DOI) to the archived data and code remains.

Schedule

- Second quarter 2019
Author & reviewer guidelines for ERC assets
- Third quarter 2019
Identify participating journals
- Fourth quarter 2019
Integrate ERC UI in Copernicus Journal submission and review system
- First quarter 2020
Call for Papers
- Fourth quarter 2020
Papers published
- Third quarter 2021
o2r project infrastructure maintained