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Chinese Water Systems

Volume 2: Managing Water Resources for Urban Catchments: Chaohu

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Foreword

China's rapid economic development—coupled with strong population growth, increasing urbanization, and improved living standards—has led to an increasing burden on existing water resources in recent years. The supply and disposal structures were often unable to keep pace with growth, which among other things led to severe water pollution.

Germany has mastered similar water pollution challenges in its past. The use of modern environmental protection technologies and sustainable water management has resulted in globally recognized quality in water protection and drinking water quality. Experiences from two decades of intensive collaboration between research and industry can serve as an example for other nations to sustainably strengthen and improve environmental protection, especially in the area of vital aquatic ecosystems.

Sustainable water research has now become an important topic in the emerging economic nation of China. The Urban Water Resource Management (UWRM)-project presented here was able to analyze the current state of a Chinese urban and lake catchment with its practically applied methods and models and present treatment options. It not only raises public awareness of the issue but also brings together the representatives of international research institutes, local authorities, and global companies. The existing German-Chinese cooperation in research and industry should also be further expanded in the future in order to work effectively with current solutions to environmental problems.

Within this UWRM-project, the German nonprofit association OpenGeoSys e.V. is supporting the compilation of all project results in a compendium, and making it available to all interested parties. The purpose of the OGS e.V. is the promotion of science and research for computer-aided simulation in the environmental science and geotechnology. Those results often serve as a bridge to transfer knowledge between science, research, and the public. In addition, the association tries to

promote other national nonprofit corporations in the field of science and research in ideal and financial ways. The purpose of the association is achieved by carrying out training courses, publicity work, advertising, and in particular by the production of visual material and publications like this book.

Leipzig, Germany
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Thomas Kalbacher

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Fig. 1 The “Urban Catchments”-project is funded by Federal Ministry of Education and Research of Germany

Fig. 2 Overview of all project partners

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Acronyms

ACLERP	Anhui Chao Lake Environmental Rehabilitation Project
ADaM	Aachener Daphnien Medium
ADB	Asian Development Bank
AEPB	Anhui Environmental Protection Bureau
AMC	AMC-Analytik & Messtechnik GmbH Chemnitz
AWATOS	Autarkic Water Observation System
bbe	bbe Moldaenke GmbH
BMBF	Bundesministerium für Bildung und Forschung, Deutschland, German Federal Ministry of Education and Research
cap	Capita
CAS-HYB	Chinese Academy of Sciences, Institute of Hydrobiology
CAWR	Centre for Advanced Water Research
CD	Capacity Development
Cd	Cadmium
CLIENT	International Partnerships for Sustainable Technologies and Services for Climate Protection and the Environment
CLMA	Chao Lake Management Authority
Co	Cobalt
Cr	Chromium
Cu	Copper
CRAES	Chinese Research Academy for Environment and Science
DDT	Dichlorodiphenyltrichloroethane
DDX	DDT-related contaminants
DEM	Digital elevation model
DFG	Deutsche Forschungsgemeinschaft, German Research Foundation
DiMoN	Application tool for statistical disaggregation of precipitation over time
DLR	Deutsches Zentrum für Luft- und Raumfahrt
DMP	Data Management Portal
DSM	Digital surface model

DWA	German Association for Water, Wastewater and Waste
DWSA	Drinking water source area
EC50	Half maximal effective concentration
ECMWF	European Centre for Medium-Range Weather Forecasts
EIS	Environmental Information System
ENVINF	Environmental Informatics
ESA CCI	European Space Agency Climate Change Initiative
EU-WFD	EU Water Framework Directive
EXTRAN	Explicit hydrodynamic transport model
FOG	Areas and objects in GIS
FTP	File Transfer Protocol
FYP	Five Year Plan
GDP	Gross domestic product
GETM	General Estuarine Transport Model
GIS	Geographical Information System
GMSH	Finite element mesh generator
GUI	Graphical user interface
Hg	Mercury
HYSTEM	Hydrological runoff model for urban drainage
HOCs	Hydrophobic organic contaminants
IARC	International Agency for Research on Cancer
IDW	Inverse distance weighting
IHB-CAS	Institute of Hydrobiology, Chinese Academy of Sciences
IOW	Leibniz Institute for Baltic Sea Research
itwh	Institute for Technical and Scientific Hydrology, Hannover, Germany
KDE	Kernel density estimates
LANDSAT	Multispectral data of the Earth's surface on a global basis
MET	Metoprolol
MIP	Multum in parvo, meaning "much in little"
Mn	Manganese
MoST	Ministry of Science and Technology of PR China
NaN	Not a number
NetCDF	Network Common Data Form
Ni	Nickel
NIGLAS	Nanjing Institute of Geography & Limnology, Chinese Academy of Sciences
NSE	Nash-Sutcliffe Efficiency
NSFC	National Natural Science Foundation of China
OGS	OpenGeoSys
OGS DE	OpenGeoSys Data Explorer
PAH	Polycyclic aromatic hydrocarbon
PCP	Pentachlorphenol
POP	Persistent organic pollutant
PRC	People's Republic of China

QA/QC	Quality assurance and quality control
QGIS	Quantum GIS
R&D project	Research and Development project
RECEIS	Research Centre for Environmental Information Science
RMSE	Root Mean Square Error
RSR	RMSE-observation standard deviation ratio
SDI-12	Serial Digital Interface at 1200 baud
SIGN	Sino-German Water Supply Network
SINOWATER	Good Water Governance-Project
SME	Small and medium-sized enterprise
SRTM	Shuttle Radar Topography Mission
SWMM	Storm Water Management Model
TAN	Total ammonia nitrogen
TBBPA	Tetrabromobisphenol
THMC	Thermo-Hydro-Mechanical-Chemical processes
THMs	Trihalmethanes
TI	Toxic index
Ti	Titanium
TIN	Triangulated irregular network
TU	Technische Universität
TUD	Technische Universität Dresden
TUD-HYB	Technische Universität Dresden, Department of Hydrosciences, Institute of Hydrobiology
TUD-SWW	Technische Universität Dresden, Department of Hydrosciences, Institute for Urban and Industrial Water Management
TVD	Total variation diminishing
UC	"Urban Catchments"-project
UFZ	Helmholtz-Zentrum für Umweltforschung
UV	Ultraviolet
UV-A	Ultraviolet radiation with a range of 315–380 nanometres
UV-LED	Ultraviolet light emitting diode
UWRM	Urban Water Resources Management
V	Vanadium
VGE	Virtual Geographic Environment
VR	Virtual reality
VTK	Visualization Toolkit Format
WISUTEC	WISUTEC Umwelttechnik GmbH
WKDV	Wissenschaftliche und Kaufmännische Datenverarbeitung, UFZ
WRF	Weather Research & Forecast Model
WWI	Waste Water Infrastructure
ZEBEV	Time coefficient method