Questionnaire

Summary of the main activities of a scientific Organisation of the Slovak Academy of Sciences

Period: January 1, 2003 - December 31, 2006

I. Formal information on the assessed Organisation:

1. Legal name and address

Institute of Hydrology Slovak Academy of Sciences
Račianska 75, 831 02 Bratislava, Slovak Republic

2. Executive body of the Organisation and its composition

Directoriat	name	age	years in the position
director	Vlasta Štekauerová, RNDr.,PhD.	58	2004 -
deputy director	Yvetta Velísková, Ing., PhD.	43	2004 -
scientific secretary	Renáta Dulovičová, Ing.	44	2006 -

3. Head of the Scientific Board

RNDr. Pavol Miklánek, PhD.

4. Basic information about the research personnel

i. Number of employees with a university degree (PhD students excluded) engaged in research and development and their full time equivalent work capacity (FTE) in 2003, 2004, 2005, 2006 and average number during the assessment period

ii. Organisation units/departments and their FTE employees with the university degree engaged in research and development

Research staff	2003		2004		2005		2006		average	
	No.	FTE	No.	FTE	No.	FTE	No.	FTE	No.	FTE
organisation in whole	29	27,5	31	29,5	30	29	29	28	29,75	28,5
Department. of soil hydrology	8	7,5	9	8,5	9	9	9	9	8,75	8,5
Department of mountain hydrology	11	10	12	11	11	10	10	9	11	10
Department of surface stream water and ground water interactions	6	6	6	6	6	6	6	6	6	6
Department of lowland hydrology	4	4	4	4	4	4	4	4	4	4
									#DIV/0!	#DIV/0!
									#DIV/0!	#DIV/0!
									#DIV/0!	#DIV/0!
									#DIV/0!	#DIV/0!
									#DIV/0!	#DIV/0!
									#DIV/0!	#DIV/0!

5. Basic information on the funding

i. Total salary budget[1] of the Organisation allocated from the institutional resources of the Slovak Academy of Sciences (SAS) in 2003, 2004, 2005, 2006, and average amount for the assessment period

Salary budget	2003	2004	2005	2006	average
total salary budget (millions of SKK)	9,631	10,884	12,601	12,999	11,529

6. URL of the Organisation's web site

http:/www.ih.savba.sk

II. General information on the research and development activity of the Organisation:

[1] Sum of the brutto salaries without the fund contributions.

1. Mission Statement of the Organisation as presented in its Foundation Charter

The activity of the Institute is oriented to research in groundwater and surface water area and is focused on:

- changes of water balance elements in catchments
- transport processes of water and chemicals in the atmosphere - crop canopy – soil - groundwater system with accent to creation of water storage and water quality
- flow of surface water, groundwater and transported substances
- impact of human activity to hydrological processes, including processes that pollute surface water and groundwater
- changes of hydrological regime of surface and subsurface water caused by expected climatic changes.

The Institute provides advisory services and expert opinions, which are connected with its main activity.

The Institute is accredited for PhD study according to generally valid legal directives.

The Institute publishes scientific and research results in form of periodical and other professional press.

2. Summary of R&D activity pursued by the Organisation during the assessed period, from both national and international aspects and its incorporation in the European Research Area (max. 10 pages)

Specific feature of the Institute of Hydrology, Slovak Academy of Sciences (IH SAS) is, that hydrology as a scientific discipline is based on empirical data acquired in particular region, watershed, locality and results of such investigation can be directly applied at the same site. New knowledge can be reached by quantification and generalisation of empirical data, using modern mathematic and physical tools. Because of regional importance of research data, they should be published at home, in Slovak periodicals and monographs. This way of publication is limiting possibilities of scientists in publishing abroad.

However, Institute is the one and only because it offers complex solution of water management problems in the range of basic research and also tasks for societal practice. It is a modern scientific workplace, which does not deal *separately* with the problems from water management or agriculture or ecology point of view as other departmental institutes.

The scientific work is organized in four departments of Institute: Department of Soil Hydrology, Department of Mountain Hydrology, Department of Lowland Hydrology and Department of Surface Stream Water and Groundwater Interactions.

Those departments together are able to cover the problems of the evaluation of the influence of global changes and anthropogenic activity on water regime of the territory or catchments.

Departments of the Institute cover the following topics:

Department of Soil Hydrology

- Study of water transport processes in the unsaturated porous media, and development of generalized laws governing these processes;
- Methods of determination of the physical characteristics of soils and other porous media, in laboratory and field conditions;
- Study of laws governing the processes of water and matter in non - homogeneous soils and in soils with a multi - modal porosity (soil matrix, macropores of various sorts);
- Monitoring and measurement of characteristics of the water, matter, and energy transport processes, and their modelling;
- Mathematical modelling of the water, matter, and energy transport processes in the soil-plant-atmosphere system (SPAC), with the aim of diagnostics and predicting of regimes of the water, matter, and energy in the SPAC system;
- Evapotranspiration and its components calculation and measurement
- Quantification of the plant properties and its influence on water and solute matter transport in SPAC system
- Methods of measurement and calculation of the quantitative transport characteristics of the water, matter, and energy in the SPAC system;
- Soil water balance in relation to the SPAC system character, and to the anthropogenic activities, oriented to the landscape with an intensive agriculture;
- Influence of long - term changes of the SPAC system character upon the water in soil and in larger hydrological units, and upon consequencies of these changes in water management and agriculture (global climate changes, changes in the land utilization, changes evoked by pedogenesis).
- Areal variability of soil water content, physical and hydrophysical properties of soil, hydropedological mapping using GIS support.

Department of Mountain hydrology

- The basic hydrological processes in the basin scale;
- The formation and interaction of the basic water balance elements;

- Study of spatial and regime characteristics of the hydrological cycle elements in the basin, as runoff characteristics including extreme discharges;
- Spatial distribution of precipitation and evapotranspiration (including its components) in the basin;
- Quantification of the soil water content;
- The study of the hydrological processes in the natural environment with regard to anthropogenic influences and global change;
- Application and development of digital elevation models (DEM) and geographic information systems (GIS) techniques;
- The ecohydrological problems and water quality in the streams.

Department of Lowland Hydrology

- Hydrologic processes in heavy soils with cracks;
- Modelling of soil water regime of East Slovakia Lowland;
- Quantification of water and solute matter transport in regional scale;

Department of Surface Stream Water and Groundwater Interactions.

- Assessment of the trend development and prognosis of the groundwater regime changes in the large regions;
- Assessment of the groundwater and surface stream water regime vulnerability with regard to anthropogenic influences in the region scale;
- Evaluation of the large water constructions impacts on the groundwater regime;
- Creation and application of a physically-based numerical models for solving of water flow in some specific areas;
- Creation and application of numerical transport models for simulation of non-conservative spreading of biological and chemical contaminants in surface water and groundwater
- Development of multidimensional mathematical and numerical models of groundwater flow for simulation of interaction with surface water, eventually interaction with hydraulic structures.

One of priorities of the Institute is education of PhD students. Young people are involved into teams solving complex problems in the framework of projects. We are looking for financial sources to ensure their mobility abroad and supporting their participation at scientific meetings. During the last years some PhD students left untimely, but there is enough candidates for PhD study - of course limited by the SAS funds for this purposes. Three-year duration of PhD study is too short, to allow them to fulfil PhD criteria. The reason is in the character of hydrology as a science: it is semi-empirical discipline in

which data are earned by the field measurements mainly. One season is often not enough to perform necessary measurements. We are trying to solve this problem by employing them on permanent positions with corresponding change of the status of PhD study – the external form, which allows two more years to study.

Active participation of our scientists in education process at universities (Faculty of Civil Engineering, Slovak Technical University Bratislava, and Slovak Agricultural University Nitra) as well as cooperation with another institutions on research projects (Slovak Technical University Bratislava, Slovak Agricultural University Nitra, Technical University Zvolen, Faculty of Natural Sciences Comenius University Bratislava) allows to choose young people during their graduate education.

Young scientists (under 35) are regularly participating on the Young hydrologists conference, organized by the Slovak Committee of Hydrology and Slovak Hydrometeorological Institute. Three awards can be given to young people from Slovak and Czech Republic every year. Young researchers from the Institute of Hydrology are being regularly awarded.

Institute of Hydrology has three remote establishments: Hydrological Research Base in Michalovce (550km from Bratislava), Experimental Hydrological Base in Liptovský Mikuláš (260km from Bratislava) and Field Hydrological Laboratory in Považská Bystrica (170km from Bratislava).

During the years 2003-2006, the employees of the Institute participated on the projects of following national granting schemes: APVV, VEGA and MVTS. International activity is notified directly in other parts of questionnaire, where commercial activity results can be also seen.

In the following part of this document some important results of the institute are listed.

Basic Research

2003

The distribution of groundwater salinity characteristics (electrical conductivity and sodium adsorption ratio) was obtained, and based on the results, it reports on the evaluation of the salinity and sodicity hazard in the fluctuation processes of the shallow mineralised groundwater, or in regime processes if such groundwater is utilized for irrigation. The issue was studied for the soil-water environment in the south-east of the Danube Lowlands. The measured data and data taken from archives were processed in the form of graphical attachments – maps, by means of the kriging interpolation method. Groundwater in the area in question is classified as highly mineralized water with a large degree of danger of salinization of the subsurface soil environment. The average annual

values of groundwater electrical conductivity ranged from 600 μS/cm to 2100 μS/cm in the examined period. The sodium adsorption ratio values ranging from 1,7 to 22,0 and indicate low, medium to high sodium salinization of the environment due to groundwater. The distribution of electrical conductivity and sodium adsorption ratio on the regional scale may serve as a reference basis for the evaluation of changes in the groundwater salinity after 1994. (Project VEGA - 2/3049/23)

2004

The valuation of existing relationships (by various investigators) for determination of the longitudinal dispersion coefficient DL was done. These relationships come out of laboratory and field experiments or theoretical analysis of dispersion phenomenon in open channels. There was found out that the results of equations are values of the longitudinal dispersion coefficient, which vary widely also for the same flow conditions (described by different hydraulic characteristics – depth, width, shear velocity, hydraulic radius, bottom slope, discharge, flow velocity). It induces a decrease of safety degree of their applications. Each user would carefully evaluate conditions of estimation and using before application of each relationship. The values of the longitudinal dispersion coefficient DL, determined by empirical relation that comes out of laboratory measurements, are lower in majority than values obtained from field measurements (except McQuivey-Keefer and Fischer relationship). It is necessary for application of relationships based on so called Fischer's integral to keep strictly to conditions which were used for approximation of velocity and depth distribution along the channel width. There were specified also the values of transverse dispersion coefficient at a segment of upper part of the Hron River, in which ecological accidents are often occurred. The values of this coefficient for various discharges (so called non-dimensional coefficient of transverse dispersion) were determined, too. The obtained knowledge on the subject of dispersion and its coefficients can contribute to successful and correct solutions of mass and contaminant transport problems in surface water. (Project: VEGA - 2/2022/22).

2005

The effectiveness of kaolinite, illite, Na- and Ca-montmorillonite in alleviating water repellency for a simple model soil material of known composition before and after wetting and drying phases was evaluated. Sand was rendered water repellent by adding 10 and 30gkg^{-1} stearic acid followed by adding different amounts (1, 2 & 3 mass %) of respective clays. Treated and untreated control sand were wetted and exposed to prolonged drying phase at 50°C to simulate the effects of wetting followed by drying under a hot spell. The persistence of water repellency was measured with the water drop penetration time (WDPT) test. During the wetting/drying cycle, the control samples (stearic acid treated

sand) and clay treated sands behaved in a fashion typically observed in water repellent soils: they were wettable above and water repellent below a critical water content, with repellency persistence (WDPT) increasing with decreasing water content. Kaolinite and Na-montmorillonite were found to be the only clay minerals able to lower the persistence of repellency of the stearic acid sand. Ca-montmorillonite and illite addition increased the persistence of water repellency of the stearic acid sand. The difference between Ca- and Na-montmorillonite ability to alleviate water repellency is explained by the differences in inter-particle forces in the clay–exchangeable cation–water system. The net effect of clay mineral addition is dependent on the amount of Ca2+ ions occurring at the surface of clay minerals. Pools of available (exchangeable) calcium decrease in the order as follows: Ca-montmorillonite >> ilite >> Na-montmorillonite kaolinite. (Project: VEGA - 2/3032/23).

2006

After 13-years of relatively dry period 1980–1993, the wetter period occurred in the Central Europe and particularly in the Danube river basin seconded by annual occurrence of the floods. The goal of the study was to identify the reasons of the floods and droughts, and if and when the multiannual periods of important floods and droughts occur in the region. Seeking of the answer was based on firm analysis of the historical data series of runoff and related phenomena (e.g. natural cyclicity of hydrological series, occurrence of atmospheric phenomena as ENSO (El Niño Southern Oscillation), NAO (North Atlantic Oscillation or QBO (Quasi Biannual Oscillation). These phenomena were studied not only in the region of Slovakia (or Europe), but the teleconnection of the climatic and hydrologic phenomena all around the world was taken into account. (Project APVT - 51-017804).

