

# Annual Report 2006

## Division

# Computational Environmental Systems

Department  
**Computational  
Landscape Ecology**

Department  
**Computational  
Hyrosystems**

Young Investigators  
Group  
**Biotic Ecosystem  
Services**



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# 1. Prologue

The most important events for the Division in 2006 were the Intermediate Evaluation of the Programme 5 as well as the start of some import research Project. According to the latter the start of the Helmholtz funded Young Investigators Group headed by Dr. Carsten F. Dormann entitle “Biotic Ecosystem Services” especially those provided by pollinators and the Helmholtz Alliance on System biology are notable.

From the mid-term Evaluation many discussions and feedback from the review panel will keep in mind. Mostly we’re happy, that the methodological focus of the work in the division was acknowledged and the issues of uncertainty, model aggregation, scaling as well as management and optimization got approved.

In summary 2006 has been successful not only in terms of scientific output (as seen from this annual report) but also in terms of international collaborations.

Sabine Attinger & Ralf Seppelt

## This years milestones

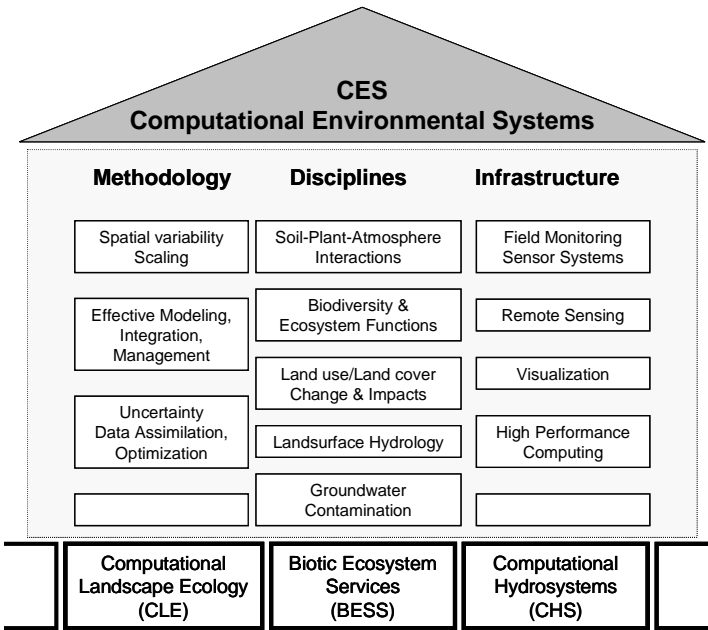
<b>January</b> <ul style="list-style-type: none"> <li>• Housewarming</li> <li>• Visitor: Dr. Alexander Löw, University of Munich</li> </ul>	<b>February</b> <ul style="list-style-type: none"> <li>• New colleague: Christoph Schneider (CHS)</li> </ul>	<b>March</b> <ul style="list-style-type: none"> <li>• New colleague: Falk Heße (CHS)</li> <li>• Visitor and UFZ-Seminar: Prof. Dr. Willam Bouten and coll.</li> <li>• Visitor: Dr. Uwe Rascher, Research Centre Jülich</li> <li>• Visitor: Dr. Olaf A. Cirpka EAWAG, Zürich</li> <li>• Visitor: Dr. Judy Shamoun-Baranes, University of Amsterdam</li> </ul>	<b>April</b> <ul style="list-style-type: none"> <li>• Visitors: Prof. Dr. Gerstengrabe, PIK and Students from Humboldt University, Berlin</li> <li>• Visitor with UFZ-Seminar: Dr. Andrew Jarvis, Lancaster University</li> </ul>
<b>Mai</b> <ul style="list-style-type: none"> <li>• Visitor: with UFZ-Seminar: Prof. Dr. Hartmut Wittenberg University of Lüneburg</li> <li>• Kick Start of BESS</li> </ul>	<b>June</b> <ul style="list-style-type: none"> <li>• Visitors with UFZ-Seminar: Dr. Jens Bartholmes und Dr. Hannes Reuter, ISPRa</li> <li>• Visitor: Dr. Boris Schröder, Uni Potsdam</li> </ul>	<b>July</b> <ul style="list-style-type: none"> <li>• New colleague: Judith Horn, (DFG-Project HYBRID, CLE)</li> </ul>	<b>August</b> <ul style="list-style-type: none"> <li>• Guests: Prof. Dr. C. Schullius and Students from University Jena.</li> <li>• New colleague: Martin Steinert (EU-Project FloodMed, CLE)</li> </ul>
<b>September</b> <ul style="list-style-type: none"> <li>• New colleague: Rohini Kumar (CHS)</li> <li>• New colleague: Jeroen Everaars, (ALARM, CLE)</li> <li>• New colleague: Bernd Gruber, (BESS, CLE)</li> </ul>	<b>October</b> <ul style="list-style-type: none"> <li>• Mid-Term Evaluation of Programme 5 “Sustainable Use of Landscapes”</li> <li>• Visitor with UFZ Seminar Hedwig van Delden, Research Institute for knowledge systems</li> <li>• Visitors: J. Arnold, C. Green (USDA-ARS Temple, TX), P. Allen (Baylor University, TX), R. Srinivasan (Spatial Sciences Lab College</li> </ul>	<b>November</b> <ul style="list-style-type: none"> <li>• New colleague Sven Arnold (CHS)</li> </ul>	<b>December</b> <ul style="list-style-type: none"> <li>• Excursion: “Historical development of the Freiberg mining industry and regional structural change”</li> </ul>

	Station, TX), R. McKeown (University of Saskatchewan, Canada), Clair Baffaut (University of Missouri);	
	<ul style="list-style-type: none"> <li>• Visitors: Piotr Magnuszki (University of Wroclow, Poland), Jan Sendzimir (IIASA) and coll.</li> </ul>	

## 2. The Division *Computational Environmental Systems*

Being an interdisciplinary division with a strong emphasis on the methodological advancements in modelling and simulation of environmental systems, a structure that supports collaboration and communication between groups, project teams and departments is required and this – an important constraint – by limiting the number of meetings for organization and administration.

