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Learning from model failures: challenges in hydrological observations and modelling

Fiona Johnson[a], James Bennett[b], Kiernan Fowler[c], Mark Thyer[d], Conrad Wasko[e], Patricia Saco[f], Julien Lerat[g]

[a] *Water Research Centre, School of Civil and Environmental Engineering, University of New South Wales, Sydney, 2052, Australia*
[b] *CSIRO, Clayton, 3169, Australia*
[c] *Department of Infrastructure Engineering, University of Melbourne, 3010, Australia*
[d] *School of Architecture and Civil Engineering, University of Adelaide, 5005, Australia*
[e] *School of Civil Engineering, University of Sydney, 2006, Australia*
[f] *School of Civil and Environmental Engineering, University of Technology Sydney, 2007, Australia*
[g] *CSIRO, Canberra, 2601, Australia*

Email: f.johnson@unsw.edu.au

Abstract: Environmental models are central to understanding and predicting complex systems—but they do not always behave as expected. This panel explores the value of sharing experiences where models failed, underperformed, or produced surprising outcomes, even when the modelling approach was sound. Inspired by the 2008 "Court of Miracles of Hydrology" workshop, the session invited reflections on legitimate lines of enquiry that led to unexpected results. These stories, often absent from the scientific literature, offer critical lessons for the modelling community.

Our panellists bring diverse perspectives and experiences. Dr Conrad Wasko will discuss the challenge of translating scientific evidence of climate-driven changes in flood-inducing rainfall into industry guidance. This process revealed not only technical hurdles but also the importance of communication and stakeholder engagement in shaping how evidence is received and applied. Dr Julien Lerat will reflect on his work on flood frequency analyses. His experience highlights the difficulty of handling uncertainties in large observed streamflows. Professor Patricia Saco will share insights from ecohydrology and coastal resilience modelling, where predictive tools sometimes struggle to capture dynamic interactions between climate, ecosystems, and human pressures.

While the focus is on model behaviour, we will also discuss how personal decisions—such as model design choices—are often intertwined. Rather than drawing hard lines, this session embraces the complexity and encourages a culture where discussing what didn't work is constructive, normal, and valued. By surfacing these stories, we aim to help others avoid similar pitfalls, foster transparency, and strengthen environmental modelling practice across disciplines.

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