The method on diagnosis of water deficit for plants was developed from seasonal course of soil water storage and hydrolimits. The method needs to estimate water storage during hydrological year and to measure basic hydrophysical characteristics. Water storage can be obtained by monitoring and also by process of simulation by mathematical models. Method was verified at different localities near the Danube for agricultural cultivated soils and forest ecosystems, too. The method was used for quantification of extreme meteorological phenomenon impact on water storage using mathematical model in near future during year 2010 and in years 2030 and 2075, too. Climate parameters for time horizons 2010, 2030 and 2075 were modified from climate scenarios CCCM2000 and GISS98. (Project: VEGA - 2/5018/05).

The method of estimation of the critical soil water content of limited availability for plants was developed. This characteristic is important because it is followed by the biomass production decrease, and its estimation allows scheduling of irrigation and drainage

activities, without biomass production decrease. Currently, as a criterion of soil water regimen control is used so called „ soil water content of decreased soil water availability for plants“, which is empirical characteristic and its value is not based physically and physiologically. Proposed new method is based on empirically proved linear relationship between biomass production rate (yield) and seasonal transpiration total of particular canopy. This linearity is generally valid, but the particular relationship is valid for given plant, soil and agrotechnic conditions. From it follows, that maximum yield can be reached under maximum transpiration total; decrease of transpiration total below the potential transpiration leads to the biomass production decrease. The „critical“ soil water content below which transpiration rate is starting to decrease was denoted as „critical soil water content of limited availability for plants“. Proposed method can be applied to soil water regime optimisation and was verified on site with maize canopy. (Project: VEGA - 2/4066/04).

Results of International Projects

2003

Pedotransfer functions were developed to estimate the soil water retention curves for Rye Island. Multiple regression analysis was used for estimating nine statistical relationships in order to predict the water retention curves. Texture and bulk density were used as predictors. Pedotransfer functions were verified on another set of measured water retention curves from the same territory as well as on soil water retention curves determined for soil of the Szigetkoz region in Hungary. A good agreement was found between the calculated and measured soil water retention curves for the Slovakian soils, while somewhat poorer estimates could be given for Hungarian soils. (Agreement about Cooperation with the Institute for Soil Science and Agricultural Chemistry of HAS, Budapest, Hungary. Theme 1: Hydrophysical characteristics estimation – using pedotransfer functions – of soils, especially for using mathematical modeling for simulation of the soil water regime.)

2004

The effectiveness of kaolinite, illite, Na- and Ca-montmorillonite in alleviating water repellency was evaluated for a simple model soil material (sand covered with stearic acid) under conditions of climate change. The model water repellent material was exposed to wetting and prolonged drying phase (the latter at 50°C) to simulate the impact of both wet and hot dry spell on the persistence of water repellency. The temperature of 50°C was chosen to represent conditions that may commonly be reached in some agricultural regions at the surface of a bare soil during a hot summer. It should be

mentioned that both the frequency and intensity of heavy rains following hot dry spells increase as a result of climate change. While kaolinite and Na-montmorillonite addition resulted in a reduction in the persistence of water repellency of the stearic acid sand, Ca-montmorillonite and illite addition increased the persistence of water repellency of the stearic acid sand. (Slovak-Spanish Project 2004SK0003).

2005

Within the bounds of project tasks we have participated in snow cover database creation by delivering selected data from the two catchments in Western Tatra and Low Tatra mountains. Measurements of several snow characteristics (snow depth, snow water equivalent, temperature and structure) were done in Western Tatra mountains and Liptovská kotlina basin. The data will contribute to the geographical classification of snow cover types and to the parameterization scheme of the effective snow characteristics that can improve simulations of the global circulation model used by foreign partners. The analysis of historical measured data (maximum daily discharge) from the upper Hron river and upper Váh river catchments was performed in frame of the Estimates of probability of extreme hydrological events related to snow cover. The objective of the analysis was the quantification of flood frequency related to snowmelt as well as high discharge trend. The analysis indicated that there were no significant changes of the causes of maximum daily discharges in the investigated catchments in time period 1962-2001. The most frequent reason of high discharges was rain falling on snow mainly within smaller catchments. The recent high discharges were neither higher nor more frequent than before. (Project: INTAS 03-51-5296).

2006

Maps of precipitation, evapotranspiration and runoff for the whole Danube river basin (810 000 km^2) and water balance of the regions were calculated in a GIS environment under the framework of the Danube countries cooperation. The maps represent a result of the long-term cooperation of all eighteen Danube countries under the umbrella of the International Hydrological Program of UNESCO. They were published as the stand-alone appendices of the follow-up volume VIII-3 of the hydrological monograph „Danube and Its Basin“.(Project IHP UNESCO).

Results of societal practice

2003

The Water Framework Directive (WFD) 2000/60/EC of the European Parliament and the Council was adopted in October 2000. The directive gives the framework for the Union for the water quality and protection policy. One of the WFD measures is to evaluate the

long-term development of anthropogenic impacts on surface and groundwater in Slovakia. Institute of Hydrology SAS developed a project Method for evaluation of the long-term trends of surface and groundwater quality in Slovakia for implementation of the EU WFD in 2003. The method will be implemented in hydrological practice in Slovakia and it gives the guidance how to evaluate the water quality development of Slovak rivers, as well as of groundwater. The method is based on requirements of the Directive 2000/60/EC and the existing water quality data in the database of the Slovak Hydrometeorological Institute. The proposed method of the trend identification are demonstrated on data of several stations in Hron basin and Banská Bystrica region. (User: Slovak Hydrometeorological Institute).

2004

In connection to the project “Evaluation of climatic changes influences on crop production with stress on agricultural development” (solved in cooperation with the Regional Research Institute of Agroecology, Michalovce), water storage was monitored and evaluated in aeration zone of three representative soils in East Slovakia Lowland (ESL). The knowledge basis was extended with characteristics, leading to building up a database to be used for simulation of water regime of heavy soils in the ESL. (User: Regional Research Institute of Agriecology Michalovce).

2005

Influence of landuse changes on snow accumulation and snow melt and flood events. Solving of the possible influence of landuse change on snow accumulation and snowmelt as well as flood event was called by praxis. It was related to the professional and public discussion induced by wind calamity in High Tatra mountains on 19.11.2004. Modelling of runoff changes in the upper Poprad catchment after the wind calamity proved that the influence of calamity was not dramatic from the point of view of flood control. It corresponds with the published knowledge of landuse changes influence on runoff regime. This conclusion was supported by the real evolution of hydrological situation in 2005. In spite of unusually rich year in snow and rainy summer month no exceptional flood events occurred in 2005 in the upper Poprad catchment. Local floods in March 2005 were related to the rapid snowmelt in dominantly agricultural foothills. In spite of weak influence of calamity on flood situation in the whole catchment of upper Poprad river, the necessity of expert approach at damaged vegetation revitalisation is required.

The maps of snow water equivalent distribution were continuously prepared together with the Slovak Hydrometeorological Institute and published at SHMI web site. We proposed the observation sites for the snow depth and snow water equivalent measurements in the High Tatra mountains as the supplement to existing SHMI observation network.

The spatially distributed hydrological mathematical model was calibrated against measured data provided by SHMI. The model was consecutively applied for Poprad river discharge forecast during spring of 2005. We have trained the SHMI staff for model application in flood forecast. (User: Slovak Hydrometeorological Institute).

2006

Proposal of the new guidelines for development of classification schemes of physical and chemical properties of water quality for Slovakia with respect to requirements of the EU Water Framework Directive (2000). The data series 1981 – 2005 of the national surface water quality monitoring network were extracted from the SHMI database. More than 170 000 water quality data entries were statistically processed from both SHMI database and IH SAS experimental basins database. Based on this analysis the „Guidelines“ were developed for 22 selected physical and chemical characteristics of the water quality with respect to the new typology of the surface streams in Slovakia. (User: Slovak Hydrometeorological Institute).

Within the framework of cooperation on solution of the project of arranging the construction of Cyclotron Centrum of the Slovak Republic, an expertise was made to evaluate a cyclotron impact on different environmental elements in its location and adjacent area. The course of soil moisture was monitored and integral water content was quantified in locality of Slovak Metrological Institute Bratislava, where Cyclotron Centrum is build. Monitoring was realized continuously during years 1999-2006. The results obtained during these seven years document retention properties of soil in climate conditions of years 1999-2006. (User: Government of Slovak Republic, Ministry of Environment).

The above-mentioned results represent only part of problems solved at the Institute. Many mathematical models were set up for simulation of transport of water, matter and heat in SPAC (SWATRE, SWAP, HYSWASOR, HYDRUS, HYDRUS –ET, GLOBAL and MOVOREP). Last three ones were developed or particularly developed in cooperation between the Institute of Hydrology and other institutions. HYDRUS –ET (U.S. Salinity Laboratory, Riverside, CA - collaboration) and GLOBAL are very intensively used. The next models which were developed in the Institute, are models INKANS, SKOKY, MODYKRS and MODI (can be used for simulation of surface water flow, pollution transport and interaction between surface water and groundwater), models WBMOD, NLN-Danube and SOLEI (for estimation of discharges, surface runoff and evapotranspiration). All these models are applied for solution of relevant social practice.

More comprehensive review of results can be found in periodicals published by the institute.

International cooperation

The leading role in institute`s international cooperation are long – term co-operations with institutions in Poland, Hungary, Russia and of course with Czech institutions. In the European Union Framework Programs we were successful only once but there were more projects applied. Institute is active in many projects in Europe and abroad.

Colleagues from Europe are visiting us mainly at the occasion of regular scientific meetings. Annually organized International Poster Day is popular in Central Europe. Conference „The influence of anthropogenic activity on water regime of the territory“ was organized simultaneously with Slovak – Czech – Polish seminar Physics of Soil Water in years 2004 and 2006.

Long – lasting informal cooperation was established twelve years ago with USDA ARS George E. Brown, Jr. Salinity Laboratory, Riverside, CA, USA. Products of this cooperation can be found in the list of literature.

Very intense cooperation is with Columbia University New York through Columbia University Seminars. Two common Proceedings were edited from this activity and one institute employee is Associate member and Co-chairman for Central Europe: Czech Republic&Slovak Republic of the Columbia University Seminars.

Institute was main co-organizer of the International IHP UNESCO conference ERB 2002 “Interdisciplinary approaches in small basin hydrology: Monitoring and research”, in Demänovská dolina.

Institute of Agrophysics PAN in Lublin and IH SAS are cooperating in the framework of Centre of Excellence leading by IA PAN.

Two institute fellows participated at the International School of Hydraulics organized by the Centre of Excellence of the Polish Academy of Sciences (Centre for Environmental Engineering and Mechanics) in Gdaňsk in 2004 and 2005. Contacts established during this event will be prolonged and utilised in future.

On behalf of IHP UNESCO Institute of Hydrology was organizer of „International Seminar on GIS and Mapping of water balance elements “ within the framework of Danube countries regional collaboration in 2005.

IH SAS is strategy partner in „The biomass-energy network (Biomass energy consortium) in Gyogyos, Hungary, during 2005 - 2009.

One institute employee is Member of Hungarian Academy Science Committee.

III. Partial indicators of the main activities:

1. Research output

i. List of the selected publications documenting the most important results of basic research. Total number of publications in the whole assessed period should not exceed the average number of the research employees

[1] ŠTEKAUEROVÁ, V., ŠÚTOR, J. 2004. Pedotransfer Functions of the Rye Island - Southwest Slovakia. In In PACHEPSKY, Ya., RAWLS, W.K. eds. Development of Pedotransfer Functions in Soil Hydrology, Development in Soil Science vol. 30, ISBN- 444 51705 7. Amsterdam, Elsevier, 2004, 465-473. (CC)

[2] BURGER, F., ČELKOVÁ, A. 2003. Salinity and sodicity hazard in water flow processes in the soil. In Plant Soil Environ.. 49, no. 7, 2003, 314-320. (CC)

[3] NOVÁK, V., VIDOVIČ, J. 2003. Transpiration and nutrient uptake dynamics in maize /Zea mays L. /. In Ecological Modelling. Elsevier, no. 166, 2003, 99-107. (CC)

[4] PEKÁROVÁ, P., MIKLÁNEK, P., PEKÁR, J. 2003. Spatial and temporal runoff oscillation analysis of the main rivers of the world during the 19th-20th centuries. In J. Hydrol. ISSN 0022-1694, ELSEVIER Science, vol. 274, no. 1, 2003, p. 62-79. (CC)

[5] DLAPA, P., DOER, S., LICHNER, Ľ., ŠÍR, M., TESAŘ, M. 2004. Effect of kaolinite and Ca-montmorillonite on the alleviation of soil water repelency. In In Plant, Soil Environ.. Vol. 50, no. 8, 2004, 358-363. (CC)

[6] MIKLÁNEK, P., PEKÁROVÁ, P., KONÍČEK, A., PEKÁR, J. 2004. Use of a distributed erosion model [AGNPS] for planning small reservoirs in the Upper Torysa basin. In Hydrology and Earth System Sciences. ISSN 1027-5606, Vol. 8, no. 6, 2004, p. 1186-1192. (CC)

[7] BALKOVIČ, J., ORFÁNUS, T., SKALSKÝ, R. 2004. Potential water storage capacity of the root zone of cultural phytocoenoses – a quantification of soil accumulation function. In EKOLÓGIA (Bratislava). Ústav krajinnej ekológie SAV, no. 4, 2004, 393 - 407. (CC)