This sets the framework for the “house” of the division, which is built upon two Departments. The working groups mentioned have different interests with respect to methodologies (left column), disciplinary research fields (middle column) and different infrastructure support.



Important within this concept is (i) to have or build up competence in different research fields, increase expertise in modelling and be experienced in data acquisition. This easily allows the exchange with other scientists within the UFZ, and other Helmholtz centres and supports international collaborations. As the question of integration of research gains more and more importance, this structure allows the scientist (ii) to investigate environmental systems in an integrative manner with the necessary competence from every field, for instance land use development and the drivers from socio-demographic change. And finally (iii) we hope to benefit from this structure by exchanging methods across different disciplines of environmental research.

### 2.1. The Department *Computational Landscape Ecology*

Landscape ecology puts ecology into a spatial context. The general aims of the research in the department is to develop and provide knowledge, models and tools to quantify impacts of land use and land-cover change to certain ecosystem functions, i.e. “ecosystem services”. Focus questions are

- Identify and quantify driver regional land use/land cover change in rural-urban regions originating from climate change, agricultural policies as well as regional decisions. Specific challenge is to identify the relevant feedbacks rather than understanding the system as solely driven by political constrains and climate (change) pressures

- Analysis, simulation and development of scenarios of land use change and landscape structure for the entire gradient from rural to urban regions to quantify the impacts to ecosystem functions and services such as water land provision, regulation, retention, pollination, recreation, flood retention, water availability and distribution, fate of nutrients, species distribution and their functioning in the ecosystem.
- This provides the base of land use/landscape management, to test and derive management strategies and scenarios for future land-use development.

Our approaches are therefore interdisciplinary and based on a fundamental understanding of physical, biological, chemical and anthropogenic processes. The invariant methodological steps are

1. Data-based modelling approaches to identify parsimonious modelling approaches and to derive optimised monitoring strategies.
2. Modelling and simulation of these impacts and feedbacks bases on problem specific physical based, empiric, statistic as well as rule-based modelling approaches with a broad methodology ranging from differential equations to agent-based approaches. Thus we aim at a range of different model approaches that serve as a landscape modelling toolset.
3. For validation and process-driven model development a high standard of field monitoring techniques a data acquisition methodology is elementary.
4. Techniques of optimization and uncertainty analysis are used to test models, test and derive management strategies.

## **2.2. The Department Computational Hydrosystems**

Water is a vital resource for human needs and natural ecosystems. Water use by humans is still increasing and includes water for agriculture and food production, municipal and industrial supply. The water availability, however, is compromised by global and regional impacts, such as climate and land use change.

Spatial heterogeneity of land surface and subsurface characteristics, originating for example from change in soil properties, topography as well as dynamic vegetation, largely control hydrological processes from the pore up to the catchments and regional scale. The realistic representation of hydrological processes, while appropriately taking into account sub grid heterogeneity is the main research focus of this Department. To this end, the Department develops and validates hydrological models at different scales of the water cycle, as well as integrates hydrological and related processes and investigates the anthropogenic change. This will allow us to develop strategies for the sustainable management of the natural resource water.

- The cores of our approach are physically based, distributed models which portray the behavior of the different natural subsystems. This requires
- the identification and description of the relevant physical, chemical and biological processes within the interactive system,
- the ability to translate these processes into conceptual and computational models, taking into account inherent uncertainty,
- the development of computational algorithms to efficiently solve them (by complexity reduction, multi-scale codes etc.),

- the development of management and optimization tools based on fully integrated, low-order, parameter-efficient simulation models to find robust strategies for water management.

### 2.3. Young Investigators Group *Biotic Ecosystem Services*

Together with the Agroecology Unit at the University of Göttingen this group's goal is to provide a description of landscape-scale biological processes. Using pollination of crops and biological control of agricultural pests as example, field data guide the development of models that can then be used to assess the effects of landscape structure and land-use management. Since ecological systems of such complexity cannot be described analytically, simulation and field experiments are integrated to obtain useful and realistic computer models.

## 3. Staff

### 3.1. Research Staff

**Prof. Dr. Sabine Attinger (CHS)** Theoretical physicist, doctorate degree in physics, professor for hydrogeology at Jena University. Major research focus: modelling and simulation of hydrological systems, development of multi-scale methods, stochastic modelling,

**Carsten Bohn** Landscape Ecologist. Research interests: Development of a phytosociological based assessment approach for floodplains concerning the requirements and targets of the EU WFD and nature protection (FFH-Directive). PhD under supervision of Prof. Dr. G. Schulte (Westfalian Wilhelms-University, Münster)

**Dr. Justin Calabrese (CLE)** Theoretical ecologist, Ph.D. in Community Ecology/Theoretical Ecology (University of Maryland, USA), postdoctoral researcher, main research interests: 1) Neutral community theory and its application to empirical data, 2) Developing practical methods to extract information about underlying movement processes from spatially explicit population-level data, 3) The influence of the timing of individual life-history events on population-, community- and landscape-level processes.

