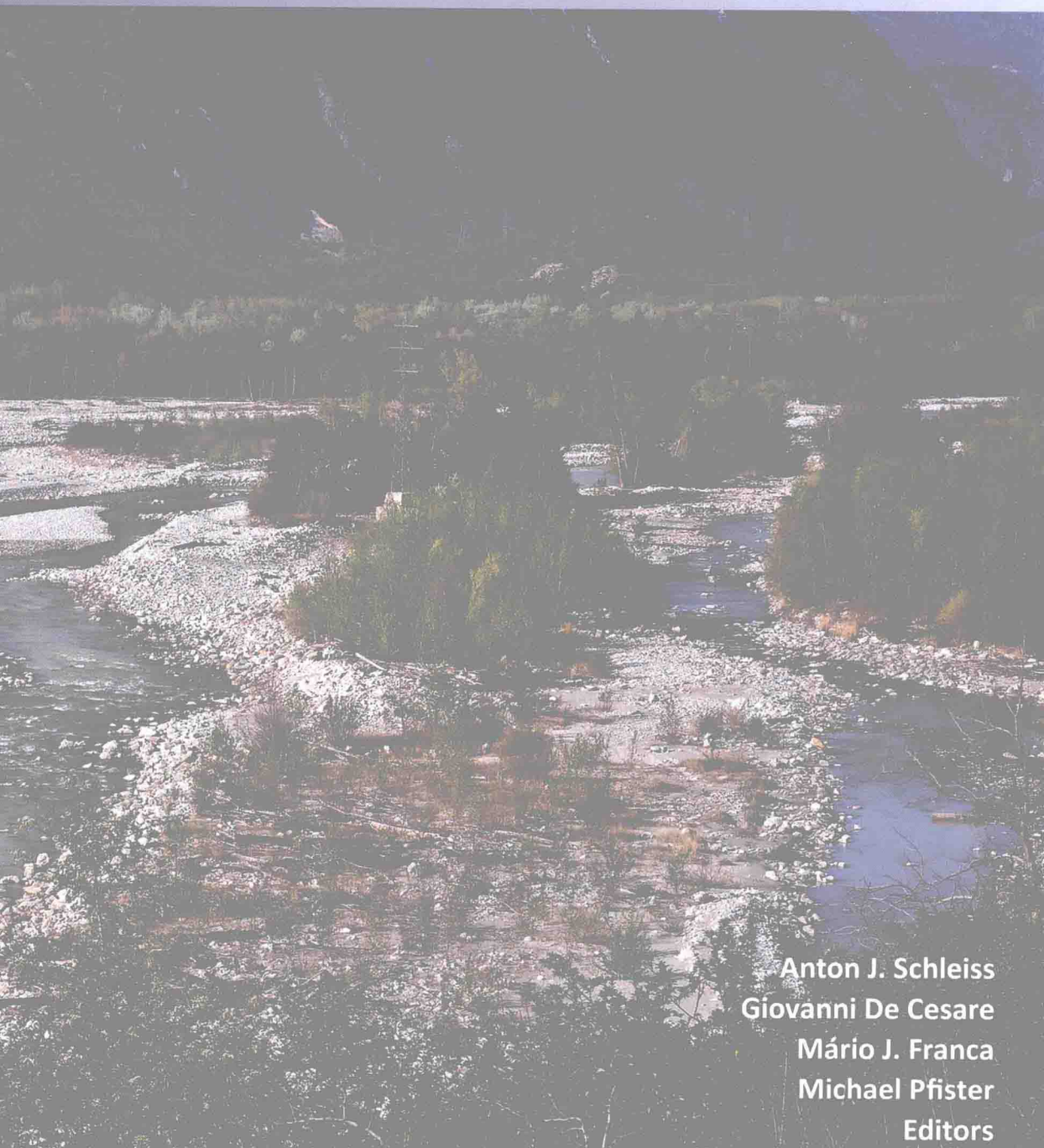
River Flow 2014

International Conference on Fluvial Hydraulics



Anton J. Schleiss
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Editors

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Editors

Anton J. Schleiss, Giovanni De Cesare,
Mário J. Franca & Michael Pfister
Laboratoire de Constructions Hydrauliques (LCH), École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

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Preface

Nature is not to be trifled with, she is always true, always earnest, always severe; she is always right, and the faults and errors are always those of man (Goethe).

Hydraulic engineers responsible for the planning of river training and restoration works should bear well in mind this quotation from Goethe. Reliable and sustainable protection against floods can only be assured by hydraulic structures that preserve the natural character of a watercourse. Accordingly, modern river engineering must take a river's natural forces and behaviour into account. For example, attempts to straighten a meander that has developed naturally may be dangerous: in extreme flood conditions, if not earlier, the apparently tamed river will recall and reoccupy the space to which it is entitled.