[8] FARKAS, C., RANDRIAMAMPIANINA, R., MAJERČÁK, J. 2005. Modelling impacts of different climate change scenarios on soil water regime of a mollisol. In Cereal Research Communication. ISSN: 0133-3720, no. 1, 2005, 185-188. (CC)

[9] MITKOVÁ, V., PEKÁROVÁ, P., MIKLÁNEK, P., PEKÁR, J. 2005. Analysis of flood propagation changes in the Kienstock-Bratislava reach of the Danube River. In

Hydrological Sciences Journal. IAHS Press, ISSN 0262-6667, vol. 50, no. 4, 2005, p. 655-668. (CC)

[10] NOVÁK, V., HURTALOVÁ, T., MATEJKA, F. 2005. Predicting the effects of soil water content and soil water potential on transpiration of maize. In In Agric. Water Management. Elsevier, Holandsko, no. 76, 2005, 211 - 223. (CC)

[11] PARAJKA, J., MERZ, R., BLÖSCHL, G. 2005. A comparison of regionalisation methods for catchment model parameters. In Hydrology and Earth System Sciences. EGU, no. 9, 2005, 157-171. (CC)

[12] LICHNER, Ľ., DLAPA, P., DOERR, S., MATAIX-SOLERA, J. 2006. Evaluation of different clay minerals as additives for soil water repellency alleviation. In In Applied Clay Science. Elsevier, ISSN: 0169-1317, 2006, pp. 238-248. (CC)

[13] LICHNER, Ľ., DLAPA, P., ŠÍR, M., ČIPÁKOVÁ, A., HOUŠSKOVÁ, B. FAŠKO, P., NAGY, V. 2006. The fate of cadmium in field soils of the Danubian lowland. In Soil & Tillage Research. Elsevier, ISSN: 0167-1987, 2006, pp. 154-165. (CC)

[14] MERZ, R., BLŐSCHL, G., PARAJKA, J. 2006. Spatio-temporal variability of event runoff coefficients. In Journal of Hydrology. ISSN: 0022-1694, 2006, vol. 331, 2006, s. 591-604. (CC)

[15] MIKULEC, V., STEHLOVA, K. 2006. Application of the climate change scenarios on selected meteorological characteristics for the purpouses of water content course prognosis in time horizons 2010, 2030 and 2075. In Cereal Research Communications. Cereal Research Non-Profit Company, ISSN-0133/3720, 2006, pp. 45-48. (CC)

[16] PARAJKA, J., BLŐSCHL, G. 2006. Validation of MODIS snow cover images over Austria. In Hydrology and Earth System Sciences, ISSN: 1027-5606. EGU, Vol. 10, 2006, pp. 679-689. (CC)

[17] PARAJKA, J., NAEIMI,, V., BLÖSCHL, G., WAGNER, W., MERZ, SCIPAL. K., R. 2006. Assimilating scatterometer soil moisture data into conceptual hydrologic models at the regional scale. In Hydrology and Earth System Sciences, ISSN: 1027-5606. 2006, Vol. 10, 2006, pp 353-368. (CC)

[18] PEKÁROVÁ, P., PEKÁR, J. 2006. Long-term discharge prediction for the Turnu Severin station (the Danube) using a linear autoregressive model. In Hydrological Processes. ISSN: 0885-6087, vol. 20, no. 5, 2006, p. 1217-1228. (CC)

[19] ŠTEKAUEROVÁ, V., NAGY, V. 2006. Course of soil layer water content in agricultural cultivated soil during years 1999 and 2000. In Cereal Research Communications. Cereal Research Non-Profit Company, ISSN-0133/3720, 2006, pp. 287-290. (CC)

[20] ŠÚTOR, J., GOMBOŠ, M. 2006. Volume changes of heavy soils of east Slovakian lowland. In Cereal Research Communications. Cereal Research Non-Profit Company, ISSN-0133/3720, 2006, pp. 299-302. (CC)

[21] TÓTH, T., RISTOLAINEN, A., NAGY, V., KOVÁCS, D., FARKAS,, C. 2006. Measurement of soil electrical properties for the characterization of the conditions of food chain element transport in soils. Part II. classification of management units. In Cereal Research Communications. Cereal Research Non-Profit Company, ISSN-0133/3720, 2006, pp. 163-166. (CC)

[22] VELÍSKOVÁ, Y. 2006. Problem of water pollution and ways of solution. In Cereal Research Communications. Cereal Research Non-Profit Company, ISSN-0133/3720, 2006, pp.101-103. (CC)

[23] DEKKER, L., HALLETT, P., LICHNER, Ľ., NOVÁK, V., ŠÍR, M. 2006. Introduction to biohydrology. In Biologia. ISSN-1335-6372, 61, 2006, Suppl. 19, 2006, S223-S224. (CC)

[24] DUŠEK, J., VOGEL, T., LICHNER, Ľ., ČIPÁKOVÁ, A., DOHNAL, M. 2006. Simulated cadmium transport in macroporous soil during heavy rainstorm using dual-permeability approach. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp. S251-S254. (CC)

[25] HOLKO, L., KOSTKA, Z., LICHNER, Ľ., PÍŠ, V. 2006. Variation of nitrates in runoff from mountain and rural areas. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp. S270-S274. (CC)

[26] MÉSZÁROŠ, I., MIKLÁNEK, P. 2006. Calculation of potential evapotranspiration based on solar radiation income modeling in mountainous areas. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp. S284-S288. (CC)

[27] NOVÁK, V., HAVRILA, J. 2006. Method to estimate the critical soil water content of limited availability for plants. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp.S 289-S293. (CC)

[28] ŠTEKAUEROVÁ, V., NAGY, V., KOTOROVÁ, D. 2006. Soil water regime of agricultural field and forest ecosystems. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp. S300-S304. (CC)

[29] TESAŘ, M., ŠÍR, M., LICHNER, Ľ., ZELENKOVÁ, E. 2006. Influence of vegetation cover on thermal regime of mountainous catchments. In Biologia. ISSN-1335-6372, Vol. 61, Suppl. 19, 2006, pp. S311-S314. (CC)

ii. List of monographs/books published abroad

A. List of monograph/book chapters published abroad

[1] NOVÁK, V. 2003. Kinetics of nutrient ions uptake from soil by corn canopy. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Hungarian Academy of Sciences, Ed. G. Halasi-Kun. Vol. XXXIV, ISBN 963 9052 31 0, 2003, 193-206.

[2] ŠTEKAUEROVÁ, V., NAGY, V. 2003. Influence of climate conditions on security necessary water for vegetation in various ecosystems. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Hungarian Academy of Sciences, Ed. G. Halasi-Kun. Vol. XXXIV, ISBN 963 9052 31 0, 2003, 206-219.

[3] ŠÚTOR, J., MAJERČÁK, J., ŠTEKAUEROVÁ, V. 2003. Quantificatioín of water store in soil aeration zone in agricultural ecosystems using. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Hungarian Academy of Sciences, Ed. G. Halasi-Kun. Vol. XXXIV, ISBN 963 9052 31 0, 2003, 220-229.

[4] HOLKO, L., MIKLÁNEK, P. 2004. Mountain hydrology research in Slovakia. In IHP/HWRP Berichte, ISSN 1614-1180, Heft 2, Eds. A Herrmann, U. Schröder, Studies in Mountain Hydrology. Koblenz, IHP-HWRP, 2004, 27-39.

[5] KOSORIN, K. 2004. On solution of two problems in free surface seepage flow hydrodynamics. In ITransactions of the Wessex Institute Online Collection, Category Modelling and Simulation. Witpress, ISSN 1743-355 X, 2004, 11-30.

[6] MIKULEC, V. 2004. Impact of saturated hydraulic conductivity of soils on numerical simulation of soil water movement. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 193-202.

[7] NAGY, V. 2004. Comparison of securing water for agriculturaly cultivated fields and forest ecosystems in location of Žitný ostrov and Szigetköz. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 311-321.

[8] NOVÁK, V. 2004. Infiltration of water into soil with preferential ways: The influence of soil cracks. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 113-124.

[9] SKALOVÁ, J., ŠTEKAUEROVÁ, V., ŠÚTOR, J. 2004. Using of basic soil properties on the assessment of water retention curves. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 230-238.

[10] STEHLOVÁ, K. 2004. Assessment of change of soil water content in the soil profile at locality Bodiky in comparison with a forecast of his potential change in the time horizon 2010, 2030 and 2075. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 203-215.

[11] ŠTEKAUEROVÁ, V. 2004. Method of calculation of the water retention curve main wetting branch and its verification. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 301-310.

[12] ŠÚTOR, J., GOMBOŠ, M. 2004. Quantification of volume changes of heavy soils of East Slovakian lowland. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed Slovak Academy of Sciences Institute of Hydrology, Ed. G. Halasi-Kun. Vol. XXXV, ISBN 80-89139-06-X, 2004, 55-72.

[13] TESAŘ, M., ŠÍR, M., DVOŘÁK, I., LICHNER, Ľ. 2004. Influence of vegetative cover changes on the soil water regime in headwater regions in the Czech Republic. In Eds. A Herrmann, U. Schröder, Studies in Mountain Hydrology. Heft 2, ISSN 1614-1180. Koblenz,

[14] VELÍSKOVÁ, Y. 2004. Possibilities of numerical simulation for solution of water pollutant dispersion. In XXIV. International School of Hydraulics, Hydraulic Problems in Environmental Engineering. Ed. W.Majevski, Gdansk, KGW-PAN, ISBN 83-85708-61-8, 2004, s.161-169.

[15] MANIAK, S., ŠTEKAUEROVÁ, V. 2005. Introduction in Geographic Information Systems. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed The regional Committee of the Hungarian Academy of Science at Pécs, Ed. G. Halasi-Kun. Vol. XXXVI, 2004-2005.ISBN 936 9052 52 3. Pécs, 2005, 211-217.

[16] MILICS, G., NAGY, V., ŠTEKAUEROVÁ, V. 2005. Application of GIS for evaluating, monitoring and presenting groundwater and soil moisture data. In Pollution and Water Resources, Columbia University Seminar Proceedings,

printed The regional Committee of the Hungarian Academy of Science at Pécs, Ed. G. Halasi-Kun. Vol. XXXVI, 2004-2005. ISBN 936 9052 52 3. Pécs, 2005, 69-75.

[17] NAGY, V., ŠTEKAUEROVÁ, V., NEMÉNYI, M. 2005. Comparison of Groundwater Household at Locations of Bodiky /Zitny Ostrov/ and Dunasziget / Szigetkőz/ in the Hungarian. In Pollution and Water Resources, Columbia University Seminar Proceedings, printed The regional Committee of the Hungarian Academy of Science at Pécs, Ed. G. Halasi-Kun. Vol. XXXVI, 2004-2005.ISBN 936 9052 52 3. Pécs, 2005, 59-68.

[18] *KOHNOVÁ, S., HLAVČOVÁ, K., SZOLGAY, J., PARAJKA, J. 2006. On the choice of spatial interpolation method for the estimation of 1- to 5- day basin average design precipitation. In J. Schanze et al. (eds.) Flood risk Management: Hazards, Vulnerability and Mitigation Measures. Springer, ISBN 13 978-1402045974, 2006, s. 77-89.*

iii. List of monographs/books published in Slovakia

[1] PEKÁROVÁ, P. 2003. Dynamics of runoff oscillation of the world and Slovak Rivers. Bratislava, VEDA, 2003, 221p., ISBN: 80-224-07801. (in Slovak)

[2] PEKÁROVÁ, P., KONÍČEK, A., MIKLÁNEK, P. 2005. Impact of land use on runoff regime in the experimental microbasins of IH SAS. Bratislava, Veda, 2005, 215 p. ISBN 80-224-0865-4. (in Slovak).

[3] PEKÁROVÁ, P., SZOLGAY (EDS.), J. 2005. Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, Veda, 2005, 496 p., ISBN 80-224-0884-0. (in Slovak)

A. List of monographs/books chapters published in Slovakia

[1] HALMOVÁ, D. 2005. The impact of potential climate change upon the utilization of operational storage of the Orava water reservoir. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 253-282. (in Slovak).

[2] HOLKO, L., KOSTKA, Z., PECUŠOVÁ, Z. 2005. Snow. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 105-168. (in Slovak).

[3] ĎUGOVÁ, O., LICHNER, Ľ., DLAPA, P. 2005. Impact of climate change on biological factors and soil hydrology. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 363-418. (in Slovak).

[4] PARAJKA, J., KUBEŠ, R., KALAŠ, M., SZOLGAY, J., HLAVČOVÁ, S. KOHNOVÁ, K. 2005. Mathematical models for modelling the climate change impact on runoff processes. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p.169-202. (in Slovak)

[5] PEKÁROVÁ, P. 2005. Teleconnection of annual discharges with SO, NAO, AO and QBO phenomenon. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 81-104. (in Slovak).

[6] PEKÁROVÁ, P., MIKLÁNEK, P., RONČÁK, P. 2005. Evaluation of chemical water quality indicators of Hron and Váh Rivers. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 283-322. (in Slovak).