**Dr. Carsten Dormann (CLE)**, Biologist, PhD in Plant Ecology (University of Aberdeen, Scotland) ; Postdoc: main projects 1. Biotic Ecosystem Services (Young Investigators Group funded by the Helmholtz Association and the UFZ); 2. Statistical aspects of species distribution analyses; 3. experimental investigation into the mechanisms behind the competition intensity-species diversity-relationship; current and previous associations to EU-projects ALARM (1 PhD student) and Greenveins.

**Dr. Bernd Gruber (CLE)**, Biologist, Postdoctoral researcher with scientific interests in habitat structures and population biology, methods and concepts in conservation biology.

**Dr. Dagmar Haase (CLE)**, geographer and landscape ecologist (PhD), senior post-doctoral researcher, main research interest: (urban) land use dynamics and population modelling, urban water balance and flood risk, flood vulnerability, integration and operationalisation of socio-economic data.

**Dr. Anke Hildebrandt (CHS)**, water resources engineer (Dipl. Ing.) and PhD in hydrology. Postdoctoral researcher with scientific interest in soil-vegetation-atmosphere interaction

on various spatial scales. Particular interest in modelling transpiration and root water uptake.

**Dr. Angela Lausch (CLE)**, biologist and landscape ecologist (PhD), senior scientist, Major research focus: Spatial explicit modelling of habitat and landscape changes, investigations of relationships between pattern and functions of changing landscapes and their influence on existence and distribution of species.

**Dr. Sven Lautenbach (CLE)**, Master in Geography and Applied system Science, PhD in Applied System Science, main research areas: environmental and hydrological modelling, integrated modelling, spatial explicit modelling, environmental management, environmental impact assessment, scaling issues, uncertainty in integrated models, ecosystem services

**PD Dr. Karsten Schulz (CLE)**, Tool Maker; Master, PhD and Habilitation in “Geoecology-Hydrology”; Main Research Areas: Modelling of Soil-Vegetation-Atmosphere Transfer processes, Uncertainty Analysis, Remote Sensing and Data-Assimilation

**Dr.-Ing. Luis Eduardo Samaniego Eguiguren (CHS)**, Civil Engineer, Master of Infrastructure Planning and PhD in Hydrology. Main research areas: multi-objective optimization, integrated catchment management and risk assessment, scale issues and uncertainty analysis in hydrology, hydroinformatics, stochastic processes and geostatistics.

**Prof. Dr. Ralf Seppelt (CLE)** Applied mathematician, doctorate degree in geoecology, full professor for applied landscape ecology at Martin Luther Universität Halle Wittenberg. Major research focus: modelling and simulation of landscape ecological systems, with respect to man-environment interrelation, urban-rural-systems, processes of abiotic-biotic interactions; methodological developments,

**Martin U. Steinert (CLE)**, Geographer, Major research focus: GIS-based landscape analysis; Landscape-related controls (PCDs) on hydrology (especially baseflow)

**Dr. Martin Volk (CLE)**, Geographer, Dr. rer. nat., Major research focus: GIS-based landscape analysis; Meso- to macro-scale modelling of hydrology and nutrients as a base to quantify landscape functions; Landscape-related controls (PCDs) on hydrology (especially baseflow and storage) in landscape units of medium to large river basins

**Dr. Björn Zehner (CHS)**, Geoscientist, Dr. rer. nat. (Friedrich-Wilhelms University Bonn and Fraunhofer Institute for Media Communication). Major research areas: Visualization and Virtual Reality in Geosciences

### **3.2. Technical & Administrative Staff**

**Steffi Erfurth (CLE)** GEO-Database management and maintenance, GIS

**Christine Geyer (IT)** Workstation management, OS Support, IT-Infrastructure coordination

**Karin Große (CLE, CHS)** Office, Departments and Division

**Steffen Lehmann (CLE)** GIS, Remote Sensing Software, Field Technician Land Surface Characteristics

**Thomas Schnicke (IT)** Workstation management, OS Support, IT-infrastructure coordination, Cluster maintenance

**Gudrun Schuhmann (CLE)** Field Technician Land Surface Hydrology

**Gundula Schulz (CLE)** GIS, Remote Sensing Software, Field Technician Land Surface Characteristics

### 3.3. PhD Theses

#### Completed

**Vanessa Stauch (CLE)** Geoecologist. Research interests: Augmentation of Eddy Covariance flux time series using data based methods. PhD under the supervision of Dr. K. Schulz and Dr.A. Jarvis (Lancaster University).

#### In Progress

**Sven Arnold (CHS)** Geoecologist, research interests: Surface -and Subsurface Hydrology, integrated ecohydrological models. PhD under supervision of Prof. S. Attinger and Dr. K. Frank (ÖSA)

**Annelie Holzkämper (CLE)** Landscape ecologist. Research interests: spatial optimization of land use patterns; habitat suitability modelling. PhD under the supervision of Prof. R. Seppelt.

**Antje Ullrich (CLE)** Geographer. Research interests: Sensitivity of SWAT to the variation of input variables. PhD under the supervision of Prof. R. Seppelt and Dr. M. Volk.

**Jaromir Borzuchowski (CLE)** Geographer. Research interests: Plant spectral response in relation to various physiological and biophysical conditions, valuation of different vegetation conditions; comparison of different remote and field technics. PhD under the supervision of Dr. K. Schulz.

**Jeroen Everaars (CLE)** Biologist. Research interests: Effects of landuse changes on insects (thesis focus: solitary bees), Biodiversity conservation of insects, Scaling laws in landscape ecology. PhD under the supervision of Dr. C. Dormann.

