MAKING MODELING AND SOFTWARE FAIR

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As readers of *Environmental Modelling and Software* are well aware, computational modeling is a critical tool supporting a wide range of scientific research and policy decisions. A recent paper by Janssen and colleagues in EMS (2020) documents the exponential growth of scientific publications based on computational modeling. However, the rapid growth of model-based research and diversification of modeling applications has come at a cost to their continued usefulness. The potential for computational models to help understand the complex dynamics of social-environmental systems and plan policies to wisely manage these systems is discarded and lost in most cases because the models cannot be used beyond the project for which they were initially developed. The same paper by Janssen and colleagues found that the code used in 90% of model-based research papers published between 1990 and 2018 is unavailable for reuse. While this situation has improved slightly over the last decade, it remains true for over 80% of the papers published in 2018. Trying to contact the authors of research papers for access to code is of little help, as documented by Collberg and Proebsting (2016). If computational models are so useful why is so much special knowledge and hours of effort by model developers being wasted in this way?

Unlike journal publishing, there are no widely accepted standards for how model code should be made available so that it can be found and accessed; which model version should be made accessible; how the code should be documented to be understandable, evaluated, or enhanced; how it should be packaged so that it can be run effectively, compiled if needed, or coupled with other models to represent interacting social and natural processes. In December 2021, 50 organizations that support model-based science around the world met to form an international standards body for computational modeling, the Open Modeling Foundation (OMF). The OMF will identify, develop, and promote common standards and best practices for FAIR modeling (Findable, Accessible, Interoperable, Reusable (Chue

Hong et al., 2021; Wilkinson et al., 2016, p. 201)) across the social, ecological, environmental, and geophysical sciences. It will also support professional incentives and educational programs to encourage the modeling community to adopt these FAIR-aligned standards. Finally, the OMF is dedicated to the global democratization of critical modeling technology, and improving modeling science through growing a community that is more diverse with respect to geography, gender, ethnicity, and class.

The OMF is the result of four years of planning and stakeholder meetings that involved representatives of modeling science organizations around the world. *Environmental Modelling and Software*, and the International Environmental Modelling and Software Society were invaluable, founding members of this initiative. In order for the OMF to be successful in its ambition goals, it needs the active support of the modeling community–and especially EMS readers. Modeling organizations are encouraged to become OMF members, and individuals can join OMF Working Groups. More information about the Open Modeling Foundation and ways in which you can support its efforts can be found at https://openmodelingfoundation.github.io.

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