

## Advances in Water Resources 35<sup>th</sup> Anniversary Issue Preface

D. A. Barry<sup>1</sup>, G. G. Katul<sup>2</sup>, C. T. Miller<sup>3</sup>, A. Rinaldo<sup>4</sup>

<sup>1</sup>Laboratoire de technologie écologique, Institut d'ingénierie de l'environnement, Faculté de l'environnement naturel, architectural et construit (ENAC), Station 2, Ecole polytechnique fédérale de Lausanne (EPFL), 1015 Lausanne, Switzerland. Email: [andrew.barry@epfl.ch](mailto:andrew.barry@epfl.ch)

<sup>2</sup>Nicholas School of the Environment, Duke University, Durham, North Carolina 27708 USA. Email: [gaby@duke.edu](mailto:gaby@duke.edu)

<sup>3</sup>Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, North Carolina 27599 USA. Email: [casey\\_miller@unc.edu](mailto:casey_miller@unc.edu)

<sup>4</sup>Laboratoire d'ecohydrologie, Institut d'ingénierie de l'environnement, Faculté de l'environnement naturel, architectural et construit (ENAC), Station 2, Ecole polytechnique fédérale de Lausanne (EPFL), 1015 Lausanne, Switzerland. Email: [andrea.rinaldo@epfl.ch](mailto:andrea.rinaldo@epfl.ch)

*Advances in Water Resources* published its first issue in 1977. The editorial policy enunciated at that time set the tone for the journal, e.g., that it was "dedicated to the more theoretical aspects", "basic developments", with an "emphasis is on new concepts and techniques," thus "case histories will only be published if they enhance the presentation and understanding of new technical concepts" [1].

This emphasis on fundamental aspects of water resources has continued and remains at the journal's core.

The journal celebrated its 25<sup>th</sup> anniversary with a special issue dedicated to covering major elements in the wide spectrum of research domains that contribute to the interdisciplinary and multidisciplinary nature of water resources. The methodology adopted at that time was simple: (i)

identify major research lines and topics, (ii) seek out active and experienced researchers in those identified areas, and (iii) give those individuals the guidance to provide an in-depth assessment of their specialist topics. For the 35<sup>th</sup> anniversary issue, an identical path was followed. For (i) and (ii), the Editors and Editorial Board used their extensive knowledge to identify the range of water resources sub-domains that could be included, as well as to assemble the numerous individuals who gave generously of their time to produce the articles in this issue. For (iii), we followed the template as was used for the 25<sup>th</sup> anniversary issue, viz., "to assemble a broad range of comprehensive, scholarly works in the field of water resources that accomplish multiple objectives: (1) to provide a critical review of the state of knowledge; (2) to provide introductions to, or comparisons among, classes of methods; (3) to unify knowledge in related areas; and (4) to point the way to future advancements in the field" [2]. The efforts of the contributing authors were enhanced by the many manuscript reviewers who also generously gave deep and considered evaluations and advice on the submissions.

The rate of change of research domains in water resources is not so rapid that the various sub-fields warrant reviews every year, for example, especially if a comprehensive overview of the entire discipline is attempted, as is the case here. One (clearly imperfect) metric is the citation half-life of journal articles published in leading water research journals. This varies by journal, but typically ranges between 5 and 10 years (for *Advances in Water Resources* the citation half-life is 6.2 years). Thus, the developments occurring in the decade since the 25<sup>th</sup> anniversary issue have had time to mature and be absorbed into the research community, and provide the motivation for this, the 35<sup>th</sup> anniversary issue.

The 25<sup>th</sup> anniversary focused on conventional areas of strength in *Advances in Water Resources* such as flow in porous media and reactive transport and their up-scaling (as well as numerical methods that confront some of those challenges), complemented by contributions in the areas of surface hydrology and hydro-meteorology including data assimilation and statistical analysis of hydrological

systems, eco-hydrology, land-atmosphere interactions and their measurement. The 35<sup>th</sup> anniversary continues to explore advancements in many of the same areas but also forges new intersections between biology and hydrology (such as aquatic canopy turbulence, plant hydrodynamics, biodiversity, desertification). A number of studies and reviews dealing with novel experimental methodologies that now offer unprecedented vistas on the fine-scale structure of porous media (e.g., high-resolution x-ray imaging) and the rapid advancement in remote sensing methodologies for the atmosphere (e.g., Lidar, Radar) and snow (MODIS) are discussed. The hydrology and hydrogeology associated with urban settings, projected to impact some 40% of the global population in the foreseeable future, is also receiving renewed attention in this special issue. A number of methodological reviews envisioned to benefit the broader field of Earth Sciences (e.g., numerical methods, fractional calculus, volume averaging, connectivity and network theories, closure methods of nonlinear systems via Green's functions, etc.) are offered in this special anniversary issue.

The journal editors are pleased to present to the water resources community the combined efforts of the internationally renowned scholars who have turned their collective efforts to considering recent developments and possible future research paths in our discipline. Their efforts will, no doubt, influence our thinking and stimulate further progress in future years. We look forward to following these developments in the next decade.

## **References**

- [1] Editorial, *Adv Water Resour* 1977;doi: 10.1016/0309-1708(77)90002-1.
- [2] Miller CT, Parlange MB, Hassanizadeh SM. Special 25th Anniversary Issue of *Advances in Water Resources*. *Adv Water Resour* 2002;25:859.