**Falk Hesse (CHS)** Master in Computational Science. Research interests: Simulating microbial activity limited by the bioavailability of nutrients or electron acceptors – upscaling of pore scale processes to the macroscale. PhD under the supervision of Prof. S. Attinger.

**Judith Horn (CLE)** Geoecologist; Research interests: Hybrid data-based mechanistic SVAT (soil vegetation atmosphere transfer) modelling of latent heat and CO<sub>2</sub> (DAAD-project); Phd under the supervision of Dr. K. Schulz.

**Rohini Kumar (CHS)** Agricultural Engineer. Research interests: Artificial intelligence techniques for solving the different type of problems in hydrology, uncertainty and risk assesment for integrated water resource management. PhD under the supervision of Prof. S. Attinger.

**Stefan Liersch** Geoecologist. Research interests: Improvement of environmental monitoring strategies using additional sources of information (empirical knowledge). PhD under the supervision of Dr. M. Volk and Prof. R. Seppelt.

**Christoph Schneider (CHS)** Computational engineer (with the specialisation of control and system theory). Research interests: Ecohydrology (modeling root water uptake) systemics, fractals. PhD under the supervision of Prof. S. Attinger and Dr. A. Hildebrandt.

**Thilo Weichel (CLE)** Geographer. Research interests: Uncertainty analysis of input data sets in the 2D – Hydrodynamic Modelling. PhD under the supervision of Dr.K. Schulz and Dr. D. Haase.

### 3.4. Diploma Thesis

#### Completed

**Sebastian Bolze** (University of Marburg): Regionalisation of heavy metal concentrations in the Elbe floodplains. Supervisor: Dr. D. Haase

**Tobias Finke**, Geography (Univ. Leipzig): Land use transition model for the Tisza river basin: a top-down approach to apply global scenarios at regional scale. Supervisors: Prof. W. Kirstein, Dr. D. Haase, C. Bohn.

**Katrin Hanneman**, Geography (Uni Bochum), Fuzzy-rule-based methods for the classification of land surface characteristics in the Schnellbach-Catchment using Landsat TM remote sensing data. Supervisors: Dr. K. Schulz, Dr. L. Samaniego.

**Marion Pause**, Photogrammetry and Remote Sensing (Uni Dresden): The quantification of soil moisture pattern using time series of ENVISAT ASAR data. Supervisor: Dr. K. Schulz

**Oliver Purschke** (University of Bernburg): Habitat modelling considering climate changes and CAP. Supervisors: Dr. D. Haase, Dr. C. Dormann.

**Sophie Schetke**, Geography (Univ. Leipzig): Multi-criteria assessment of the urban green network development in a shrinking city using the URGE-ICC and the FLAG model. Supervisors: Prof. U. Weiland, Dr. D. Haase.

**Dorit Schiller** (University of Halle-Wittenberg): Multi-criteria functionality assessment schemes for urban floodplains. Supervisor: Dr. D. Haase

**Martin Steinert**, Geography (Univ. Leipzig): A review of methods for the assessment of the landscape retention function on the example of the Upper Ems River Basin. Supervisors: Prof. Kirstein, Dr. M. Volk.

#### In Progress

**Conrad Jackisch**, (University of Potsdam): Integrated Modeling of Cropping, Water Budget and Market Accessibility on Sub-Catchment Scale (India). Supervisors: Prof. E. Zehe, Dr. L. Samaniego.

**Franziska Kroll**, (University of Tübingen): Effects of demographic change on regional land use and infrastructure since 1990. Supervisor: Dr. D. Haase.

**Steffen Lauf** (University of Halle-Wittenberg): A SD land use change model for the urban region of Leipzig with respect to demographic transition. Supervisors: Dr. D. Haase, Prof. R. Seppelt

**Nicole Weber** (University of Leipzig): Noise level and nano-particle concentration along urban roads in a shrinking city. Supervisors: Dr. D. Haase, Dr. U. Franck.

**Anni Feist** (University of Leipzig) Investigating the representativity of long-term forest surveys by means of comparisons with regional soil mapping. Supervisors: Dr. C. Lorz (Dresden), Dr. M. Volk

## 3.5. Habilitations

### In Progress

**Dagmar Haase**, (Univ. Halle): Dynamic urban spaces, book proposal in preparation.

**Martin Volk**, Analysis of catchment-related control of baseflow and storage in medium to large river basins.

## 4. Projects

### 4.1. Participation at Programm 5 of Helmholtz Association

#### Coordination

##### Urban Monitoring and Modelling (5.1.1.5)

The aims of the research work in this field are to reach conclusions about the development of urban areas and to make available and develop the methods required for this in the areas of integrated modelling and remote sensing. Particularly the effects of changes in land use on people's quality of life, as well as biotic and abiotic resources, under various current conditions and driving forces are investigated: growth, stagnation, negative growth and demographic change.

**Scientists involved:** Ralf Seppelt, Dagmar Haase

#### URLs:

- Research Theme: <http://www.ufz.de/index.php?en=4925>
- Cluster: [http://www.ufz.de/index.php?en=4925&pof\\_nr=p5010105](http://www.ufz.de/index.php?en=4925&pof_nr=p5010105)

##### Integrated Modelling (5.2.4.2)

The scale at which natural processes and human activities converge is the regional or landscape scale. Traditionally, processes at landscape scales are in the focus of landscape ecologists. However, landscape ecology is still lacking a generally accepted conceptual and theoretical basis (Wu & Hobbs, 2002). Our research aims at the development of systematic multi-scale and integrative modelling schemes for aggregating hydro- and ecosystem processes, the synthesis of hydro- and ecosystem processes, model parametrization on different scales.

