



## PARTNER PROFILE FORM

CONTACT DETAILS			
<b>Organisation Name</b>	<i>Institute of Meteorology and Water Management</i>		
<b>Financial capital</b>	~ 20 mln Euro	<b>Human capital</b>	1502
<b>Type of organization</b>	■ Research and Development Unit	<b>Contact Person</b>	Marta GLIŃSKA
<b>Department</b>	Hydrological Forecasting Service		
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EXPERTISE OFFERED	
<b>The Institute's interests:</b>	<ul style="list-style-type: none"> <li>▪ Hydrological and meteorological forecasting methods;</li> <li>▪ Hydrological and meteorological warning;</li> <li>▪ Monitoring of maritime management and civil aviation;</li> <li>▪ Regular hydrological and meteorological measurements and observations;</li> <li>▪ Acquisition, archiving, processing and making available hydrological and meteorological measurement and observational materials;</li> <li>▪ Development and exploitation of hydrological mathematical models;</li> <li>▪ Monitoring the quality of flowing waters;</li> <li>▪ Monitoring of the radioactive air contamination;</li> <li>▪ Collecting and archiving information of processes occurring in the atmosphere and hydrosphere;</li> <li>▪ Analysis and assessment of interactions with other components of natural environment;</li> <li>▪ Warning the society and national economy.</li> </ul>
<b>Keywords specifying the Expertise:</b>	Hydrology, hydrography, operational hydrology, limnology, lakes, shore zones, litoral zones, river channel, morphology, physical – geographical parameters, rating curve, water balance, hydrographical division, frequency analysis, streamflow characteristics,

	<p>ungaged basins, risk assessment, extreme hydrological events, water resources, flood, flooding, drought, flood analysis, drought analysis, low flow, extreme flows, disaster, hazard, hydrological forecasting, monitoring system, warning system, hydrological modelling, multivariate statistical analysis, static and dynamic bayesian models, stochastic models, multivariate normal regression, matrix normal regression, multivariate discount weighted regression, applied hydrology, GIS, heavy rains, hydrological design characteristics, data collecting, data distribution, data processing system, data storage system (database), hydrological data, meteorological data.</p>
<p><b>Department research interests:</b></p>	<p><b>Hydrological Forecasting Service</b></p> <ul style="list-style-type: none"> <li>▪ Data collecting and processing;</li> <li>▪ Quantitative monitoring of water resources;</li> <li>▪ Hydrological forecasting;</li> <li>▪ Simulation techniques to study possible hydrological effects of environmental and management decision;</li> <li>▪ Flood monitoring;</li> <li>▪ Drought monitoring.</li> </ul> <p><b>System of Hydrology Centre</b></p> <ul style="list-style-type: none"> <li>▪ Development of SH and adaptation to users requirements;</li> <li>▪ Development of SH and adaptation to requirements of end-users of hydrological and meteorological data and products;</li> <li>▪ Training and integration of SH users;</li> <li>▪ Monitoring of SH resources;</li> <li>▪ Projects aimed to storage, processing and distributing data.</li> </ul> <p><b>Centre of Hydrology</b></p> <ul style="list-style-type: none"> <li>▪ Digital Map of Hydrographic Division of Poland (MPHP);</li> <li>▪ Thematic GIS maps created on the basis of MPHP;</li> <li>▪ GIS technology in hydrology;</li> <li>▪ Hydrographic parameters of rivers and basins;</li> <li>▪ Rivers' length and network schemes;</li> <li>▪ Discharge modeling from small ungauged catchments;</li> <li>▪ Regional and local floods;</li> <li>▪ Heavy rains and flash floods;</li> <li>▪ Water circulation balance and determination of basin water resources;</li> <li>▪ Water resources assessment on national, regional and local scale;</li> <li>▪ Lakes dynamic water resources assessment;</li> <li>▪ Calculation of water exchange in river-lake systems;</li> <li>▪ Study of land use impact on lakes water resources</li> </ul>

	<p>status;</p> <ul style="list-style-type: none"> <li>▪ Systems theory and mathematical modeling in hydrology;</li> <li>▪ Hydrologic modeling for climate impact assessments;</li> <li>▪ Statistical methods for flood and low flow frequency analysis;</li> <li>▪ Methods for risk assessment of hydrological events;</li> <li>▪ Estimation of hydrological forecasting uncertainty;</li> <li>▪ Statistical models of floods and low flows;</li> <li>▪ Assessment and verification of flows in river channel applying hydrodynamic models and new methods for rating curve determination;</li> <li>▪ Hydrological characteristics for planning and designing;</li> <li>▪ Extreme hydrological events and their statistical models;</li> <li>▪ Statistical methods, robust statistics;</li> <li>▪ Multimodel inference;</li> <li>▪ Water management on reservoirs and its impact on hydrological regime.</li> </ul>
<p><b>International projects from last 5 years:</b> (Title of project, source of funds, duration, partner or leader)</p>	<ul style="list-style-type: none"> <li>▪ <b>Elaboration of joint Polish-German computer map of Nysa Łużycka and transboundary Odra River catchment;</b> (Erarbeitung einer gemeinsamen Computerkarte des Einzugsgebietes der Lausitzer Neise und der Grenzoder; MŚ; from 1997, partner;</li> <li>▪ <b>Cooperation within ETN-R (European Terrestrial Network River Discharge) and EFAS (Developing of the European Flood Alert System) projects.</b> Delivering of near real time discharge and water level data occurred in an operation mode for German Federal Institute of Hydrology (data processing and information provision service). Duration: 2008-2010, financed by EC funds;</li> <li>▪ <b>ESPA project (Emergency Stress Psychological Assistance) Psychological support in the stress situation caused by catastrophe</b> – IMGW’s role: researches and support in the field of floods. Duration: 2006 – 2007, financed by grant of the EC DG Environment;</li> <li>▪ <b>EFRP project (Emergency Flood Recovery Project).</b> Designing and implementation with put in motion System of Hydrology. Duration: 2000 – 2005, financed by World Bank loan;</li> <li>▪ <b>Report on the selected Flash Floods in Poland,</b> [in:] Study of the Historical Floods from Integrated Flood Management Viewpoint ; CEE – WMO, 2004; partner.</li> </ul>