[7] VELÍSKOVÁ, Y. 2005. Pollution dispersion at upper part of Hron River. In Assessment of climate change impact on selected components of the hydrosphere and biosphere in Hron and Vah River basins. Bratislava, VEDA, 2005, ISBN 80-224-0884-0, p. 335-362. (in Slovak).

[8] PETROVIČ, P., NACHTNEBEL, H., KOSTKA, Z., HOLKO, L., MIKLANEK, P. ET.AL., 2006. Basin-wide water balance in the Danube river basin. In The Danube and its basin-Hydrological monograph Part VIII-3, ISBN 80-89062-49-0. IHP UNESCO & VÚVH, Bratislava.

iv. List of other scientific outputs specifically important for the Organisation

[1] NOVÁK, Z., KOSORIN, K. 2004. The significance of endoscopic septostomy. In Endoskopie. ISSN, no. 4, 2004, p. 71-74. (SCOPUS)

[2] PEKÁROVÁ, P., MIKLÁNEK, P. 2004. Abflusstrends slowakischer Flüsse und mögliche Zusammenhänge mit ENSO/NAO - Erscheinungen. In Österreichische Wasser- und Abfalllwirtschaft. ISSN 0945-358X, Springer, vol. 56, no. 1-2, 2004, p. 17-25. (SCOPUS)

[3] TESAŘ, M., ŠÍR, M., PRAŽÁK, J., LICHNER, Ľ. 2004. Instability driven flow and runoff formation in a small catchment. In Geologica Acta. Vol. 2, no. 2, 2004, 147-156. (SCOPUS)

[4] PARAJKA, J., MERZ, R., BLÖSCHL, G. 2005. Regionale Wasserbilanzkomponenten für Österreich auf Tagesbasis. In In Österreichische Wasser- und Abfallwirtschaft. ISSN: 0945-358X, no. 3-4, 2005, s. 43-56. (SCOPUS)

[5] HALMOVÁ, D., MELO, M. 2006. Climate change impact on reservoir water supply reliability. In IAHS-AISH Publication. Wallingford, ISSN 0144-7815, no. 308, 2006, p. 407-412. (SCOPUS)

[6] HOLKO, L., HERRMANN, A., KULASOVÁ, A. 2006. Changes of runoff regime in small catchments in central Europe: Are there any?. In IAHS-AISH Publication. Wallingford, ISSN 0144-7815, no. 308, 2006, p. 508-513. (SCOPUS)

[7] MERZ, R., BLOSCHL, G., PARAJKA, J. 2006. Regionalization methods in rainfall-runoff modelling using catchment samples. In IAHS-AISH Publication. IAHS, no. 307, 2006, 117-125. (SCOPUS)

[8] MERZ, R., BLŐSCHL, G., PARAJKA, J. 2006. Raum-zeitliche Variabilitet von Ereignisabflussbeiwerten in Österreich. In Hydrologie und Wasserbewirtschaftung. 2006, HW 50, no. 1, 2006, pp. 2-11. (SCOPUS)

[9] PEKÁROVÁ, P., MIKLÁNEK, P., PEKÁR, J. 2006. Long-term trends and runoff fluctuations of European rivers. In IAHS-AISH Publication. ISSN 0144-7815, Wallingford, no. 308, 2006, p. 520-525. (SCOPUS)

[10] STEHLOVÁ, K., ŠTEKAUEROVÁ, V. 2006. Impact of extreme meteorological phenomena on soil water storage of Slovakia typical lowland site. In Agriculturae Conspectus Scientificus. Vol. 71, ISSN 1331-7768, no. 3, 2006, p. 95-102. (SCOPUS)

[11] SKALOVÁ, J., ŠÚTOR, J., ŠTEKAUEROVÁ, V. 2003. Pedotransferove funkcie pre pody Zahorskej niziny. In Acta Horticulturae et Regiotecturae. ISSN: 1335-2563, no. 6, 2003, 66-69. (CAB)

[12] ŠTEKAUEROVÁ, V., ŠÚTOR, J., FARKAS, C. 2003. Evaluation of soil pedotransfer functions for soils of the Csallókőz and Szigetkőz Regions. In Acta Agronomica Hungarica. Hungaria, no. 3, 2003, 355-367. (CAB)

v. Table of research outputs

*Table **Research outputs** shows research outputs in number of specified entries; these entries are then divided by FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).*

Research outputs	2003			2004			2005			2006			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
monographs, books published abroad	0	0,00	0,00	1	0,03	0,09	0	0,00	0,00	0	0,00	0,00	1	0,3	0,01	0,02
monographs, books published in Slovakia	1	0,04	0,10	0	0,00	0,00	2	0,07	0,16	1	0,04	0,08	4	1,0	0,04	0,09
chapters in monographs, books published abroad	3	0,11	0,31	12	0,41	1,10	3	0,10	0,24	1	0,04	0,08	19	4,8	0,17	0,41
chapters in monographs, books published in Slovakia	0	0,00	0,00	0	0,00	0,00	7	0,24	0,56	0	0,00	0,00	7	1,8	0,06	0,15
CC publications	3	0,11	0,31	4	0,14	0,37	4	0,14	0,32	18	0,64	1,38	29	7,3	0,25	0,63
scientific publications indexed by database SCOPUS	0	0,00	0,00	3	0,10	0,28	1	0,03	0,08	6	0,21	0,46	10	2,5	0,09	0,22
scientific publications indexed by database ICEA	10	0,36	1,04	12	0,41	1,10	3	0,10	0,24	5	0,18	0,38	30	7,5	0,26	0,65
scientific publications indexed by database CAB	3	0,11	0,31	1	0,03	0,09	0	0,00	0,00	0	0,00	0,00	4	1,0	0,04	0,09
scientific publications in other journals	33	1,20	3,43	50	1,69	4,59	39	1,34	3,09	33	1,18	2,54	155	38,8	1,36	3,36
publications in proc. of international scientific conferences	23	0,84	2,39	24	0,81	2,21	31	1,07	2,46	15	0,54	1,15	93	23,3	0,82	2,02
publications in proc. of nat. scientific conferences	59	2,15	6,13	50	1,69	4,59	45	1,55	3,57	43	1,54	3,31	197	49,3	1,73	4,27
active participations at international conferences	20	0,73	2,08	21	0,71	1,93	25	0,86	1,98	12	0,43	0,92	78	19,5	0,68	1,69
active participations at national conferences	50	1,82	5,19	50	1,69	4,59	41	1,41	3,25	43	1,54	3,31	184	46,0	1,61	3,99

vi. Renormalized publications[2]

Renormalized publications = number of CC publications in the given year times authorship's portion of the Organisation times the journal impact factor in 2005 divided by the median impact factor in the research field

Renormalised publications	2003			2004			2005			2006		
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget
Renormalized publications	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00	0	0,00	0,00

vii. Standard manuscript page count[3]

Standard manuscript page count	2003			2004			2005			2006		
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget
page count	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0

viii. List of patents and patent applications

ix. Supplementary information and/or comments on the scientific output of the Organisation

The foreign scientists presented their contribution during visiting of IH SAS:

Dr. Andreas Horn, University of Kiel, Germany „Derivation of pedotransfer functions for the parameters of the Freundlich sorption isotherm", March 2, 2005.

Prof. Tomaš Vogel, Czech Technical University, Prague.„Mathematical modelling of water and ions in variable saturated soils" April 12, 2005.

[2] This information is required only from the Organisations of the Section 2 of the Slovak Academy of Sciences.

[3] This information is required only from the Organisations of the Section 3 of the Slovak Academy of Sciences.

Dr. Richardo Lo Pinto, Columbia University USA „Alternative methods for testing the quality of receiving waters and effluents“, March 12, 2006.

Dr. Jeffrey R. Johansen, John Caroll University, Department of Biology, University Heights, Ohio, USA, „Microbiotic soil crusts: Ecological significance with special reference to hydrology “,March 30, 2006.

Prof. Dr. György Várallyay, Research Institute for Soil Science and Agricultural Chemistry (RISSAC) of the Hungarian Academy of Sciences, Budapest “Soil Aspects of Extreme Hydrological Events“, Oktober 4, 2006.

Dr. M.Th. van Genuchten, George E. Brown, Jr. Salinity Laboratory, USDA – ARS, Riverside, CA, U.S.A „Modeling of water flow and contaminant transport in soil and groundwater using the HYDRUS codes“, November 15, 2006.

One institute employee is Member of the Examination Committee of the Doctoral Committee of the University of West Hungary Mosonmagyaróvár, Hungary and two employees are members of International Doctoral School – Debrecen, Hungary.

The employees of Institute of Hydrology are members of many commissions, and committees.

2. Responses to the scientific output

*Table **Citations** shows specified responses to the scientific outputs; these entries are then divided by the FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).*

Citations	2002			2003			2004			2005			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
Web of Science	5	0,2	0,5	7	0,2	0,6	24	0,8	1,9	19	0,7	1,5	55	13,8	0,5	1,2
SCXOPUS	6	0,2	0,6	2	0,1	0,2	9	0,3	0,7	8	0,3	0,6	25	6,3	0,2	0,5
ICEA	14	0,5	1,5	16	0,5	1,5	48	1,7	3,8	11	0,4	0,8	89	22,3	0,8	1,9
in monographs, conf. proceedings and other publications abroad	31	1,1	3,2	45	1,5	4,1	64	2,2	5,1	30	1,1	2,3	170	42,5	1,5	3,7
in monographs, conf. proceedings and other publications in Slovakia	221	8,0	22,9	421	14,3	38,7	179	6,2	14,2	338	12,1	26,0	1 159	289,8	10,2	25,1

i. List of 10 top-cited publications and number of their citations in the assessment period

[1] Kostka, Z., Holko, L.: Vplyv klimatickej zmeny na priebeh odtoku v malom horskom povodí. Národný klimatický program SR 8/2000, MŽP SR a SHMÚ, 2000, 91-109. (citations: 28)

[2] Novák, V.: Vyparovanie vody v prírode a metódy jeho určovania. Monografia, Bratislava, Veda, 1995, 260. (citations: 28)

[3] Majerčák, J., Novák, V.: GLOBAL, one-dimensional variable saturated flow model, including root water uptake, evapotranspiration structure, corn yield, interception of precipitations and winter regime calculation. Výskumná správa, ÚH SAV, Bratislava, 1994, 75. (citations: 26)

[4] Šútor, J., Štekauerová, V.: Hydrofyzikálne charakteristiky pôd Žitného ostrova. ISBN 80 - 968480 - 1 - 1, Bratislava, ÚH SAV, 2000, 170. (citations: 24)

[5] Šimunek, J., Huang, S., Šejna, Majerčák, J., Van Genuchten, th., M., Novák, Šútor, V.: The HYDRUS - ET software package for simulating the one - dimensional movement of water, heat and multiple solutes in variably saturated media. X,

Institute of Hydrology, Slovak Academy of Sciences, Bratislava, 1997, 184. (citations: 24)

[6] Svoboda, A., Pekárová, P., Miklánek, P.: Flood Hydrology of Danube between Devín and Nagymaros. Publication of the Slovak Committee for Hydrology No.5, SVH a ÚH SAV, 2000, 97 s. (citations: 23)

[7] Pekárová, P., Pekár, J.: The Impact of Land Use on Stream Water Quality in Slovakia. J. Hydrol, ISSN 0022-1694, Elsevier Science, vol. 180, 1996, 1, p. 333-350. (citations: 21)

[8] Halmová, D.: Vplyv zmien klímy na zabezpečenosť odberu vody z vodného diela Orava. Acta Hydrologica Slovaca, ÚH SAV, 2000, 2, 3-12. (citations: 17)

[9] Kostka, Z., Holko, L.: Vplyv zmeny vegetačnej pokrývky na hydrologický režim horského povodia. Národný klimatický program SR, VI, zv.10, MŽP SR, SHMÚ, 2001, 82-93. (citations: 16)

[10] Šútor, J., Mati, R., Ivančo, J., Gomboš, M., Kupčo a p.Šťastný, M.: Hydrológia Východoslovenskej nížiny. Monografia, Media Group, v.o.s, 1995, 467. (citations: 16)

ii. List of top-cited authors from the Organisation (at most 10 % of the research employees) and their number of citations in the assessment period

[1] Pekárová Pavla – 213 citations

[2] Šútor Július - 196 citations

[3] Novák Viliam - 164 citations

iii. Supplementary information and/or comments on responses to the scientific output of the Organisation

Institute of Hydrology is also interested in regional hydrology and its research results are used by other Slovak institutions. Many contributions were published and cited in proceedings of national conferences. For that reason, number of this kind of citations and also publications is much higher than CC scientific publications or citations.

3. Research status of the Organisation in the international and national context

- **International/European position of the Organisation**

i. List of the most important research activities documenting international importance of the research performed by the Organisation, incl. major projects (details of projects should be supplied under Indicator 4). Collective

membership in the international research organisations, in particular within the European Research Area

[1] Long – lasting informal cooperation was established twelve years ago with USDA ARS George E. Brown, Jr. Salinity Laboratory, Riverside, CA, USA. Products of this cooperation can be found in the list of literature.

[2] Very intense cooperation is with Columbia University New York through Columbia University Seminars. Two common Proceedings were edited from this activity and one institute employee is Associate member and Co-chairman for Central Europe: Czech Republic&Slovak Republic of the Columbia University Seminars.

