



## AUSTRIAN NATIONAL COMMITTEE FOR IHP

Summary Report for the period  
July 2006 – May 2008

Austrian Academy of Sciences  
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Vienna  
May 2008

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The Austrian National Committee for IHP (in Austria called “Hydrologie Österreichs”) was already established in 1980 and is acting under the auspices of the Austrian Academy of Sciences. The chairman of the Committee is appointed by the Academy.

## STRUCTURE OF THE AUSTRIAN NATIONAL COMMITTEE

Chairman: Prof. Dr. Dieter Gutknecht, Vienna University of Technology, Institute for Hydraulics and Water Resources Engineering, Karlsplatz 13, A-1040 Vienna, Austria. Phone: +43-58801-22301; [gutknecht@hydro.tuwien.ac.at](mailto:gutknecht@hydro.tuwien.ac.at)

Secretary: Dr. Günter KÖCK, Austrian Academy of Sciences, National and International Research Programmes, Dr. Ignaz Seipel-Platz 2, A-1010 Vienna, Tel. ++43 1 51581-1271, Fax: ++43 1 51581-1275, e-mail: [guenter.koeck@oeaw.ac.at](mailto:guenter.koeck@oeaw.ac.at)

Members of the Austrian Academy of Sciences:	Prof. Dr. Michael Hantel Prof. Dr. Helmut Pichler Prof. Dr. Peter Steinhauser Prof. Dr. Dieter Gutknecht
The Ministry of Science and Research:	MR Dr. Stefan Kolarsky
The Ministry of Foreign Affairs:	MR Dr. Frieda Luggauer-Gollner
The Ministry of Economics and Labour:	Dr. Robert Holnsteiner
The Ministry of Agriculture, Forestry, Environment and Water Management:	MR Dipl.-Ing Dr. Reinhold Godina
Austrian Commission for UNESCO:	Secretary General Mag. Gabriele Eschig
Austrian Geological Survey:	Dr. Gerhard Letouze
Central Institute for Meteorology and Geodynamics:	Director Dr. Fritz Neuwirth
Network Austrian provinces	Dipl.-Ing. Gerald Lindner

## FUNDING:

The funding for IGCP, provided by the Austrian Ministry for Science and Research, is currently EURO 200.000,- (= approx. US\$ 319.000,-) per year. This funding is entirely used for research projects.

## NATIONAL COMMITTEE MEETINGS

In the period from July 2006 to May 2008 six meetings of the Austrian National Committee for IGCP took place.

## WORKSHOP:

In January 2008 the Austrian National Committee for IHP has organized a workshop to discuss its future research strategies. This workshop attracted strong participation from the national hydrology research community and is the base for the compilation of the upcoming report “State of the Art in Austrian Hydrology”. For the period of 2008 – 2011 the Austrian National IHP-Committee will focus theme-supported funding for future

research predominantly on the field "Hydrological processes in a changing environment with special emphasis on predictability".

## **LIST OF PROJECTS:**

### ***Multi-data precipitation analysis and prediction***

Project manager: L. SKODA, University of Vienna

This project is running on the amalgamation of several precipitation data sources for optimal precipitation analysis and prediction in Austria with very high spatial (1 km) and temporal (1h) resolution. The development of methods for

- (1) near real-time Bayesian-type combination of multiple sources of precipitation information involving rain stations, radar, satellite and models; and for
- (2) multi-scale realization of precipitation field ensembles conditioned on the available information.

The results will improve the precipitation input to hydrological models especially in remote catchments. Conditioned ensembles of precipitation fields allow predictability studies.

### ***Transformation of observed and computed ice- and snowmelt data to ungauged basins (SNOWTRANS)***

Project manager: H. HOLZMANN, University of Natural Resources and Applied Life Sciences Vienna

The project SNOWTRANS was funded by the Austrian Academy of Sciences (ÖAW) for the period 2004 to 2007. It aimed to deliver a better understanding of high Alpine snow- and ice melt processes by means of detailed field measurements and modelling results from a well observed highly glacierized test basin. As a second major task of the SNOWTRANS project various sufficiently calibrated snow- and ice melt models were tested for their applicability for sparsely gauged or ungauged basins.

