

THURSDAY PRESIDENT'S INVITED MID-CAREER PLENARY SPEAKER

Dr Conrad Wasko

Sydney Horizon Fellow, The University of Sydney

Advancing Australia's flood guidance: Lessons learned and future directions

Australia's approach to flood risk under climate change has undergone a significant transformation over the past decade. Initially, guidance in *Australian Rainfall and Runoff* offered a simplistic recommendation—a 5% increase in extreme rainfall per degree of warming—reflecting limited understanding of climate impacts on flooding. Since then, extensive research has advanced knowledge of hydroclimatic processes, culminating in a comprehensive update to national flood guidance. This update represents a paradigm shift, embedding climate science into engineering practice and decision-making across disciplines.

Flooding exemplifies the challenge of translating global climate model outputs to local-scale decisions. Climate models were never designed for site-specific predictions, yet their use in engineering is increasingly expected. Translating the climate science to guidance required a novel, transparent approach: a discussion paper initiated stakeholder engagement, followed by a systematic review and meta-analysis integrating multiple lines of evidence. Community feedback was sought throughout, ensuring confidence and accessibility.

The revised guidance introduces several world-firsts. Historical records are now recognized as non-representative of current conditions, acknowledging that climate change is a present reality. Updates incorporate multiple drivers of flooding, provide rates of change for all inputs into flood estimation, and recognise increasing probable maximum precipitation for dam design. These changes set a benchmark for integrating climate science into practical guidance.

While this achievement reflects years of collaborative effort, it is not an endpoint. Maintaining trust and relevance requires ongoing updates, bridging gaps between scientists, engineers, and decision-makers. Future directions should focus on adaptive frameworks that leverage evolving climate science, ensuring guidance remains robust and actionable in an era of accelerating change.