**Scientists involved:** Sabine Attinger (coordination), Justin Calabrese, Carsten Dormann, Anke Hildebrandt, Annelie Holzkämper, Angela Lausch, Sven Lautenbach, Marion Pause, Luis Eduardo Samaniego Eguiguren, Karsten Schulz, Ralf Seppelt, Vanessa Stauch, Martin Volk

#### URLs:

- Research Theme: <http://www.ufz.de/index.php?en=4953>
- Cluster: [http://www.ufz.de/index.php?en=4953&pof\\_nr=p5020402](http://www.ufz.de/index.php?en=4953&pof_nr=p5020402)

## Participation in Research Themes

### **Biodiversity, ecosystem function and ecosystem stability (5.2.1)**

Biological diversity (or biodiversity) and its interaction with land use and landscape structure, is at the core of the research theme (RT). Biodiversity is endangered worldwide by biological invasions, changes of land use, climatic extreme events and pollution. Thereby, it is important to know, which role anthropogenic impacts play and which effects the decrease of biological diversity have on the stability and function of ecosystems. These important themes are examined in European cultural landscapes, in semiarid areas, and in tropical forests. In all of these landscapes there is a need to manage the biological diversity in a sustainable way. Therefore, we are developing integrative concepts, which comprise natural as well as social (including economics, law, and philosophy) sciences.

**URL** Research Theme: <http://www.ufz.de/index.php?en=4950>

Scientists of the division take part within the following research clusters:

- Land use, landscape structure, and biodiversity (URL [http://www.ufz.de/index.php?en=4950&pof\\_nr=p5020101](http://www.ufz.de/index.php?en=4950&pof_nr=p5020101))
- Biological invasions, dispersal processes and biodiversity (URL [http://www.ufz.de/index.php?en=4950&pof\\_nr=p5020102](http://www.ufz.de/index.php?en=4950&pof_nr=p5020102))

**Scientists involved:** Carsten Dormann, Annelie Holzkämper, Angela Lausch

### **Integrated management of water resources in river basins (5.2.2)**

River basin management requires a comprehensive understanding of i) runoff generation and associated matter transport ii) environmental stresses on aquatic ecosystems and iii) the relationship between land-use changes and water quantity and quality. The integration of the various research activities proceeds from sector-specific approaches up to a catchment-level decision support system (DSS) that allows alternative management options to be explored and compared. In this context, a particularly innovative step will be the upscaling of results from detailed mechanistic studies to the catchment level. Integrated ecological, economic and social assessment methods, in which stakeholders from the areas of politics, economy and administration are involved will be developed and used to support the selection of efficient management strategies.

**URL** Research Theme: <http://www.ufz.de/index.php?en=4951>

**Scientists involved:** Dagmar Haase, Martin Volk.

## **4.2. Externally Funded Projects**

**ALARM:** Assessing large scale environmental risks for biodiversity with tested methods (EU-IP, 2/2004-1/2009, 1 Doktorand: Effects of Landscape composition and configuration on pollinator diversity and pollination efficiency)

**AMLATUR:** Analysis and Management of Landscape Transition in the Urban-Rural Gradient, Ralf Seppelt (PI), 2004-2005, DAAD, Travel Budget 10 T€

**FLOODsite:** Integrated Flood Risk Analysis and Management Methodologies (EU-IP, associated at the Department for Economy; Travel budget)

**3ZM-GRIMEX:** Development of a coupled model for integrated flood risk management of surface and groundwater flow in urban areas (German BMBF, 1 PhD student)

**HYBRID:** Development of hybrid stochastic-mechanistic models for the partitioning and extrapolation of land surface to atmosphere water, energy and carbon fluxes. PI: Dr. K. Schulz, (DFG: Schu1271/4-1, 1 PhD student)

**NeWater:** New approaches to adaptive water management under uncertainty (EU-IP, 1 PhD student, 1 Postdoc)

**BESS:** Biotic Ecosystem Services: quantifying the ecosystem services pollination and biocontrol in dependence of the landscape setting; Young Investigator's Group awarded to Carsten Dormann together with the Agroecology Group at the University of Göttingen, Germany (Helmholtz-Association; 2 PhDs, 1 Postdoc, 2006-2010)

**PLUREL:** Peri-urban Land Use Relationships: Strategies and Sustainability Impact Assessment Tools for urban-rural Linkages (EU-IP, 2006-2008)

**FLOODMED** Monitoring, forecasting and best practices for FLOOD-Mitigation and prevEntion in the CADSES region. – (INTERREG II B CADSES-Project, 2006-2008, 0.7 Position)

**LeipEx:** The Leipzig Remote Sensing Experiment (a collaboration between the Department of Applied Landscape Ecology at UFZ and the Department of Geography and Remote Sensing (Prof. Mauser) at the Ludwig-Maximilians-University of Munich 2005)

## 5. Publications

### 5.1. International Journals (ISI referenced)

#### Research Articles

Abdulle, A., **Attinger, S.** (2006): Numerical methods for transport problems in microdevices *Lect.Notes Comput.Sci.* 3743, 67-75 [http://dx.doi.org/10.1007/11666806\\_6](http://dx.doi.org/10.1007/11666806_6)

Bogena, H., **Schulz, K.**, Vereecken, H. (2006): Towards a network of observatories in terrestrial environmental research. *Advances in Geosciences* 9, 109-114