[3] Institute was main co-organizer of the International IHP UNESCO conference ERB 2002 “Interdisciplinary approaches in small basin hydrology: Monitoring and research”, in Demänovská dolina.

[4] Institute of Agrophysics PAN in Lublin and IH SAS are cooperating in the framework of Centre of Excellence leading by IA PAN.

[5] Two institute fellows participated at the International School of Hydraulics organized by the Centre of Excellence of the Polish Academy of Sciences (Centre for Environmental Engineering and Mechanics) in Gdaňsk in 2004 and 2005. Contacts established during this event will be prolonged and utilised in future.

[6] On behalf of IHP UNESCO Institute of Hydrology was organizer of „International Seminar on GIS and Mapping of water balance elements “ within the framework of Danube countries regional collaboration in 2005.

[7] IH SAS is strategy partner in „The biomass-energy network (Biomass energy consortium) in Gyogyos, Hungary, during 2005 - 2009.

[8] One institute employee is Member of Hungarian Academy Science Committee.

[9] national coordinator - MHP UNESCO 1.1 Flow Regimes from International Experimental and Network Data.

[10] international coordinator MHP UNESCO 1.1 Flow Regimes from International Experimental and Network Data, Subprojekt 5: Catchment Hydrological and Biogeochemical Processes in Changing Environment

[11] National coordinator of project ERB (European Network of Experimental and Representative Basins) – permanent continues project

[12] National coordinator of project MHP UNESCO 2.2 International River Basins and Aquifers– 2003/2006

[13] National coordinator of project MHP UNESCO 3.3 Land Habitat Hydrology – Mountains – 2003/2006

[14] National coordinator of project INTAS 03-51-5296 - Influence of snow vertical structure on hydrotermal regime and snow-related economical aspects in Northern Eurasia – 2004/2007

[15] National coordinator of project NATO - Snow-climate, society and economy in central and eastern Europe – CLG981942

[16] Ladislav Holko - Co-Convener: EGU General Assembly, Viedeň, 25.-29.4.2005: HS6 - Tracing the runoff generation process - integrated experimental investigations from plot to catchment scales.

[17] Ladislav Holko - Co-Convener: EGU General Assembly, Viedeň, 25.-29.4.2005: HS43 - Use of isotopes in river basin studies (co-sponsored by IAEA).

[18] Ľubomír Lichner - Co-Convener: EGU General Assembly, Viedeň, 25.-29.4.2005: HS23 - Biological influence on hydrological and chemical processes in the unsaturated zone of soil (co-listed in BG).

[19] Ivan Meszaros - Co-Convener: EGU General Assembly, Viedeň, 25.-29.4.2005: HS17 -Ecohydrology of riparian zones and floodplains (co-listed in BG)

[20] Juraj Parajka - Co-Convener: EGU General Assembly, Viedeň, 25.-29.4.2005: HS35 - Space-time interpolation and analysis methods in catchment and groundwater hydrology (co-listed in NH).

ii. List of international conferences (co-) organised by the Organisation

[1] Organizer of Conference with international participation „Hydrology at the beginning of the 21th century - vision and reality". Smolenice 2003, Slovakia

[2] Co-organizer of International conference „Soil hydrology in small catchments", Prague 2003, Prague, Czech Republic.

[3] Co-organizer of International conference "Conference of young hydrologists", Bratislava, 2003, 2004, 2005, 2006.

[4] Co-organizer of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

[5] Organizer of V. – VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands", 2004 and 2006.

[6] Organizer of 16. and 17. Slovak–Czech-Poland Scientific Seminar „Physics of soil water" 2004 and 2006.

[7] Co-organizer of International conference „Soil hydrology in small catchments", Prague, 2005, Czech Republic

[8] Co-organizer of VI. Internaional Scientific Conference „Hydrological days" 2005",Bratislava, Slovak Republic.

[9] Co-organizer of International Conference "Biohydrology 2006", Prague, Czech Republic

iii. List of international journals edited/published by the Organisation

[1] Journal of Hydrology and Hydromechanics

iv. List of edited proceedings from international scientific conferences and other proceedings

[1] XI. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, CD, eds. Hurtalová, Orfánus, Mikulec, Bača, Hornáček, Matejka, Bratislava, IH SAS, 2003, ISBN 80 – 89139- 02-7

[2] V. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands",CD, eds. Ivančo, Pavelková, Gomboš, Tall, Michalovce, IH SAS, 2004, ISBN 80 – 89139- 04-3

[3] 15. Slovak–Czech-Poland Scientific Seminar „Physics of soil water", CD, eds. Ivančo, Pavelková, Gomboš, Tall, Michalovce, IH SAS, 2004, ISBN 80 – 89139- 04-3

[4] XII. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, CD, eds. Novák, Hurtalová, Čelková, Mikulec, Bača, Nagy, Matejka, Bratislava, IH SAS, 2004, ISBN 80 – 89139- 05-1

[5] XIII. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, CD, eds. Čelková, Matejka, Bratislava, IH SAS, 2005, ISBN 80 – 85754- 13-4

[6] VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands",CD, eds. Ivančo, Pavelková, Gomboš, Tall, Michalovce, IH SAS, 2006, ISBN 80 – 89139- 09-4

[7] 16. Slovak–Czech-Poland Scientific Seminar „Physics of soil water", CD, eds. Ivančo, Pavelková, Gomboš, Tall, Michalovce, IH SAS, 2006, ISBN 80 – 89139- 09-4

[8] XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, CD, eds. Čelková, Matejka, Bratislava, IH SAS, 2006, ISBN 80 – 85754- 15-0

- **National position of the Organisation**

i. List of selected most important national projects (Centres of Excellence, National Reference Laboratories, Agency for the Promotion of Research and Development (APVV/APVT), National Research Programmes, Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA), and others)

[1] APVT-51-650202 - Assessment of climate change impact on selected components of the hydrosphere and biosphere in Slovakia (2002 / 2005) – finance: 2003 - 1 592 000,- Sk; 2004 -1 946 000,- Sk; 2005 - 1 541 000,- Sk.

[2] APVT 27-018202 - Hydrological monograph of the Danube River basin – water balance of areal precipitation, runoff and evapotranspiration – international cooperation within the IHP UNESCO (2002/2004) – finance: 2003 – 160 000,- Sk, 2004:160 000,- Sk

[3] APVT 51-044802 - Impact of the drought on water regime and biodiversity of lowland regions in Slovakia and design of counter-measures (2004 / 2006) – finance: 2004 - 3 165 000,- Sk , 2005: 3 165 000,-Sk , 2006: 3 165 000,- Sk

[4] APVT 51-017804 - Prediction of the land use change impact on stream water quantity and quality (2005 / 2007) – finance: 2005: 2 997 000,-Sk , 2006: 2 997 000,- Sk

[5] APVT 99-033204 - Water-saving irrigation technology from the point of view of water protection against nitrate pollution coming from agricultural productionate (2005 / 2007) – finance: 2005: 104 000,-Sk , 2006: 104 000,- Sk

[6] APVV 51 – 030205 - Microclimate of windthrows in High Tatras (2005 / 2007) – finance: 2005: 3 845 000,-Sk , 2006: 4 243 000,- Sk

[7] VEGA 2/2022/22 - Statement of characteristics and simulation of transpot phenomena in surface and ground water under the influence of their mutual interaction (2002 / 2004) – finance: 2003 - 51 000,- Sk , 2004:49 000,- Sk

[8] VEGA 2/3049/23 - Groundwater flow and solute transport in integrated surface streams and aquifer hydrologic system in the case of groundwater drought (2003 / 2005) – finance: 2003 - 83 000,- Sk , 2004:65 000,- Sk , 2005:59 000,- Sk

[9] VEGA 2/3184/23 - Impact of temporal and spatial variability of snow cover on snowmelt runoff (2003 / 2005) – finance: 2003 - 137 000,- Sk , 2004:129 000,- Sk, 2005:89 000,- Sk

[10] VEGA 2/2016/22 - Parametrization of the extreme runoff formation processes in the slovak basins in conditions of the non-stationarity of the hydrological system (2002 / 2004) – finance: 2003 - 112 000,- Sk , 2004:116 000,- Sk

[11] VEGA2/2003/22 - The influence of extreme meteorological phenomena on soil water regime of Slovakia lowland areas (2002 / 2004) – finance: 2003 - 95 000,- Sk , 2004:149 000,- Sk

[12] VEGA 2/3073/23 - Short and medium dated prognosis of soil-water regime characteristics (2003 / 2005) – finance: 2003 - 30 000,- Sk , 2004:37 000,- Sk , 2005: 46 000,- Sk

[13] VEGA 2/1084/21 - Transport of water and solutes due to evapotranspiration in non-homogeneous and deformable soil (2001 / 2003) – finance: 2003 - 82 000,- Sk

[14] VEGA č. 2/3032/23 - Soil water repellency and its consequences on water flow in soil (2003 / 2005) – finance: 2003 - 21 000,- Sk , 2004:22 000,- Sk , 2005:50 000,- Sk

[15] VEGA 2/3018/23 - Quantification of water balance of heavy soils in the East Slovakian Lowland and prognosis of their changes under extreme meteorological conditions (2003 / 2005) – finance: 2003 - 107 000,- Sk , 2004:137 000,- Sk , 2005: 106 000,- Sk

[16] VEGA 2/4066/04 - The role of plant canopies quantification in the transport processes of water and solute in soil (2004/ 2006) – finance: 2004:54 000,- Sk , 2005:70 000,- Sk, 2006: 52 000,- Sk

[17] VEGA 2/5055/25 - Influence of land use on runoff formation and erosion processes in a catchment (2005/ 2007) – finance: 2005:55 000,- Sk , 2006: 60 000,- Sk

[18] VEGA 2/5056/22 - Scenarios of the extreme hydrological events on Slovak rivers for the integrated management of river basins (2005/ 2007) – finance: 2005:96 000,- Sk , 2006: 165 000,- Sk

[19] VEGA 2/5054/25 - Flow and transport of contaminants in surface and groundwater during dry period (2005/ 2007) – finance: 2005:67 000,- Sk , 2006: 80 000,- Sk

[20] VEGA 2/5018/25 - Water storage quantification as water source for biosphere of Slovak catchments (2005/ 2007) – finance: 2005: 179 000,- Sk , 2006: 205 000,- Sk

[21] VEGA 2/6004/26 - Dominant hydrological subsurface processes in the riverine zone of waterworks and predictions of their development (2006/ 2008) – finance: 2006: 88 000,- Sk

[22] VEGA 2/6046/26 - Soil drought, its formation and quantification considering soil properties and metheorological elements (2006/ 2008) – finance: 2006: 182 000,- Sk

[23] VEGA 2/6003/26 - Effect of biological factors on soil hydrological processes (2006/ 2008) – finance: 2006: 66 000,- Sk

[24] VEGA - 2/6018/6 - Mathematical modelling of moisture and nutrient regime in plants root zone (2006/ 2008) – finance: 2006: 44 000,- Sk

[25] MVTS 51-98-9296-00/2002 - Land Habitat Hydrology – Mountains (2002 / 2007) – finance: 2003 – 80 000,- Sk , 2004: 90 000,- Sk , 2005: 90 000,- Sk, 2006: 80 000,- Sk

[26] MVTS 51-98-9350-00/2002 - Flood regime of rivers in the Danube basin (2003 / 2007) – finance: 2003 – 80 000,- Sk , 2004:90 000,- Sk , 2005: 100 000,- Sk, 2006: 100 000,- Sk

[27] MVTS INTAS 03-51-5296 - Influence of snow vertical structure on hydrotermal regime and snow-related economical aspects in Northern Eurasia (2004 / 2007) – finance: 2005: 59 000,- Sk, 2006: 58 000,- Sk

[28] MVTS IAEA 3.30.15 - Combined Hydrograph and Isotopic Baseflow Separation for the Upper Vah Catchment Vulnerability Assessment (2004 / 2009) – finance: 2005: 45 000,- Sk, 2006: 30 000,- Sk

[29] MVTS IST-2000-28084 - System for European water monitoring (SEWING) (2001 / 2004) – finance: 2004: 43 000,- Sk

[30] MVTS NATO - Snow-climate, society and economy in central and eastern Europe (2006/ 2007) – finance: 2006: 21 000,- Sk

ii. List of national scientific conferences (co)-organised by the Organisation

[1] Co-organizer of VII. – X. Regional Seminar “Days of Water”, 2003, 2004, 2005, 2006, Michalovce.

iii. List of national journals published by the Organisation

[1] Acta Hydrologica Slovaca (in Slovak).

