Prefacing the second decade

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After a decade of exemplary leadership, and after declining my efforts to retain him for another term, Benoit Cushman-Roisin has stepped aside from his role as the founding Editor-in-Chief to become an associate editor of the journal. His original vision of the need for a journal at the interface between fluid mechanics and environmental science and engineering has materialized, and the Journal of Environmental Fluid Mechanics (EFM) is the result. Today, EFM attracts a healthy inpouring of papers covering a myriad of topics in environmental flows—atmosphere, oceans, cryosphere, subsurface and surface flows. It enjoys a wide reputation for excellence, a respectable impact factor, great readership and worldwide circulation, thanks to the efforts of Benoit, the associate editors, the editorial board and the publisher. On behalf of the EFM community, it is opportune to take our hats off to Benoit for his initiative and dedication.

In passing the baton to me, Benoit sets a daunting challenge—*Onward and Upward* [2]. To this end, the journal counts on the continued support of the EFM community: their submittal of trail-blazing papers of environmental relevance rich in elegant fluid mechanics. Papers that cut across disciplinary boundaries and are useful to practitioners are actively sought. The coverage of traditional topics such as waves, turbulence, stratified and rotating flows, instabilities and multi-phase flows continues to be a major pillar of the journal. Informative and comprehensive reviews of current importance that appeal to broad audiences are welcome. Rapid Communications that carry papers of immediate utility are being contemplated as a new feature.

The need for a journal of the ilk of EFM was articulated by Benoit in his original editorial [1], pointing out how the same basic fluid dynamics principles are used by different disciplines to achieve specific objectives. The new journal EFM was tasked with the understanding and analysis of natural flows, focusing on the well-being of ecosystems and on human quality of life, in particular. At that time, environmental flows were considered as something difficult to ‘design’ but in need of being observed and predicted. A decade later, however,

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with the advent of concepts such as cyber-infrastructure and sustainability, the reality of ‘manipulating’ natural flows are on the horizon, at least at urban scales. Fluid mechanics is a pillar of this activity. The separation between purely natural flows (studied in Geophysical Fluid Dynamics) and those identified within the anthropogenic realm (Environmental Fluid Mechanics) is becoming clearer.

The second decade of the journal (and of the twenty-first century) greets us with new challenges: smart cities engineered to minimize heat and pollution generation, facilitate ventilation, adapt to climate change and reduce risks of natural disasters; urban security against chemical, biological and radiological releases; wetlands, bays, backwaters and vegetation to mitigate storm surge impacts; understanding climate change impacts on cities; impacts of sea-level rise and land subsidence in coastal areas; tapping into wind and hydrokinetic energy; flow interactions with biological species; chemical pathways in air and water pollution and hotspot development; and dispersion, deposition, re-entrainment and transport of micro- and nano-scale aerosols. In all, one of the grand challenges in environmental fluid mechanics is the precise understanding and modeling of bio-geo-chemo-physical interactions in nature within the fabric of fluid motions. Addressing these challenges behooves identification of knowledge gaps and their closure as well as development of high-fidelity parameterizations and predictive models. The scientific community is invited to publish these research outcomes in EFM, covering all approaches—laboratory and field measurements, theoretical and statistical analyses and numerical simulations.

New challenges beget opportunities, and the second decade promises to be exciting for EFM.

References

1. Cushman-Roisin B (2001) What is environmental fluid mechanics. *Environ Fluid Mech* 1:1–2
2. Cushman-Roisin B (2011) Editorial. *Environ Fluid Mech* 11. doi:[10.1007/s10652-011-9227-y](https://doi.org/10.1007/s10652-011-9227-y)