Chen, P., Arnold, J. G., Srinivasan, R., **Volk, M.**, Allen, P. M. (2006): Surveying ground water level using remote sensing: an example over the Seco and Hondo Creek watershed in *Texas Ground Water Monitoring & Remediation* 26 (2), 94-102 <http://dx.doi.org/10.1111/j.1745-6592.2006.00077.x>

Herzog, F., Steiner, B., Bailey, D., Baudry, J., Billeter, R., Bukacek, R., de Blust, G., de Cock, R., Dirksen, J., **Dormann, C. F.**, de Filippi, R., Frossard, E., Liira, J., Schmidt, T., Stöckli, R., Thenail, C., van Wingerden, W., Bugter, R. (2006): Assessing the intensity of temperate European agriculture at the landscape scale *European Journal of Agronomy* 24 (2), 165-181 <http://dx.doi.org/10.1016/j.eja.2005.07.006>

**Hildebrandt, A.**, Eltahir, E. A. B. (2006): Forest on the edge: seasonal cloud forest in Oman creates its own ecological niche *Geophys.Res.Lett.* 33, L11401 <http://dx.doi.org/10.1029/2006gl026022>;

**Hirt, U.** (2006): Nitrogen inputs in ground and surface waters in the middle Mulde catchment *Nutr.Cycl.Agroecosys.* 76 (1), 49-65 <http://dx.doi.org/10.1007/s10705-006-9040-z>

**Holzkämper, A.**, **Lausch, A.**, **Seppelt, R.** (2006): Optimizing landscape configuration to enhance habitat suitability for species with contrasting habitat requirements *Ecol.Modell.* 198 (3-4), 277-292 <http://dx.doi.org/10.1016/j.ecolmodel.2006.05.001>

- Matthies, M., Berlekamp, J., **Lautenbach, S.**, Graf, N., Reimer, S. (2006): System analysis of water quality management for the Elbe river basin *Environ.Modell.Softw.* 21 (9), 1309-1318 Onlinepublikation <http://dx.doi.org/10.1016/j.envsoft.2005.04.026>
- Samaniego, L.**, Bárdossy, A. (2006): Simulation of the impacts of land use/cover and climatic changes on the runoff characteristics at the mesoscale *Ecol.Modell.* 196 (1-2), 45-61 <http://dx.doi.org/10.1016/j.ecolmodel.2006.01.005>;
- Schröder, B., **Seppelt, R.** (2006): Analysis of pattern-process interactions based on landscape models-Overview, general concepts, and methodological issues *Ecol.Modell.* 199 (4), 505-516 <http://dx.doi.org/10.1016/j.ecolmodel.2006.05.036>
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## 5.2. Other Journals

- Kalz, B., **Gruber, B.** (2006): Monitoring von Fischotterpopulationen mittels DNA-Analyse aus Kotproben *Naturschutzarbeit in Mecklenburg-Vorpommern* 49 (1), 10-16
- Lorz, C., **Volk, M.**, Schmidt, G. (2006): Implementing spatial distribution and functionality of forests in models for river basin management *Forstwirtschaftliche Beiträge Tharandt* 28, 241-248
- Marks, T., **Lausch, A.**, Arndt, E. (2006): Entwicklung der Landschaftszerschneidung in Sachsen-Anhalt am Beispiel des Saalkreises und der kreisfreien Stadt Halle *Hercynia* N.F. 39, 1-10
- Samaniego, L.**, Treuner, P. (2006): Optimisation of infrastructure location *Jahrbuch für Regionalwissenschaft* 26 (2), 119-145 <http://dx.doi.org/10.1007/s10037-006-0001-4>;
- Schmeller, D. S., **Gruber, B.**, Bauch, B., Henle, K. (2006): Arten- und Lebensraum-Monitoring in Europa *Nat. Landschaft* 81 (9/10), 505-506
- Schmeller, D. S., **Gruber, B.**, Bauch, B., Henle, K. (2006): EuMon - Arten- und Lebensraum-Monitoring in Europa *Natursch. Landschaftspl.* 38 (12), 384-385

### 5.3. Monographs, Book Chapters

- Lischke, H., Bolliger, J. and **Seppelt, R.** (2006). Dynamic spatio-temporal landscape models. In: F. Kienast, S. Ghosh and O. Wildi (eds.). A changing world: challenges for landscape research, Dordrecht: Kluwer Academic Publisher. 283-306.
- Haase, A., **Haase, D.**, Fritzsche, A., Kabisch, S. (2006): Reurbanisierung - langfristige Stabilisierung der Kernstadt? *Statistischer Quartalsbericht/ Stadt Leipzig* 1/2006, 16-19

