

# ENVIRONMENTAL SOFTWARE SYSTEMS

Environmental Risk Assessment Systems

SECOND EDITION



IFIP TC 5 WG 5.11

6<sup>th</sup> International Symposium on Environmental Software Systems

(ISESS 2005)

May 24-27, 2005, Sesimbra, Portugal

***Edited by***

**Tony Jakeman**  
*The Australian National University,  
Australia*

**David A. Swayne**  
*University of Guelph  
Canada*

**SECOND EDITION**  
**Edited by Ralf Denzer**  
*Environmental Informatics Group, Germany*

doi: 10.13140/2.1.3824.0325

**March 2015**

# **ENVIRONMENTAL SOFTWARE SYSTEMS, Volume 6**

## **Environmental Risk Assessment Systems**

### **SECOND EDITION**

This volume contains a newly compiled version of the Proceedings of the 6<sup>th</sup> International Symposium on Environmental Software Systems 2005 (ISESS 2005), published by the International Federation for Information Processing (IFIP) under ISBN 3-901882-21-9.

The original version was a CDROM. This SECOND EDITION contains the newly edited proceedings as one document and has been produced with permission of the copyright holder, IFIP and IFIP WG5.11 “Computers and Environment”.

The intention behind creating this SECOND EDITION was to make those volumes of ENVIRONMENTAL SOFTWARE SYSTEMS easily available on-line which are not available through a commercial publisher.

This edition has been created based on the PDF's of the original CDROM. As the grouping of the papers in the original version was a little scattered, a new table of contents has been created which is a little more compact.

This edition is permanently available at

<http://www.enviromatics.org/isess/2005.ISESS.Proceedings.pdf>

The original CDROM version is permanently available at

<http://www.enviromatics.org/isess/2005.ISESS.CDROM.zip>

**Gaiberg, March 2015**

**Ralf Denzer**  
ralf.denzer@enviromatics.org



**ISBN: 3-901882-21-9**

**IFIP Conference Series**

# ENVIRONMENTAL SOFTWARE SYSTEMS, Volume 6

## Environmental Risk Assessment Systems



Computing Research Laboratory for the Environment



Environmental Informatics Group



Environmental Informatics Institute



Hochschule fuer Technik und  
Wirtschaft des Saarlandes



International Federation for Information Processing



IFIP Working Group 5.11  
Computers and the Environment



International Environmental Modelling  
and Software Society

## **IFIP – The International Federation for Information Processing**

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- open conferences;
- working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.



ISBN: 3-901882-21-9

IFIP Conference Series

**Copyright** 2005, 2015 by International Federation for Information Processing

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, mechanical, photo-copying, recording or otherwise, without the prior written permission of the International Federation for Information Processing.

# TABLE OF CONTENTS

## PREFACE AND INTRODUCTION

Introduction <i>David A.B. Swayne</i> .....	2
--	---

## KEYNOTE

Participatory Planning of River Basin <i>Rodolfo Soncini Sessa</i> .....	4
---	---

## ENVIRONMENTAL MONITORING AND INFORMATION SYSTEMS

Analysis of Environmental Information Management in the Czech Republic <i>Jirí Hřebíček, Tomáš Pitner, Jaroslav Ráček</i> .....	6
Examples of Public Environmental Information Systems and Portals in Baden-Wuerttemberg <i>Werner Geiger, Clemens Düpmeier, Markus Ruchter, Thorsten Schlachter, Rainer Weidemann, Renate Ebel, Ernst Schmid</i> .....	16
Corporate Environmental Communication and Reporting <i>Jaroslav Ráček, Lukáš Kokrment, Jan Ministr, Josef Fiala</i> .....	26
Sensor Web Enabling the Advanced Fire Information System <i>Gavin Fleming, Frans van den Bergh, Frederic Claudel, Philip Frost</i> .....	34
Design of a Regional Biomass Information Portal <i>Rolf Krieger, Stefan Naumann, Kerstin Schäfer, Bernhard Wern</i> .....	42

## ENVIRONMENTAL DECISION SUPPORT

Decision Support Systems for Integrated Water Resource Management: Value and Success Factors <i>Jaroslav Mysiak</i> .....	53
DSSs, Problems, Concepts and the Socio-Managerial Environment – a long-term Polish Perspective <i>Jan W. Owsinski</i> .....	64

Uses and Limitations of Uncertainty Assessment in Model-based Decision Support <i>J. P. Norton, J. D. Brown, J. Mysiak</i> .....	77
Cognitive Considerations in Environmental Decision Support <i>Steven P. Frysiner</i> .....	87
Consumer Decision Support for Product Selection <i>Daryl H. Hepting, Timothy Maciag</i> .....	95
Using a Universal Information Robot as a Decision Support System for Evaluating Public Projects <i>Jiri Hrebíček, Filip Procházka, Jana Soukopová, Zdenko Staníček</i> .....	107
Information Technology and Decision Support for Innovative Real-time Wetland Salinity Management Strategies in a Large-scale, Diverse River Basin <i>Nigel W.T. Quinn</i> .....	116
Design and Implementation of a Decision Support System for Environmental Effects Monitoring <i>William G. Booty, Isaac Wong, David Lam, Oskar Resler</i> .....	128

## TOOLS AND TECHNIQUES

Graphical Probability Network Modeling in Environmental Risk Assessment <i>David Swayne</i> .....	140
Simulating Clorpyrifos Leaching and Runoff in a Floodplain Allophonic Soil Using GLEAMS Model <i>Edier Humberto Perez, Martha Isabel Paez, José Miguel de Paz</i> .....	148
Using an Expert System to Update Forest Maps <i>Yves Voirin, Froduald Kabanza, Goze Benie, Eric Beaudry, Kami Rousseau</i> .....	157
Abacus: A Multi-agent System for Meteorological Radar Data Management and Decision Support <i>Ioannis N. Athanasiadis, Marios Milis, Pericles A. Mitkas, Silas C. Michaelides</i> .....	168
The PIAM Approach to Modular Integrated (Assessment) Modelling <i>J. Hinkel</i> .....	179
A New Approach to Integrated Catchment Modelling: The Catchment Modelling Toolkit <i>Robert M. Argent, Keirnan Fowler</i> .....	193
Interactive Aggregation Methods for Analyzing Results of Environmental Modeling <i>Gennady Andrienko, Natalia Andrienko</i> .....	202
ORCHESTRA - Development of an Open Architecture for Risk Management in Europe <i>Ralf Denzer, Thomas Usländer</i> .....	212

<b>A New Service Oriented Architecture for Risk Management</b> <i>Hugues Sassier, Christian Alegre, Stephane Pierotti, Pascal Lazaridis</i> .....	222
<b>Software Agents in Environmental Informatics (Tutorial)</b> <i>Ioannis N. Athanasiadis, Pericles A. Mitkas</i> .....	229
<b>Research on Visual Analysis of Spatio-temporal Data at Fraunhofer AIS: An Overview of History and Functionality of CommonGIS (Tutorial)</b> <i>Natalia Andrienko, Gennady Andrienko</i> .....	231