[2] Water Management on East Slovakia Lowland (Vodné hospodárstvo na Východoslovenskej nížine), (in Slovak)

iv. List of edited proceedings of national scientific conferences/events

[1] VII. Regional Seminar “Days of Water”, eds. Ivančo, Pavelková, Gomboš, Michalovce, IH SAS, 2003, ISBN 80 – 89139- 01-9

[2] VIII. Regional Seminar “Days of Water”, eds. Ivančo, Pavelková, Gomboš, Michalovce, IH SAS, 2003, ISBN 80 – 89139-03-5

[3] IX. Regional Seminar “Days of Water”, eds. Ivančo, Pavelková, Gomboš, Michalovce, IH SAS, 2003, ISBN 80 – 89139-07-8

[4] X. Regional Seminar “Days of Water”, eds. Ivančo, Pavelková, Gomboš, Michalovce, IH SAS, 2003, ISBN 80 – 89139-08-6

- **International/European position of the individual researchers**

i. List of invited/keynote presentations at international conferences, documented by an invitation letter or programme

[1] NOVÁK, V. Evapotranspiration of different agricultural canopies and its structure over the territory of Slovakia. The European Regional Workshop of IAP Coupling Surface and Groundwater research: A New Step Forward Towards Water Management“.Lodz,Poland European Reg. Centre for Ecohydrology, 2006.

[2] ŠTEKAUEROVÁ, V., Soil water regime Evaluation with Respect to the vegetation need. The European Regional Workshop of IAP Coupling Surface and Groundwater research: A New Step Forward Towards Water Management“. Lodz,Poland European Reg. Centre for Ecohydrology, 2006.

[3] KOSORIN, K.: Motion of water some problems and solutions. XIV th International Poster Day Transport of Water, Chemicals and Energy in the System Soil-Crop Canopy-Atmosphere, IH SAS, Bratislava 2006.

[4] PARAJKA, J.: Assimilating scatterometer data into conceptual hydrologic models at the regional scale. EGU General Assembly, Vienna, NH1.02: „Radar and Satellite for monitoring and forecasting floods and droughts“, 2005.

[5] LICHNER, Ľ.: Simulation of hydrologic cycle and phytomass productivity based on a temperature of plant transpiration in cold climate. EGU General Assembly, Vienna, HS 23: „Biological influence on hydrological and chemical processes in the unsaturated zone of soil” dňa 27.4.2005.

[6] MÉSZÁROŠ, I.: Modeling of potential evapotranspiration in mountain basin. XIII. Poster day with international participation “ Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, IH SAS, Bratislava 2005.

[7] ŠÚTOR, J.: Drought – phenomenon of Climate Change IH SAS, Bratislava 2005,

[8] ŠTEKAUEROVÁ, V.: Evaluation of soil moisture according to climate change. International Conference Climate Change: Impacts and Responses in Central and Eastern European Countries, 5-8 November, 2005, Pécs, Hungary.

[9] ŠTEKAUEROVÁ, V.: Institute of Hydrology of SAS and its scientific trend. Columbia. Seminars: SOIL HYDROLOGY OF NORTHERN CARPATIAN BASIN – SLOVAKIA, Columbia University in the City of New York, U.S.A., 2005.

[10] ŠTEKAUEROVÁ, V.: Alternative methods to infiltrational experiment. Columbia. Seminars: SOIL HYDROLOGY OF NORTHERN CARPATIAN BASIN – SLOVAKIA, Columbia University in the City of New York, U.S.A., 2005.

[11] ŠÚTOR, J.: Where is Slovakia in Europe. Columbia. Seminars: SOIL HYDROLOGY OF NORTHERN CARPATIAN BASIN – SLOVAKIA, Columbia University in the City of New York, U.S.A., 2005.

[12] ŠÚTOR, J.: Mathematical modelling of soil water regime. Columbia. Seminars: SOIL HYDROLOGY OF NORTHERN CARPATIAN BASIN – SLOVAKIA, Columbia University in the City of New York, U.S.A., 2005.

[13] NAGY, V.: Estimation of soil water regime at localities near the Danube. Columbia. Seminars: SOIL HYDROLOGY OF NORTHERN CARPATIAN BASIN – SLOVAKIA, Columbia University in the City of New York, U.S.A., 2005.

[14] ŠTEKAUEROVÁ, V.: Numerical simulation as an alternative method of soil water infiltration characteristics estimation. International Scientific conference "Innovation and utility in the Visegrad Fours", Nyiregyháza, Hungary,2005.

[15] NAGY, V.:Securing water for Agriculturally cultivated field and forest ecosystems. International Scientific conference "Innovation and utility in the Visegrad Fours, Nyiregyháza, Hungary,2005.

ii. List of employees who served as members of the organising and/or programme committees for international conferences

[1] Július Šútor - chairman of organising committee of international conference „Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003.

[2] Zdeno Kostka - member of organising committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003

[3] Pavla Pekárová - member of organising committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003

[4] Yvetta Velísková - member of organising committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003

[5] František Burger - member of organising committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003

[6] Jozef Ivančo - member of organising committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality" IH SAS, 2003

[7] Viliam Novák – chairman of scientific committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality, IH SAS, 2003.

[8] Július Šútor - member of scientific committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality, IH SAS, 2003.

[9] Ľubomír Lichner - member of scientific committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality, IH SAS, 2003.

[10] Karol Kosorin - member of scientific committee of international conference „ Hydrology at the threshold of the 21st century – Vision and reality, IH SAS, 2003.

[11] Ladislav Holko – member of scientific committee of international seminar “Soil hydrology in small catchment”, Prague, 2003.

[12] Ľubomír Lichner - member of scientific committee of international seminar “Soil hydrology in small catchment”, Prague, 2003.

[13] Pavol Miklanek - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2003

[14] Pavla Pekárová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2003

[15] Ladislav Holko – member of Scientific Advisory Committee of international coference „ERB2004 – Progress in surface and subsurface water studies at the plot and small basin scale “, Torino, 2004

[16] Pavol Miklánek – member of organising committee of international conference “Hydrology of Mountain Environments” Berchtesgaden, 2004

[17] Pavol Miklánek - member of scientific committee of international conference “Hydrology of Mountain Environments” Berchtesgaden, 2004

[18] Pavol Miklanek - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2004

[19] Pavla Pekárová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2004.

[20] Pavla Pekárová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2004

[21] Ľubomír Lichner - member of scientific committee of international seminar “Soil hydrology in small catchment”, Prague, 2005.

[22] Ladislav Holko - member of scientific committee of international seminar “Soil hydrology in small catchment”, Prague, 2005.

[23] Vlasta Štekauerová - member of scientific committee of international seminar “Soil hydrology in small catchment”, Prague, 2005.

[24] Pavol Miklanek - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[25] Ladislav Holko - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[26] Pavla Pekárová - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[27] Vlasta Štekauerová - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[28] Július Šútor - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[29] Viliam Novák - member of scientific committee of international conference “Hydrological days”, Bratislava, 2005

[30] Dana Halmová - member of organising committee of international conference “Conference of young hydrologists”, Bratislava, 2005

[31] Pavol Miklanek - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2005

[32] Pavla Pekárová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2005.

[33] Pavol Miklanek - member of scientific committee of international conference “XXIII.Conference of the Danubian countries on the hydrological forecasting and hydrological bases of water management”, Belgrade - Serbia, 2006

[34] Pavol Miklánek - member of scientific committee of international conference ERB, Luxembourg, 2006

[35] Ladislav Holko - member of scientific committee of international conference ERB, Luxembourg, 2006

[36] Pavol Miklanek - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2006

[37] Pavla Pekárová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2006

[38] Dana Halmová - member of scientific committee of international conference “Conference of young hydrologists”, Bratislava, 2006

[39] Vlasta Štekauerová – member of scientific committee of international conference „Flood protection “ Podbanské, Vysoké Tatry 2006

[40] Ivan Mészároš – member of organising committee of international conference “Biohydrology”, Praha, 2006

[41] Ľubomír Lichner - member of organising committee of international conference “Biohydrology”, Praha, 2006

[42] Ľubomír Lichner - member of scientific committee of international conference "Biohydrology", Praha, 2006

[1] Jozef Ivančo – member of organising committee of scientific conference V. – VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands", 2004 and 2006.

[43] Jozef Ivančo - member of organising committee of 16. and 17. Slovak–Czech-Poland Scientific Seminar „Physics of soil water" 2004 and 2006.

[44] Milan Gomboš – member of organising committee of scientific conference V. – VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands", 2004 and 2006.

[45] Milan Gomboš – member of organising committee of 16. and 17. Slovak–Czech-Poland Scientific Seminar „Physics of soil water" 2004 and 2006.

[46] Dana Pavelková – member of organising committee of scientific conference V. – VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands", 2004 and 2006.

[47] Dana Pavelková - member of organising committee of 16. and 17. Slovak–Czech-Poland Scientific Seminar „Physics of soil water" 2004 and 2006.

[48] Andrej Tall - member of organising committee of scientific conference VI. International Scientific Conference „Influence anthropogenic activity on soil water regime of Lowlands", 2006.

[49] Andrej Tall - member of organising committee of 17. Slovak–Czech-Poland Scientific Seminar „Physics of soil water", 2006.

[50] Vilam Nagy – member of organising committee of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

[51] Viliam Novák - member of organising committee of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

[52] Anežka Čelková - member of organising committee of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

[53] Peter Bača - member of organising committee of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the

System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

[54] Vladimír Mikulec - member of organising committee of XI.- XIV. Poster day with international participation " Transport of water, Chemicals and Energy in the System Soil - Crop Canopy – Atmosphere, Bratislava 2003, 2004, 2005, 2006, Slovakia.

iii. List of employees who served as members of important international scientific bodies (e.g. boards, committees, editorial boards of scientific journals)

[1] Viliam Novák - member of editorial board of Applied Mathematics and Mechanics (Shanghai Univ.)

[2] Viliam Novák – member of editorial board of Acta Agrophysica (IA PAN, Lublin, Poľsko)

[3] Viliam Novák - member of editorial board of Soil Tillage Research (Elsevier)

[4] Július Šútor - member of editorial board of International Agrophysics, (IA PAN, Lublin, Poľsko)

[5] Vlasta Štekauerová - member of editorial board of International Agrophysics, (IA PAN, Lublin, Poľsko) - from 2005.

[6] Viliam Novák – member of editorial board of Journal Hydrology and Hydromechanics – editor

[7] Vlasta Štekauerová – member of editorial board of Journal Hydrology and Hydromechanics

[8] Karol Kosorin – member of editorial board of Journal Hydrology and Hydromechanics

[9] Ladislav Holko – member of editorial board of Journal Hydrology and Hydromechanics

iv. List of international scientific awards and distinctions

[1] Mikulec Vladimír obtained award for The best presentation of young scientific workers on International conference 5th ALPS-ADRIA SCIENTIFIC WORKSHOP, 6-11 March 2006, Opatija, Croatia.

[2] Mikulec Vladimír, Stehlová Katarína received Award for best paper at the 15th Conference of young hydrologists in 2003

[3] Orfánus Tomáš received Award for best paper at the 16th Conference of young hydrologists in 2004

[4] Mitková Veronika received Award for best paper at the 17th Conference of young hydrologists in 2005

- **National position of the individual researchers**

i. List of invited/keynote presentations at national conferences documented by an invitation letter or programme

ii. List of employees who served as members of organising and programme committees of national conferences

[1] Jozef Ivančo - member of organising committee of Regional Seminar "Days of Water", Michalovce 2003, 2004, 2005, 2006.

[2] Milan Gomboš - member of organising committee of Regional Seminar "Days of Water", Michalovce 2003, 2004, 2005, 2006.

iii. List of employees serving in important national scientific bodies (e.g. boards, committees, editorial boards of scientific journals)

[1] Viliam Novák – member of Scientific board of Slovak University of Technology

[2] Július Šútor - member of Scientific board of Slovak Agricultural University, Slovak Hydrometeorological Institute, Hydromelioration, Regional Research Institute Agroecology Michalovce and Water Research Institute.

[3] Vlasta Štekauerová - member of Scientific board of Slovak Hydrometeorological Institute

[4] Vlasta Štekauerová - member of Scientific board of Water Research Institute

[5] Vlasta Štekauerová - chairman of editorial board of Acta hydrologica Slovaca

[6] Katarína Stehlová – assistant editor of editorial board of Acta hydrologica Slovaca

[7] Pavol Miklánek – member of editorial board of Acta hydrologica Slovaca

[8] Július Šútor - member of editorial board of Acta hydrologica Slovaca

[9] Pavla Pekárová - member of editorial board of Acta hydrologica Slovaca

[10] František Burger - member of editorial board of Acta hydrologica Slovaca

[11] One institute employee is National correspondent of ICT (International Committee on Tracers) IAHS (International Association of Hydrological Sciences)

[12] One institute employee is chairman of Slovak committee for hydrology

[13] One institute employee is member of National committee for International Hydrological Program UNESCO

[14] One institute employee is national correspondent of ICSIH (International Commission for Snow and Ice Hydrology) IAHS (International Association of Hydrological Sciences)

[15] One institute employee is member of the Bureau of the Presidium of the Slovak Commission for UNESCO

[16] One institute employee is Chairman of the Section of Natural Sciences of the Slovak Commission for UNESCO

[17] One institute employee is Chairman of the National Committee of IGBP (International Geosphere Biosphere Programme)

[18] One institute employee is President of Association of Slovak Hydrologists

[19] One institute employee is national correspondent of project ERB (European Network of Experimental and Representative Basins)

iv. List of national awards and distinctions

[1] P. Miklánek – Memorial tablet of academician Dub (award of the Dean of Faculty of Civil Engineering, Slovak University of Technology - 2004)

[2] P. Pekárová et al. – Award of Slovak Academy of Sciences for scientific and research activities in field of collaboration with universities in 2004

[3] P. Pekárová et al. – Award of Literary Fund, category – scientific literature, section – natural and technical sciences, 2005

[4] K. Kosorin – award „Eminent Personages of SAS“, 2006

[5] V. Štekauerová – acknowledgement letter of Water Research Institute on the 55th anniversary occasion

...