### 5.4. Participation in Conferences

- Haase, D.** (2006; invited keynote lecture): Landscape effects caused by demographic change, IALE-D Annual Conference, 27-29 September 2006, Kiel, Germany.
- S. Kabisch, **Haase, D.**, Haase, A. (2006): Beyond growth – urban development in shrinking cities as a challenge for modelling approaches, iEMSS Annual Conference, 9-13 July 2006, Burlington, US.
- Haase, D.**, Haase, A., Kabisch, S., Bischoff, P. (2006): Monitoring of reurbanisation - appropriateness of approaches and methodological design, EURA European Urban Research Association, 11-16 May, 2006, Warsaw, Poland.
- Haase, D.** (2006): Applicability of social science data for land use transition models and advanced monitoring systems in urban areas, German Institute for Economics DIW, 30 June – 1 July 2006, Berlin, Germany.
- Haase, D.** (2006) - 1<sup>st</sup> lecture: Perforated cities? The development of a household type based model for the improved explanation of declining urban spaces, 2<sup>nd</sup> lecture: Analysing historical maps to approach current environmental problems and landscape planning, Royal geographic Society RGS, 30 August – 1 September 2006, London, UK.
- Haase, D.** (2006; invited lecture): Sub-, De- or Re-urbanisation of landscapes, Seminar 'Ecological Indicators II' of the German Science Foundation, 16-19 May 2006, Villa Vigoni, Italy.
- Haase, D.**, Walz, U., Neubert, M., Rosenberg, M. (2006; invited lecture): Changes to Central European urbanised landscapes – analysing historical maps to approach current environmental issues, ICHG, 20-24 August 2006, Hamburg, Germany.
- Haase, D.** (2006; invited lecture): Modelling to support ideas of sustainable urban development, University of Salzburg, 11 December 2006, Salzburg, Austria.
- Haase, D.** (2006; invited lecture): Effects of demographic change on landscapes and nature protection, Bund Naturschutz Bayern, 16 November 2006, Rosenheim, Germany.
- Samaniego, L.** EGU General Assembly 2006 "Simulation of the Impacts of Land Use/Cover and Climatic Changes on Low Flow Characteristics at the Mesoscale," 04. April 2006, Vienna.
- Samaniego, L.** 3rd International Symposium on Integrated Water Resources Management "Exploratory Modelling applied to Integrated Water Resources Management," IAHS, Universität Bochum, 28. September 2006,
- Samaniego, L.** AGU Fall Meeting, "Finding an Appropriate Similarity Measure for Catchment Characterization" San Francisco, CA. 11-15. Dezember 2006, (Poster Presentation)
- Schneider, C.:** Symposium "The Role of Forests and Forest Management in the Water Cycle," 27.-30. November 2006, Dresden.

- Steinert, M.** (2006), Basisabflussseparation - mit einer festen Rezessionskonstante?, AG Hydrologische Modellierung – 4.Frühjahrstreffen, 18.-19. Mai 2006, Potsdam, (19.05.2006)
- Steinert M.** (2006), Überprüfung von Verfahren zur Bewertung der Retentionsfunktion am Beispiel des Einzugsgebiets der Oberen Ems, Vortrag zur Verleihung des Preises der Geographischen Gesellschaft zu Leipzig e.V. 2006, Leipzig, (30.10.2006)
- Schmidt, G., **M. Volk** (2006): Effects of the input data resolution on SWAT simulations - A case study at the Ems River Basin (Northwestern Germany). - In: Srinivasan, R., J. Jacobs, D. Day & K. Abbaspour (Eds., 2006): 3rd International SWAT Conference Proceedings, Zürich. [Conference Book](#): 241-250.
- Volk, M.**, J.G. Arnold, P.M. Allen, P.-Y. Chen (2006): Towards a process-oriented HRU-concept in SWAT: Catchment-related control on base flow and storage of Landscape units in medium to large river basins. – In: Srinivasan, R., J. Jacobs, D. Day & K. Abbaspour (Eds., 2006): 3rd International SWAT Conference Proceedings, Zürich. [Conference Book](#): 159-168.
- Volk, M.** (2006): Model application in mesoscale river basin analysis and management – present state, problems and challenges. – Forest and Water Management in Central and Eastern Europe. Transnational land-use management and monitoring. DynamicDATA EU25+ Regional Workshop I, March 30-31, 2006, Dresden, TU Dresden (funded by BMBF and International Bureau).
- Volk, M.** (2006): Model application in mesoscale river basin analysis and management – Potential contributions to DynamicData EU25+. – DynamicDATA EU25+ Regional Workshop II, September 07-08, 2006, Zrece, Slovenia (funded by BMBF and International Bureau).
- Volk, M.** (2006): River basin modelling and management: Current methods, available data and future directions. – DynamicDATA EU25+ Final Meeting, November 27, 2006, Prague, Czech Republic, Czech University of Agriculture Prague, Dresden University of Technology (funded by BMBF and International Bureau).
- Volk, M.**, J.G. Arnold, P.M. Allen & P.-Y. Chen (2006): Towards a process-oriented HRU-concept in SWAT: Catchment-related control on base flow and storage of Landscape units in medium to large river basins. – In: Srinivasan, R., J. Jacobs, D. Day & K. Abbaspour (Eds., 2006): 3rd International SWAT Conference Proceedings, Zürich. [Conference Book](#): 159-168.

## 5.5. Workshops and Symposia

- Joint Indo-German Research Workshop: Will competition for land and water hinder energy development in India? National Institute of Advanced Studies, Indian Institute of Science Campus (NIAS), Bangalore. **Seppelt, R.** “Modeling methods for assessing local/regional impacts of energy development on water and land resources”. March 7-8, 2006, Bagalore, Indien, Invitation by NIAS
- Session: ‘Beyond growth? Integrated models, simulations and scenarios of the future shape urban-rural regions’ Burlington, US, 10 July 2006, organized by **Dagmar Haase** and **Ralf Seppelt** (UFZ).
- Session S9: "Scale-elevators": Scaling indicators and Scaling Issues in Quantitative Analysis of Land and Resource Management, organized by **Martin Volk** (UFZ), Herman van Keulen, Frank Ewert; 3rd Biennial meeting of the International Environmental

Modelling and Software Society, July 9-13, 2006 The Wyndham Hotel, Burlington, Vermont, USA

