

River Basin Management II

WITPRESS

WIT Press publishes leading books in Science and Technology.

Visit our website for new and current list of titles:

www.witpress.com

WIT*eLibrary*

Making the latest research accessible, the WIT electronic-library features papers presented at Wessex Institute of Technology's prestigious international conferences.

To access the library and view abstracts free of charge please go to:

www.witpress.com

International Series on Progress In Water Resources

Series Editor

A.H-D. Cheng

Department of Civil Engineering
University of Mississippi
PO Box 1848
University, MS 38677-1848
USA

Honorary Editors

J. Bear

Technion-Israel Institute of
Technology
Israel

G. Pinder

University of Vermont
USA

Associate Editors

Y. Abousleiman

Lebanese American University
Lebanon

C-L. Chiu

University of Pittsburgh
USA

A. Aldama

Mexican Inst of Water Technology
Mexico

M. da Conceicao Cunha

ISEC
Portugal

P. Anagnostopoulos

Aristotle University of Thessaloniki
Greece

A.B. de Almeida

Instituto Superior Tecnico
Portugal

B. Bobee

Universite du Quebec
Canada

J.P. du Plessis

University of Stellenbosch
South Africa

C.A. Brebbia

Wessex Institute of Technology
UK

R.A. Falconer

Cardiff University of Wales
UK

G. Gambolati

Universita di Padova
Italy

P. Holz

Brandenburg Technical University
Germany

K.L. Katsifarakis

Aristotle University of Thessaloniki
Greece

D. Koga

Saga University
Japan

L.F. Konikow

U S Geological Survey
USA

M.A. Losada

University of Cantabria
Spain

K. Onishi

Ibaraki University
Japan

A.C. Rodrigues

Universidade Nova de Lisboa
Portugal

W.W-G. Yeh

University of California at Los Angeles
USA

B.C. Yen

University of Illinois at Urbana-
Champaign
USA

SECOND INTERNATIONAL CONFERENCE
ON RIVER BASIN MANAGEMENT

RIVER BASIN MANAGEMENT II

CONFERENCE CHAIRMAN

C.A. Brebbia

Wessex Institute of Technology, UK

INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE

J.S. Antunes de Carmo	J-L. de Kok
M. Butts	R.A. Falconer
I. Cluckie	Y.R. Fares
R.A. Crowder	M. Hartnett
J.M. Crowther	J. Rodrigo

Organised by

Wessex Institute of Technology, UK

River Basin Management II

EDITOR

C.A. Brebbia

Wessex Institute of Technology, UK

WIT PRESS Southampton, Boston 

C.A. Brebbia

Wessex Institute of Technology, UK

Published by

WIT Press

Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK

Tel: 44 (0) 238 029 3223; Fax: 44 (0) 238 029 2853

E-Mail: witpress@witpress.com

<http://www.witpress.com>

For USA, Canada and Mexico

Computational Mechanics Inc

25 Bridge Street, Billerica, MA 01821, USA

Tel: 978 667 5841; Fax: 978 667 7582

E-Mail: info@compmech.com

US site: <http://www.witpressUSA.com>

British Library Cataloguing-in-Publication Data

A Catalogue record for this book is available
from the British Library

ISBN: 1-85312-966-6

ISSN: 1461-6513

*The texts of the papers in this volume were set
individually by the authors or under their supervision.
Only minor corrections to the text may have been carried
out by the publisher.*

No responsibility is assumed by the Publisher, the Editors and Authors for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein.

© WIT Press 2003.

Printed in Great Britain by Bookcraft Ltd., Bath.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Publisher.

PREFACE

This book contains the edited papers presented at the 2nd International Conference on River Basin Management, which took place in Las Palmas of Gran Canaria in 2003, organised by the Wessex Institute of Technology of the UK. It deals with the planning, design and management of river basin systems.

The contributions published in the volume cover a wide variety of topics such as: Hydraulics and Hydrology; Integrated Watershed Planning; River and Watershed Management; Water Resources Management; Water Quality and Environmental Modelling; Flood Risk; Ecological Perspectives; MIS, GIS and Remote Sensing; Sediment Transport.

The contents of the book offer a variety of recent advances in the management of river systems contributed by researchers from many different countries. The Editor is grateful to all authors for the quality of their papers, as well as to the members of the International Scientific Advisory Committee for their help in reviewing the abstracts and final contributions.

The Editor
Las Palmas de Gran Canaria
2003

Contents

Section 1: Hydraulics and hydrology

Quantitative assessment of the most decisive factors determining river level in an estuary <i>S. Yoshida, K. Yokoo, C. P. Caulfield & P. F. Linden</i>	3
Systems theoretic approach to modelling rainfall-runoff process with conceptual component <i>S. Sanaga & A. Jain</i>	13
Simultaneous solution of coupled surface water/groundwater flow systems <i>O. Gunduz & M. M. Aral</i>	25
Determination of an optimal unit of hydrograph of river basin using genetic algorithm <i>S. Sanaga & A. Jain</i>	35
Evaluation of some rapid flood forecast models: TOPMODEL & MARINE <i>V. Estupina-Borrel & D. Dartus</i>	45
Use of HSPF in estimating future influences of climate change on watersheds <i>M. Albek & E. Albek</i>	55
Comparison between open channel flow models in natural rivers <i>A. Sole & G. Zuccaro</i>	67
Numerical modelling of turbulent flow in a square river harbour <i>H. Hakimzadeh</i>	77

Section 2: Integrated watershed planning

Internal consistency as guiding principle for integrated system modelling <i>J.-L. de Kok, K. van der Wal & H. G. Wind</i>	89
---	----