Supplementary information and/or comments documenting international and national status of the Organisation

International engagement of the Institute has broad range. The Institute collaborates under international projects (INTAS, NATO and others) with countries: Argentine, Bulgaria, Czech Republic, Monte Negro, China, France, Ghana, Greece, India, Israel, Columbia, Hungary, Morocco, Germany, Pakistan, Poland, Portugal, Austria, Russia, Serbia, Spain, Switzerland, Sweden, Turkey, Ukraine, Uzbekistan, Great Britain, Vietnam, USA.

The Institute collaborates under national projects with these institutions: Slovak University of Technology – Bratislava, Slovak University of Agriculture – Nitra, Technical University – Zvolen, Comenius University – Bratislava and departmental institutes of Ministry of Agriculture SR and Ministry of Environment SR.

4. Project structure, research grants and other funding resources

- **International projects and funding**

i. List of major projects within the European Research Area – 5th and 6th Framework Programme of the EU, European Science Foundation, NATO, COST, INTAS, CERN, etc. (here and in items below please specify: type of project, title, grant number, duration, funding, responsible person in the Organisation and his/her status in the project, e.g. coordinator, principal investigator, investigator)

[1] RP5 - *System for European water monitoring (SEWING)* - IST-2000-28084 – 2001/2004 – 2003:14 000 EUR, 2004:14 000 EUR, Lichner – investigator.

[2] *MHP UNESCO 1.1 Flow Regimes from International Experimental and Network* Data – 2003/2007, Miklánek – *national coordinator*.

[3] MHP UNESCO 1.1 Flow Regimes from International Experimental and Network Data, Subprojekt 5: Catchment Hydrological and Biogeochemical Processes in Changing Environment – 2003/2006, Holko – *international coordinator*

[4] ERB (European Network of Experimental and Representative Basins) – *permanent project, Miklánek – national coordinator*

[5] *MHP UNESCO 2.2 International River Basins and Aquifers– 2003/2006, Miklánek – national coordinator*

[6] MHP UNESCO 3.3 Land Habitat Hydrology – Mountains – 2003/2006, Miklánek – *national coordinator*

[7] *INTAS 03-51-5296 - Influence of snow vertical structure on hydrotermal regime and snow-related economical aspects in Northern Eurasia* – 2004/2007, 2004: 7987EUR, Kostka – *national coordinator*

[8] NATO - *Snow-climate, society and economy in central and eastern Europe – CLG981942*, 2006: 10 250 EUR, Holko - *national coordinator*

[9] *INTEREG IIIA - Design of common conception of water resources and environment control, evaluation of its design and realisation in Medzibodrožie region* – 14420100009, Šútor – *investigator in Institute*

ii. **List of other international projects incl. funding**

[1] Slovak-Czech project: Cadmium transport in a structure soil under conditions of climate warming - *185/099 – 2002/2003 – 2003: 23 000,-Sk*, Lichner – *principal investigator*

[2] Slovak-Czech project: Hydrophysical background information for designation of vulnerable zones and codes of practices for agricultural lands in the process of

implementation of the EU Nitrates Directive – *039/099 – 2002/2003 – 2003: 23 000,-Sk*, Štekauerová – *principal investigator*

iii. List of other important projects and collaborations without direct funding

[1] *IAEA - Combined Hydrograph and Isotopic Baseflow Separation for the Upper Vah Catchment Vulnerability Assessment - International Atomic Enegy Agency (IAEA) – CRP F3.30.15* -2004/2009, Holko – *investigator*

[2] Spanish-Slovak project: Assessing the microbiological, biochemical, soil-physical and hydrological effects of remediation of degraded soils - 2004SK0003 - *2004/2005, investigator*

[3] Czech Science Foundation: Endoscope model of pressure conditions in liquor zone of brain - NR/7805-2 - *2004/2006, investigator*

[4] Agreement of collaboration with **University of West Hungary – Faculty of Agricultural Sciences, Mosonmagyaróvár**: The Effect of Hydrological Changes on The Agricultural Potential in region: Žitný Ostrov – Szigetköz (2002/2004)

[5] Agreement of collaboration with **Institute of Water problems, Russian Academy of Sciences, Moscow, Russia**: Soil water regime and soil water resources formation (2002/2004)

[6] Agreement of collaboration with **Institute of Agrophysics, Polish Academy of Sciences, Lublin, Poland**: Modelling of water regime in soil profile as an element of ground water, soil canopy and atmosphere system (2002/2004)

[7] Agreement of collaboration with **Institute for Soil Science and Agricultural Chemistry of HAS, Budapest, Hungary**: Theme1 - Hydrophysical characteristics estimation – using pedotransfer functions – of soils, espetially for using mathematical modeling simulating the soil water regime**.** Theme2**:** Adaptation of the Global model for intensively tilled soils for both countries (2001/2003)

[8] Agreement of collaboration with **Institute for Soil Science and Agricultural Chemistry of HAS, Budapest, Hungary**: Studiyng the effect of extreme metheorological events on soil water regime of lowland areas to ensure the necessary water amount for vegetation (2004/2006)

[9] Agreement of collaboration with **University of West Hungary – Faculty of Agricultural Sciences, Mosonmagyaróvár**: The impact the extreme meteorological phenomena on soil water regime of Zitny ostrov and Szigetkoz locatities in respect of the conservation and adaptation of the ecosystems and agricultural plants (2005/2007)

[10] Agreement of collaboration with **Institute of Water problems, Russian Academy of Sciences, Moscow, Russia**: Water and carbone transport processes on dryland surface as influenced change (2005/2007)

[11] Agreement of collaboration with **Institute of Geography, Russian Academy of Sciences, Moscow, Russia**: Space presentation and inerpretation of hydrophysical characteristics fields and soil water balance components – development of methods (2004/2006)

[12] Agreement of collaboration with **Institute of Physico-Chemical and Biological Problems of Soil Science, Russian Academy of Sciences, Moscow, Russia**: Development of the soil water regime models for forest and agricultural environment to chracterize cyclus of carbon and natrium of boreal zone under different climate scenario (2004/2006)

[13] Agreement of collaboration with **University of Natural Resources and Applied Life Sciences, Vienna (BOKU), Austria**: Parametrization of root properties for mathematical modeling of the soil-plant interactions (2006/2010)

- **National projects and funding**

i. List of projects supported by the Agency for the Promotion of Research and Development (APVV/APVT), National Research Programmes, and their funding

[1] APVT-51-650202 - Assessment of climate change impact on selected components of the hydrosphere and biosphere in Slovakia (2002 / 2005) – finance: 2003 - 1 592 000,- Sk; 2004 -1 946 000,- Sk; 2005 - 1 541 000,- Sk.

[2] APVT 27-018202 - Hydrological monograph of the Danube River basin – water balance of areal precipitation, runoff and evapotranspiration – international cooperation within the IHP UNESCO (2002/2004) – finance: 2003 – 160 000,- Sk, 2004:160 000,- Sk

[3] APVT 51-044802 - Impact of the drought on water regime and biodiversity of lowland regions in Slovakia and design of counter-measures (2004 / 2006) – finance: 2004 - 3 165 000,- Sk , 2005: 3 165 000,-Sk , 2006: 3 165 000,- Sk

[4] APVT 51-017804 - Prediction of the land use change impact on stream water quantity and quality (2005 / 2007) – finance: 2005: 2 997 000,-Sk , 2006: 2 997 000,- Sk

[5] APVT 99-033204 - Water-saving irrigation technology from the point of view of water protection against nitrate pollution coming from agricultural productionate (2005 / 2007) – finance: 2005: 104 000,-Sk , 2006: 104 000,- Sk

[6] APVV 51 – 030205 - Microclimate of windthrows in High Tatras (2005 / 2007) – finance: 2005: 3 845 000,-Sk , 2006: 4 243 000,- Sk

ii. Number of projects supported by the Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA) for each year, and their funding

VEGA	2003	2004	2005	2006
number	9	9	10	9
funding (millions of SKK)	0,716	0,756	0,816	0,947

- **Summary of funding from external resources**

External resources	2003	2004	2005	2006	total	average
external resources (millions of SKK)	4,755	8,536	14,152	15,226	42,669	10,667
external resources transfered to coooperating research organisations (millions of SKK)	1,410	2,891	6,095	4,992	15,388	3,847
ratio between external resources and total salary budget	0,494	0,784	1,123	1,171	--	0,893
overall expenditures from external as well as institutional resources(millions of SKK)	19,705	23,954	29,686	31,129	104,474	26,119

Supplementary information and/or comments on research projects and funding resources

Institute of Hydrology of SAS is subsidised organisation from the economic point of view. Part of the financial sources is obtained from the state budget, part from the scientific projects (both national and international) and part by application of the results in practice through commercial contracts, or expertises.

During 2003-2004 the institute was involved in 7 APVT/APVV projects, 18 VEGA projects, 6 MVTS projects and finances were also obtained thanks to 27 commercial contracts, including 2 expertises.

5. Organisation of PhD studies, other pedagogical activities

i. List of accredited programmes of doctoral studies (as stipulated in the previously effective legislation as well as in the recently amended Act on the Universities)

Hydrology and water management, 39-41-09

Engineering Hydrology, 4.1.24 Hydrology

ii. Summary table on doctoral studies (number of internal/external PhD students; number of students who completed their study by a successful thesis defence; number of PhD students who quitted the programme)

PhD study	31.12.2003			31.12.2004			31.12.2005			31.12.2006		
number of potential PhD supervisors	11			11			11			13		
PhD students	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted
internal	4	2	1	4	0	2	4	0	0	4	1	0
external	7	1	5	7	1	1	5	2	1	3	2	1
supervised at external institution by the research employees of the assessed organisation	3	0	2	4	0	0	1	1	2	0	0	0

iii. Postdoctoral positions supported by

a) external funding (specify the source)

Dr. Margarita L. Himmelbauer from Department of Water, Atmosphere and Environment, Institute of Hydraulics and Rural Water Management,University of Natural Resources and Applied Life Sciences (BOKU), Vienna, Austria.

She worked in Institute of Hydrology in Project: MOEL 201:Root Uptake Modeling at Field Scale. Parameter assessment , duration 3 months, funding from Austria.

b) internal funding - the Slovak Academy of Sciences Supporting Fund of Stefan Schwarz

iv. Summary table on pedagogical activities in undergraduate programmes for each year

Teaching	2003	2004	2005	2006
lectures (hours/year)	10	10	27	10
practicum courses (hours/year)	65	39	39	15
supervised diploma works (in total)	4	5	1	3
members in PhD committees (in total)	4	5	4	12
members in DrSc. committees (in total)	3	3	3	3
members in university/faculty councils (in total)	2	2	2	2
members in habilitation/inauguration committees (in total)	1	1	1	1

v. List of published university textbooks

vi. Number of published academic course books

vii. List of joint research laboratories/facilities with the universities

viii. Supplementary information and/or comments on doctoral studies and pedagogical activities

Institute participates in ESF project (Europe Social Fund) with study program: *Hydroinformation* - tools for simulate modelling, informational and communication technology in hydrology, hydraulic and water management. CD ROM “Soil hydrophysical characteristics of lowland” was edited.

Scientific workers from Institute of Hydrology have participated as consultants on thesis of Slovak Technical University (Bratislava), Comenius University (Bratislava) and Agricultural University (Nitra).

6. Direct output to the society (applications of results, popularisation and outreach activities)

i. List of the most important results of applied research projects

[1] Method for evaluation of the long-term trends of surface and groundwater quality in Slovakia for implementation of the EU WFD. 2003, user: Slovak Hydrometheorological Institute.

[2] Evaluation of climatic changes influences on crop production with stress on agricultural development. 2004, user: Regional Research Institute of Agroecology, Michalovce,.

[3] Influence of landuse changes on snow accumulation and snow melt and flood events. 2005, user: Slovak Hydrometheorological Institute.

[4] Guidelines for development of classification schemes of physical and chemical properties of water quality for Slovakia. 2006, user: Slovak Hydrometheorological Institute.

[5] Notional impact of extreme meteorological phenomenon on cyklotron centrum area. 2006, user: Government of Slovak Republic, Ministry of Environment.

ii. List of the most important studies commissioned for the decision-making authorities, the government and NGOs, international and foreign organisations

[1] Analysis of hydrological processes in protection zone of cave Domica and proposal of protection steps. Office of Slovak Caves, Liptovský Mikuláš, 2003.

[2] Expert opinion of soil water conductivity of main and neighbouring pitch. Slovak football association, Bratislava, 2004.

iii. List of the most important popularisation activities

[1] Radio Slovakia - April 2003, ŠÚTOR, J. – about Regional Seminar “Water Days” in Michalovce

[2] „Farmer`s news”, August 2003, ŠÚTOR, J. :“Water in agriculture land”

[3] newspaper “SME”, August 2003, ŠÚTOR, J. “To problems of soil drought (the role of wetlands)”

[4] Breefing to flood and drought, organized by SAS, September 2003 (radio, TV, press) - ŠÚTOR, J.