The world is like a river, running along in its bed, this way and that, forming sandbanks by chance and then being forced by these to take a different course. Whereas this all proceeds smoothly and easily and gradually, the river engineers have great difficulties when they seek to counteract this natural behaviour (Goethe).

Goethe (once again) recognized that the dynamics of a river can only be controlled to a limited extent by channel modifications and rigid river training works. The term "dynamics" refers to variations in hydromorphology over space and time due to flood discharges and sediment transport. These processes regularly lead to the destruction of habitats, especially in riparian areas, and the creation of space for new habitats. Dynamic watercourses require a considerable amount of space. For example, naturally meandering rivers may migrate laterally within a belt of roughly five to six times the width of the channel bed. In the valleys of the Alps and Pre-Alps, rivers originally required the entire valley floor.

As well as providing flood protection, watercourse alterations carried out over the last two centuries were designed to reclaim land for development and agriculture. Efforts were thus made to impede the dynamics: rivers and streams were channelized, and channel bed widths were optimized with regard to sediment transport. This resulted in monotonous watercourses, with almost no variation in hydraulic or morphological characteristics.

Today's challenge for river engineers, in close collaboration with environmental and ecological scientists, is to restore the channelized river under the constraints of high urbanization and limited space. The behaviour of river systems is a result of the complex interaction between flow, sediments, morphology and biota. Furthermore rivers are often used as a source for water supply and energy production as well as a waterway for transportation.

During the 7th International Conference on Fluvial Hydraulics "River Flow 2014" at École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, scientists and professionals from all over the world addressed these challenges and exchanged their knowledge regarding fluvial hydraulics and river morphology. Past conferences, as well as the current one, organized under the auspices of the Committee on Fluvial Hydraulics of the International Association for Hydro-Environment Engineering and Research (IAHR), witnessed a significant increase in participation of our community of river engineers and researchers, confirming the need for such a forum.

The Local Organizing Committee of River Flow has received more than 650 abstracts, of which more than 630 were aligned with the conference's topics. Subsequently, 410 papers were submitted by engineers and researchers. The International Scientific Committee has finally selected 343 contributions (from authors originating from 43 countries) to be included in the Proceedings and in the separate book documenting the special session on Reservoir Sedimentation. Of these about 2/3 were considered for long oral presentation (15 minutes) and 1/3 were selected for short presentation (3 minutes) and poster. The overall very high quality of the contributions demonstrates the dynamism of the scientific and professional community working on fluvial hydraulics.

A traditional distinctive feature of River Flow conferences has been the organisation of Master Classes the day before the formal opening of the conference. Master Classes present a unique opportunity for PhD and MSc students and young researchers to address their research with renowned senior scientists,

meet peers working on similar topics and identify possible collaborations for the continuation of their work. At River Flow 2014 six Master Classes were conducted by 13 masters, enrolling 65 students from 15 countries. This confirms the vitality of the fluvial hydraulics community contributing to ensure the sustainability of IAHR.

Prof. Dr. Anton J. Schleiss, *Conference Chairman*
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Dr. Mário J. Franca, *Co-Chairman*
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Acknowledgements

The success of a conference depends above all on the quality of the contributions of the participants. We are therefore grateful to all researchers and practitioners working in the river-related disciplines who made such a large number of contributions to River Flow 2014. The International Scientific Committee verified the pleasingly high quality of the submitted contributions when performing an in-depth review of the manuscripts. We are very grateful to its members for their excellent review work, rare in conferences, despite the limited time available. A major concern of the River Flow conferences is to attract young researchers. In this light we specially thank all students that applied to the Master Classes as well as all Masters who accepted the invitation to lecture in our conference and who attracted so many students.

A conference, involving numerous students at a reduced fees, can only be financially viable with some significant level of sponsorship. We acknowledge the support of the Swiss Federal Office for the Environment, BG Consulting Engineers, and Hydro Exploitation SA as gold sponsors for the proceedings and the conference. The existence of numerous Master Classes and the need to cover the expenses of distinguished Masters was only possible with the support of Swiss National Science Foundation (SNSF). Finally, further support to the Conference was given by the silver sponsors e-dric.ch, IM & IUB Engineering, Basler & Hofmann, AquaVision Engineering, and Met-Flow SA.

River Flow 2014 benefits from the experience of the organizers of previous editions and we thank them for the fruitful advices. The success of River Flow is a result of the excellent teamwork within the LOC supported by all staff of the Laboratory of Hydraulic Constructions (LCH), who invested considerable time during two years for the preparation of the conference. A special thanks goes to the conference secretariat ensured by Mrs. Scarlett Monnin and Mr. Gesualdo Casciana.

Finally the involvement of IAHR and the Committee on Fluvial Hydraulics was fundamental for the divulgation of the conference; and for their efforts we express our gratitude.

The Local Organizing Committee of River Flow 2014

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