A series of intensive field observation campaigns were carried out in the Sonnblick test basin including snow course observations (depth, density, snow temperature), discharge observations during the summer period (May to November), glacier monitoring (ice thickness, area, depletion) and meteorological measurements, where most of the latter were provided by the observatory at the mount Sonnblick peak. These data formed a good base to apply different types of hydrological water balance models, where both index based conceptual model (e.g. PREVAH, BOKU-model) as well as physically based concepts (ALPINE3D energy balance model) were used. The focus of the model evaluation was on the reliable estimation of the discharge including the diurnal variation, the correct estimation of snow accumulation and depletion patterns and the correct estimation of the glacier mass balance. The accumulated runoff at the basin outlet was reliably modelled by all concepts. The diurnal variation in discharge during the summer periods was satisfactory simulated by the mixed index approaches considering radiation, where the simple temperature index approach could not reproduce the daily variability. Snow layers exhibited to retain rainfall or melt water considerably, where ice melt rapidly contributed to runoff. The conceptual models exhibited some mass errors in snow accumulation due to the wind drift, where ALPINE3D includes a couple of sub-models capturing snow drift (initialized from turbulent kinetic energy of the mesoscale model ARPS). The results and parameters of

the test basin could be transferred to some local basins within a distance of approx. 100 km.

### ***Aerogeophysics for spatial distribution of soil (GeoPUB)***

Project manager: W. KOLLMANN, Austrian Geological Survey Vienna

In the proposed project a detailed investigation in two small areas is planned. Most of the datasets are already available and they will be incorporated into a GIS-System and a ground-truthing of the airborne measurements will be done. The existing software for calculating soil moisture will be improved and a runoff and soil moisture model will be developed. In addition there is an irrigation experiment planned and it will be used to investigate the temporal change of soil moisture. This project has two aims. The first is to examine how apparent spatial statistical properties of soil moisture change with the measurement scale. The second is to examine whether standard geostatistical techniques are applicable to organised soil moisture patterns. The main feature of this project is that we use in-situ soil moisture data together with a very high spatial resolution by airborne mapping. In a second step these results will be transferred to a different area followed by ground measurements and an aerogeophysical survey at different times. Building up on these results it should be clear, which demand on information is necessary to model soil moisture and runoff and how good the quality of this information has to be. A research on the available and future spaceborne measurement platforms will be done together with a cost benefit analysis including possible alternatives like helicopter, fixed wing or unmanned aerial vehicles.

### ***Spatial and temporal dynamics of soil moisture in ungauged basins***

Project manager: G. BLÖSCHL, Vienna University of Technology

The aim of this project is to identify methods of estimating the space-time dynamics of hydrologically relevant soil moisture for Austrian conditions with a focus on catchments without runoff measurements. The project idea is to combine two sources of information on soil moisture - hydrological models and scatterometer satellite data. The rationale behind this combination is that even though both sources are associated with significant uncertainty it is their combination that helps reduce the uncertainty of the integrated estimates because of the different error structures of the two types of estimates. Estimation of soil moisture for ungauged catchments (i.e. without runoff data) takes advantage of the simulations of the hydrological model and the scatterometer data that extend over the ungauged catchments. The methods are tested for Austrian catchments and their predictive uncertainty is assessed.

## **PUBLICATIONS:**

In order to increase both the scientific output and public access to the results of projects financed by the ÖAW research programmes, the option of online publication (including ISBN and DOI) of project reports was introduced in cooperation with Austrian Academy of Sciences Press. To date 16 project reports (accessible by full-text search with all WWW search engines) can be downloaded from the Austrian Academy of Sciences Press homepage (<http://epub.oeaw.ac.at/forschungsprogramme>). Among these publications one report contributing to IHP shall be highlighted:

*Holzmann, H., W. Schöner, G. Koboltschnig, Ch. Kroisleitner, B. Hynek, R. Mott, G. Michlmayer, W. Schneider, G. Kaiser, M. Vollmann, L. Rauch (2008). SNOWTRANS - Regionalisation of snow- and ice melt processes in the Hohe Tauern mountains in*

*Austria. Austrian Academy of Sciences Press 2008, Vienna, Digital Edition. ISBN: 978-3-7001-3987-4, DOI: 10.1553/snowtrans07, 34 pp.*

The SNOWTRANS-Project has also contributed to:

*Böhm, R., W. Schöner, I. Auer, B. Hynek, C. Kroisleitner, G. Weyss (2007). Gletscher im Klimawandel – Vom Eis der Polargebiete zum Goldbergkees in den Hohen Tauern. Zentralanstalt für Meteorologie und geodynamik, Wien, ISBN 978-3-200-01013-0, 111 pp.*

Vienna, May 2008/Dr. Köck