[5] TV station TA3, 7/11/2005, 14,30 h., Interview about theme “Water - miraculous liquid” (NOVÁK, V., 10 min),

[6] Broadcast intro “ European week of Science”, November, 2005.

[7] Reports in “News of SAS” – 3x (NOVÁK, V.), 2005.

[8] Briefing to “Earth Day” in cabinet of SSN, 22/4/2005 at 10.30 h. (ŠÚTOR, J., ŠTEKAUEROVÁ, V.) – “Floods and droughts as demonstration of global and climatic changes in Slovakia”

[9] Radio Regina, broadcast “Ozveny dňa (Day´s Echo)”, 21/4/2006 at 17.00 h., PEKÁROVÁ, P.: “Danube watershed is in multi-years wet phase according to experts”, TV TA 3, moderator Jurkovičová Jana, 2006

[10] TV TA3, Midday journal, 23/4/2006 at 12.00 h., PEKÁROVÁ, P.: “ Floods are not curious in last time”, moderator Martin Linhart, 2006

[11] TV STV, News STV, 22/4/2006 at 19.30 h., PEKÁROVÁ, P.: “Scientists investigate why the floods obsess ours in last time”, moderator Marta Jančkárová, 2006

[12] TV TA3, Midday journal, 25/4/2006 at 12.00 h., PEKÁROVÁ, P.: “Floods could be exchanged by drought during several next years”, moderator Martin Linhart, 2006

[13] Newspaper Pravda, 8/4/2006, contribution, PEKÁROVÁ, P.: “After floods is coming the period of drought”, 2 p.

[14] Newspaper Pravda, 28/6/2006, contribution, PEKÁROVÁ, P.: “It is not possible to prevent the floods, but it is possible to prevent their consequences”, 1 p.

[15] Radio Slovakia, broadcast “Afternoon with radio”, 25/4/2006, PEKÁROVÁ, P., SVOBODA, A.: “Europe lives out so-called “wet period”, moderator Petra Strižková, 2006

[16] Newspaper Pravda, rider Bratislava, 22/4/2006, SVOBODA, A., PEKÁROVÁ, P.: “The last flood did not surprise experts”, 1 p.

[17] Radio Regina Bratislava, Broadcast “Contacts”, 18/12/2006, 11,00 - 11,45 h., LAPIN, M., MAJERČÁKOVÁ, O., PEKÁROVÁ, P.: moderator Blanka Dóková

[18] RAN, Vol.9., No1., 2006, NOVÁK, V.:” The science and faith, two dimensions of Vatican

[19] Biologia, Bratislava, Vol.61., 2006, Suppl. 19, p.223–224, DEKKER, L.W., HALLETT, P.D., LICHNER, Ľ., NOVÁK, V., ŠÍR, M.: “Introduction to biohydrology.”

[20] News of SAS, Vol.42, 2006, p.10, 11, International conference “BIOHYDROLOGY 2006”, contribution LICHNER, Ľ.: View on wide range of processes

iv. List of patents issued abroad, incl. revenues

v. List of the patents issued in Slovakia, incl. revenues

vi. List of licences sold abroad, incl. revenues

vii. List of licences sold in Slovakia, incl. revenues

viii. List of contracts with industrial partners, incl. revenues

[1] Soil moisture in forest ecosystem, Forest Research Institute, Zvolen, 2003. 446 880,- Sk

[2] Estimation of water balance elements using mathematical models on base of soil moisture monitored data. Ministry of Environmental SR, 2003. 323 000,- Sk

[3] Use cultivate technologies from the point of global climate change elimination in environmental conditions of East Slovak Lowland, Regional Research Institute of Agroecology Michalovce, 2003 50 000,- Sk

[4] Calculation of the physico-geographic parameters of the river basins and correlations of the hydrological characteristics, Slovak Hydrometeorological Institute, Bratislava, 2003. 210 000,- Sk

[5] Analysis of hydrological processes in cave Domica protection zone and proposal of protection steps. Office of Slovak Caves, Liptovský Mikuláš, 2003. 40 000,- Sk

[6] Evaluation of the interaction of precipitation with soil surface of various granularity with respect to flood origin, Slovak Hydrometeorological Institute, Bratislava,2003. 100 000,-Sk

[7] Software development for objective selection of analogons for extrapolation of mean monthly and annual runoff, Slovak Hydrometeorological Institute, Bratislava, 2003 43 000,- Sk.

[8] Software development for routine calculation of average monthly series of flows in system of basins, Slovak Hydrometeorological Institute, Bratislava, 2003. 16 000,- Sk

[9] Elaboration of method for trend estimation of water quality development in the sense of Water Framework Directive for. Slovak Hydrometeorological Institute, Bratislava, 2003. 90 000,- Sk

[10] Soil moisture in forest ecosystem. Forest Research Institute, Zvolen, 2004. 467 040,- Sk

[11] Expert opinion of soil water conductivity of main and neighbouring pitch. Slovak football association, Bratislava, 2004. 30 000,- Sk

[12] The evaluation of climate change impact on production process of field crops with emphasis to sustainable agriculture. Regional Research Institute of Agriecology Michalovce, 2004. 50 000,- Sk

[13] Soil moisture in forest ecosystem. Forest Research Institute, Zvolen, 2005. 467 040,- Sk

[14] Calculation of water volume in snow cover for Poprad-Kežmarok basin, Slovenský hydrometeorologický ústav, Bratislava, 2005, 110 000,- Sk

[15] Consultations to runoff regions selection and construction of runoff map of Slovakia, Slovak Hydrometeorological Institute, Bratislava, 2005. 32 000,- Sk

[16] Effect of global climate change on sequence of production process of field crops and grass stands. Research Institute of Plant Production Piešťany - Research Institute of Agriecology Michalovce, 2005. 50 000,- Sk

[17] Assessment of regional types of mean monthly runoff and construction of the regional types map in GIS, Slovak Hydrometeorological Institute, Bratislava, 2005. 92 000,- Sk

[18] Setting of WASIM model into operation, Slovak Hydrometeorological Institute, Bratislava, 2005. 48 000,- Sk

[19] Soil moisture in forest ecosystem, Forest Research Institute, Zvolen, 2006. 441 000,- Sk

[20] Disassembly of two bore holes for measuring of soil water content by neutron probe. SIBAMAC, Bratislava, 2006. 90 000,- Sk

[21] Soil water content monitoring in area of Slovak Metrological Institute and over its boundary during years 2004-2005. Ministry of Environment SR, 2006. 691 000,- Sk

[22] Soil water content monitoring in area of Slovak Metrological Institute and over its boundary during year 2006. Ministry of Environment SR, 2006. 276 000,- Sk

[23] Provisions of adaptation for climatic changes in area of meadow cultivation, grass husbandry and agricultural crops. Research Institute of Plant Production Piešťany - Research Institute of Agriecology Michalovce, 2005. 50 000,- Sk

[24] Model WaSiM and its application in operational hydrology, Slovak Hydrometeorological Institute, Bratislava, 2006. 42 000,- Sk

[25] Calibration and simulation of the snow water content by the WaSiM model for the water reservoir Orava, Slovak Hydrometeorological Institute, Bratislava, 2006, 48 000,- Sk

[26] Statistical analysis of the selected physical and chemical parameters of the water quality by ARIMA model, Slovak Hydrometeorological Institute, Bratislava, 2006. 49 900,- Sk

[27] Assessment of the 100-year maximum specific runoff in the Hron river basin by topkriging method, Slovak Hydrometeorological Institute, Bratislava, 2006, 49 900,- Sk

ix. List of research projects with industrial partners, incl. revenues

x. Summary of outreach activities

Outreach activities	2003	2004	2005	2006	total
studies for the decision sphere, government and NGOs, international and foreign organisations	0	0	1	1	2
articles in press media/internet popularising results of science, in particular those achieved by the Organization	3	0	4	6	13
appearances in telecommunication media popularising results of science, in particular those achieved by the Organization	3	0	2	6	11
public popularisation lectures	1	1	1	1	4

xi. Supplementary information and/or comments on applications and popularisation activities

Institute of Hydrology has increased its popularisation activity during last years.

7. Background and management. Staffing policy and implementation of findings from previous assessments

The last accreditation of Institute of hydrology was in year 2005. There were evaluated the activities of the institute during years 2001-2004. Commission for accreditation recommended to us to increase number of CC publications.

During four years 2001 – 2004 we had 11 CC publications – average value is 2,75.

During year 2005 we had 4 CC and 1 SCOPUS publications.

During year 2006 we had 18 CC and 6 SCOPUS publications.

The increase is evident during two last years.

i. Summary table of personnel

Personnel	2003	2004	2005	2006
all personel	48	49	48	47
research employees from Tab. Research staff	29	31	30	29
FTE from Tab. Research staff	27,5	29,5	29	28
averaged age of research employees with university degree	44	44	45	46

ii. Professional qualification structure

Number of	2003	2004	2005	2006
DrSc.	3	3	3	3
PhD / CSc.	13	14	16	18
Prof.	0	0	0	0
Doc./Assoc. Prof.	1	1	1	1

iii. Status and development of research infrastructure incl. experimental, computing and technical base (description of the present infrastructure, premises, and material and technical resources. Infrastructure, instrumentation and major technical equipment necessary for the achievement of the objectives specified in the research Concept)

IH SAS performs theoretical, laboratory and field research. The institute is situated in Bratislava and it has 3 remote establishements, two of them Michalovce and Liptovský Mikuláš are involved in own projects.

What concerns the *theoretical research* (development of mathematical models, computational and statistical methods, etc.) the institute is relatively good equipped with computer network.

Situation in *laboratory research* is not as favourable. The workplaces in Bratislava and Michalovce established laboratories for analysis of basic physical and hydrophysical properties of the soils (including the pressure apparatus Soil Moisture Equipment, Santa Barbara California), monitoring of the processes in the soil and measurement of unsaturated hydraulic conductivity. Equipment for e.g. measuring of root systems, or chemical analyses is used in collaboration with other institutions (Department of Water, Atmosphere and Environment, Institute of Hydraulics and Rural Water Management,

University of Natural Resources and Applied Life Sciences -BOKU, Vienna, Austria), or they are contracted through project financing.

What concerns the *field research*, three of the workplaces (Bratislava, Liptovský Mikuláš and Michalovce) are equipped by cars, soil moisture monitoring devices (neutron probe, TDR method), devices for measuring of filtration coefficients (Guelph permeameter, disc permeameter, and other), sampling devices, lysimeters, limnigraphs, automatic meteorological stations, current meters.

With respect to *information technologies* the institute is running own server, computer network, all workplaces are connected to INTERNET and the communication between workplaces is on good level.

Part of the institute`s budget was used for maintainance and upgrade of the remote establishements mainly.

For the achievement of the objectives specified in the research Concept:

Drought of soils represents an actual topic for the Slovak territory, from the scientific point of view, and also from the one of taking and executing the necessary correction measures. Impacts of the climate change upon the soil water storage and its dynamics,is bringing the problem of the drought phenomenon in real time and in the selected time predictions, into a close attention. The observed time series of the soil water content in the selected regions and periods represent a basic information for analysis of conditions of the drought origin and progress, both in time and space. Key problem in such analyses is the collection of data – time series of the soil water content. There are two methodological approaches in this respect. First is the direct observation (monitoring) of the moisture in soil, the second one is the numerical simulation using a mathematical model. The first approach acquires the organization of a monitoringsystem, processing and interpretation of the observed data using trend analyses of the integral soil ater content time series in the soil aeration zone. Such monitoring system of soils on the whole territory of Slovakia does not exist so far.

The Institute of Hydrology would like to participate in creating of such soil moisture and groundwater level monitoring network in Slovak river basins. It requires to gain remote sensing monitoring probes installed in field. We expect increase in applying projects in this field.

Part of the institute`s budget will be used for maintainance and upgrade of the workplaces.

iv. Status and development of bibliographic resources, activities of the Organisation’s library and/or information centre

The library is equipped by INTERNET, and it is one of the reasons of subscription reduction. Because of saving of costs we cooperate with libraries of other institutions and subscription of some periodicals is shared.

v. Describe how the results and suggestions of the previous assessment were taken into account

The Institute will aim its effort to submit the proposals of projects, which allow to finance capital outlays and current expenses of the Institute. The Institute keeps its activities in obtaining of finances from external resources.

The increase of number of CC publications during two last years is evident.

During four years 2001 – 2004 we had 11 CC publications – average value is 2,75.

During year 2005 we had 4 CC and 1 SCOPUS publications.

During year 2006 we had 18 CC and 6 SCOPUS publications.

vi. Supplementary information and/or comments on management, research infrastructure, and trends in personnel development

The Institute intends to sustain the PhD study at present level. PhD-student has to finish his/her study after 3 years according to contemporary PhD-study programmes. Qualification increase hastens by this way. The Institute supports international postdoc fellowships of young scientists (3-6 month) with aim to increase their language skills and to obtain work experiences in international teams.

There is expected that research workers of the Institute will increase their qualification degrees: 5 to IIb-degree, 6 to IIa-degree, 5 to I-degree and 2 scientists will get DrSc.-academic degree.

Other information relevant to the assessment