“2006 Soil and Water Assessment Tool Model Developers Workshop”; Responsible for Group 1 "Landscape Processes": Fred Hattermann (PIK), **Martin Volk** (UFZ), October 3-6 2006, PIK Potsdam, Germany

FLOODMed Partner's General Assembly at UFZ Leipzig, KUBUS, October 23, 2006, and Workshop on “Monitoring Network Standards”, Action 6.2, FLOODMed-Project at UFZ Leipzig, KUBUS, October 24, 2006, organized by **Martin Volk** and **Martin Steinert** (UFZ)

Kick-off workshop “Integrated catchment management and risk- based resource allocation in urban and peri-urban areas,” Uni-Stuttgart 19. Dezember 2006, **Luis Samaniego**

Workshop "GIS for management of soil degradation and desertification" at the Instituto Venezolano de Investigaciones Cientificas - Venezuelan Institute for Scientific Research -I.V.I.C.- Caracas, VENEZUELA, 30.10.-08.11.2006, Organized by Dr. Jürgen Berlekamp (University of Osnabrück) and **Sven Lautenbach**

## 5.6. Press

**Haase, D.:** with **Kieler Tageblatt** on ‘Landscape effects caused by demographic change’ at IALE-D Annual Conference, 27-29 September 2006, Kiel, Germany.

## 6. Visiting Scientists & Guests

**Dr. Alexander Löw** University of Munich, Faculty for Geoscience., Department Geography, Geschwister-Scholl-Platz1, 80539 München

**Prof. Willem Bouten** Instituut voor Biodiversiteit en Ecosysteem Dynamica, Nieuwe Achtergracht 166, 1018 WV Amsterdam. Email: [W.Bouten@uva.nl](mailto:W.Bouten@uva.nl)

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**Dr. Olaf Cirpka** Swiss Federal Institute of Aquatic Science & Technology (EAWAG) Department of Water Resources and Drinking Water Überlandstr. 133 8600 Dübendorf. Email: [Olaf.Cirpka@EAWAG.CH](mailto:Olaf.Cirpka@EAWAG.CH)

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**Prof. Dr. Hartmut Wittenberg** (11.-12.05.), Hydrology and Water management, University  
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Email: [r-srinivasan@tamu.edu](mailto:r-srinivasan@tamu.edu)

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**Ruth McKeown** (02.10.), University of Saskatchewan, Canada, Email:  
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**Dr. Piotr Magnuszewski** (11.-12.10), Institute of Physics, Wrocław University of  
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**Dr. Jan Sendzimir** (11.-12.10.), International Institute for Applied Systems Analysis  
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## 7. Memberships in Committees, Review Activities

**Sabine Attinger:**

- Paper reviews for Water Resources Research, Hydrological Sciences, Advances in Water Resources, Journal of Computational Physics.

**Justin Calabrese:**

- Paper reviews for American Naturalist, Biological Conservation, and Ecological Modelling

**Carsten F. Dormann:**

- Project reviews for Schweizer Nationalfond (SNF),

- Paper reviews: Journal of Applied Ecology, Journal of Ecology, Oecologia, Proceedings of the Royal Society of London B

**Dagmar Haase:** Article Reviews for Landscape Online, Landscape and Urban Planning, Archives for Agronomy and Soil Sciences, Landscape Ecology.

**Karsten Schulz:**

- Project reviews for the German Research Foundation DFG (1);
- Article reviews for Hydrology and Earth Sciences, Ecological Modelling, Boundary Layer Meteorology and Water Resources Research

**Ralf Seppelt:**

- Associate Editor of Environmental Modelling and Software, Elsevier,
- Member of Review Panel of BIOTA Projects, Federal Ministry of Education and Research
- Project Reviews for ETH Zurich
- Vice President of International Society for Environmental Modelling and Software
- Reviews for Ph.-D. Programm at Environmental Protection Agency, Ireland.
- Paper Reviews for Journals: Ecological Indicators, Environmental Modelling & Software, Ecography, Ecological Modelling

**Martin Volk:**

- Member of the “Executive Board” of the European Network “Landscape Europe”,
- Member of the Scientific Commission of the International SWAT-Conferences,
- Reviews for Ecological Indicators, Ecological Modelling, Environmental Modelling and Software, Hydrological Sciences Journal, Journal of Hydrology, Water Resources Management.

**Luis Samaniego:**

- Reviews for Water Resources Research (2).

## 8. Teaching Activities

### 8.1. University of Leipzig

**Carsten Dormann:** Practical Course "Statistical Analysis of Ecological Data" (MSc Ecology studies, Botanical Institute); Praktical Course “Ecological Field Methods” (with PD Dr. Martin Freiberg, Botanical Institute)

### 8.2. University Jena

**Sabine Attinger:** Lecture on “Introduction into Modelling Groundwater”, “Case Studies“

### 8.3. Martin-Luther University of Halle-Wittenberg

**Dagmar Haase:** Seminar on Physical Geography, Seminar on Ecosystem processes modeling (Martin-Luther-University Halle-Witterberg)

**Ralf Seppelt:** Lecture and Seminar on “Introduction in Modelling and Simulation of Ecosystem processes”

**Martin Volk:** Seminar in Physical Geography on "Hydrological control on processes in river basins"

#### **8.4. University of Potsdam**

**Dagmar Haase:** Lecture "Applications in Landscape Ecology"(MSc Geoecology studies, Geoecological Institute)

#### **8.5. International**

**Sabine Attinger:** International Summer Course, August, Utrecht