South Africa's new approach to integrated catchment management to ensure equitable, sustainable and efficient use of the country's water resources <i>C. F. B. Havenga & J. C. Cooke</i>	99
Optimising the River Karun system, Iran <i>M. S. Sadeghian, H. Hassunizadeh & A. N. McNaughton</i>	109
Estimation of the torrential environment (potential) of isle Zakynthos (Greece) using GIS <i>P. Stefanidis & I. Kalinderis</i>	119
Water, environment and food security: a case study of the Haihe River basin in China <i>H. Yang</i>	131

Section 3: River and watershed management

Methodology for the development of river sub-basin management plans: Concept and application <i>J. Staes, R. De Sutter, M. Coenen, K. Buis, A. Lust & P. Meire</i>	143
Optimal daily operation of reservoirs subject to probabilistic flood constraints <i>A. Turgeon</i>	153

Section 4: Water resources management

Assessment of hydrological characteristics in the upper Citarum catchment, West Java <i>Y. R. Fares & D. Yudianto</i>	165
A knowledge-based decision support system for river basin management <i>P. Mikulecky, D. Ponce & M. Toman</i>	177
Optimizing cropping pattern to maximize water productivity <i>M. N. Nimah, A. Bsaibes, F. Alkahl, M. R. Darwish & I. Bashour</i>	187
Implementation of regulatory directives for a water supply reservoir - a case history of Crystal Springs Dam in San Francisco Peninsula, California, U.S.A. <i>P. Petersen, A. Mavroudis & C. C. Chang</i>	199
Optimum allocation of Hirmand river water in Sistan area <i>M. H. Karim Koshteh, A. Akbari & A. J. Kimia</i>	209

Section 5: Water quality and environmental modelling

Influence of dam-reservoirs exploitation on the water quality <i>L. F. G. Lopes, J. S. Antunes do Carmo & R. M. V. Cortes</i>	221
Water quality monitoring of a watershed <i>J. Haddad & M. N. Nimah</i>	231
Export of organic carbon from a minimally developed southern New England watershed <i>R. W. Fulweiler, S. W. Nixon, B. Buckley & S. Granger</i>	237
Classification of chemical status of rivers for water management planning in Lake Võrtsjärv catchment area, Estonia <i>A. Järvet & Ü. Mander</i>	251
The influence of reservoir morphometry on nitrogen retention <i>P. Koszelnik & J. A. Tomaszek</i>	261
Data collection to risk assessment of the fluvial transportation of oil and natural gas in the Amazon Basin - PIATAM - Project <i>C. E. C. Freitas & A. A. F. Rivas</i>	271
Evaluation the impact of thermal discharges on the temperature budget of a lowland stream using a dynamic water quality model <i>A. Petruck, M. Beckereit & J. Stemplewski</i>	279
Informational and modeling computer system for prediction, estimation and analysis of radioactive contamination of surface water objects <i>S. Kazakov, V. Kisselev, A. Krylov & N. Zhilina</i>	289

Section 6: Flood risk

Scaling properties of flood hydrographs and their use to derive design flood hydrographs <i>S. Le Clerc, E. Sauquet & M. Lang</i>	301
Drenaj problems and floods in the Adapazari plain <i>M. Uludag</i>	311
The effects of soil properties on floods in the Agri basin (southern Italy) <i>S. Manfreda, D. Carriero, V. Iacobellis, A. Sole & M. Fiorentino</i>	321
Towards best practice in flood warning <i>R. Khatibi, C. Haggett, L. Cook, J. Haywood, D. Jackson & M. Kerman</i>	331

Web based 3D visual user interface to a flood forecasting system
M. Jern, A. Nilsson, S. Palmberg & M. Ranlöf 341

A new method for debris-flow hazard assessment in alluvial fans
C. Ceccarelli, F. Napolitano & F. Savi 351

Section 7: Ecological perspectives

Reduction of mercury concentration in fish through intensive fishing of lakes: A preliminary testing of assumptions
N. Thérien, C. Surette, R. Fortin, M. Lucotte, S. Garceau, R. Schetagne & A. Tremblay 365

Ecological evaluation for river meandering restoration. A case study on five Flemish rivers
C. Van Liefferinge, D. De Smedt, R. Banasiak, R. Verhoeven & P. Meire 377

Fishing modification due to dam, pollution and introduction fish species in the Tietê River, SP, Brazil
W. S. Smith, E. L. G. Espíndola, M. Petrere Jr. & O. Rocha 389

Section 8: MIS, GIS and Remote Sensing

The development of a GIS-based water quality model
M. Hartnett, S. Nash & P. Mills 401

Integrated water basin management and risk assessment through advanced modeling techniques
S. Fattorelli, M. Coccato, E. Frank & A. Ostan 411

Land-use, water resources and nitrogen load in major river basins in Asia
K. Okamoto, S. Shindo & H. Kawashima 423

The EUROHARP data management system
M. Van Liedekerke, F. Bouraoui, P. Panagos & A. Nogueira 431

Technologies for storing, processing and fruition of hydrological data
A. Colagrossi & G. Nardone 441

An integrated approach to river basin management based on EU Water Framework Directive using GIS and Remote Sensing
I. D. Cluckie, J. S. Park, R. Christian & H. Candy 449

Section 9: Sediment transport

Estimation of sediment yields in a watershed area using ANN method
C.-Y. Hsu, H.-Y. Lee & Y.-L. Lin 461

Efficient sampling for estimating suspended sediment loads - case studies from the river Rhine and the river Elbe <i>A. Schmidt</i>	471
Application of unit stream power theory to stable meandering and braided reaches of Sefidroud River <i>M. R. M. Tabatabai</i>	481
Authors Index	483