<p><b>Added value that Department can provide:</b> (know-how/ expertise and equipment)</p>	<p><b>Hydrological Forecasting Service</b></p> <ul style="list-style-type: none"> <li>▪ Experience in mathematical modeling of hydrological process (rainfall – runoff models and hydrodynamic models);</li> <li>▪ Monitoring and warning systems;</li> <li>▪ Short – term hydrological forecast.</li> </ul> <p><b>System of Hydrology Centre</b></p> <p>The System of Hydrology (SH) is IT software used for collecting, processing and distribution of data as well as hydrology and meteorological products in the IMGW. SH is an open modular system, that is easy to extended and modified according to user needs.</p> <ul style="list-style-type: none"> <li>▪ Collecting and validation of hydrological and meteorological data ;</li> <li>▪ Operational data processing system (forecasts, reports, visualizations, GIS, notes, warnings, analyses);</li> <li>▪ Historical data processing system (annual compilations, calculations of the characteristic hydrological values);</li> <li>▪ Hydrological and meteorological storage data system (database);</li> <li>▪ Data and products distribution system.</li> </ul> <p><b>Centre of Hydrology</b></p> <ul style="list-style-type: none"> <li>▪ Hydrological processes modeling;</li> <li>▪ Water resources study;</li> <li>▪ Low flows impact on rivers and lakes water resources analysis;</li> <li>▪ Floods and their impact analysis;</li> <li>▪ Expertise in GIS and statistical methods;</li> <li>▪ Systems theory and mathematical modeling in hydrology;</li> <li>▪ Hydrological modeling to assess climate impact on water resources and watercourses regime;</li> <li>▪ Statistic methods in hydrology;</li> <li>▪ Modeling of natural phenomena using dynamic Bayesian models;</li> <li>▪ Bayesian methods for estimation of hydrological forecasting uncertainty;</li> <li>▪ Mathematical models for prediction of flood and low flow;</li> <li>▪ Contribution to Hydrological Atlas of Poland; Elaboration of Hydrographical Atlas of Poland in 1:200000 scale;</li> <li>▪ Elaboration of hydrographic division in 1:50000 scale and its computer map (MPHP)(ArcGIS);</li> <li>▪ Work in the Commission for Establishing Names of Localities and Physiographic Objects at the Ministry of Interior and Administration;</li> <li>▪ River's runoff models development;</li> </ul>
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	<ul style="list-style-type: none"> <li>▪ GIS thematic maps elaboration on the basis of MPHP;</li> <li>▪ Monography of floods that affected Poland since 1945;</li> <li>▪ Assessment of water resources and periodical reports on quantity and quality of surface water resources in Poland;</li> <li>▪ Collaboration on Transboundary Rivers;</li> <li>▪ Long-term studies on river valleys and beds morphology using aviation remote sensing;</li> <li>▪ Hydrometeorological data;</li> <li>▪ Measurement equipment;</li> <li>▪ Hydrological characteristics for planning and designing.</li> </ul>
<p><b>Main researchers and expertise:</b> (name, surname, academic degree, speciality)</p>	<p><b>Hydrological Forecasting Service</b></p> <ul style="list-style-type: none"> <li>▪ Małgorzata MIERKIEWICZ, PhD P.Eng. – hydrological modelling, hydrological forecasting;</li> <li>▪ Michał CERAN, MSc Eng. – operational hydrology, hydrological forecasting;</li> <li>▪ Marcin DOMINIKOWSKI, MSc – operational hydrology, hydrological forecasting, science;</li> <li>▪ Andrzej KADŁUBOWSKI, MSc – hydrological modelling, hydrological forecasting, science;</li> </ul> <p><b>System of Hydrology Centre</b></p> <ul style="list-style-type: none"> <li>▪ Paweł CABAŃSKI, MSc Eng. – GIS, hydrology, modeling;</li> <li>▪ Dorota CERAN, MSc Eng. – historical hydrology;</li> <li>▪ Marcin DĄBROWSKI, MSc Eng. – hydrology, IT systems and data bases in hydrology;</li> <li>▪ Grzegorz SŁOTA, MSc Eng. – hydrology, IT systems for hydrology.</li> </ul> <p><b>Centre of Hydrology</b></p> <ul style="list-style-type: none"> <li>▪ Jerzy BRZEZIŃSKI, PhD Eng. – hydrology</li> <li>▪ Maurycy CIUPAK, PhD Eng. – environmental science and technology;</li> <li>▪ Janusz OSTROWSKI, PhD Eng.– technical sciences</li> <li>▪ Bogdan OZGA – ZIELIŃSKI, PhD P.Eng. – senior hydrologist</li> <li>▪ Ewa BOGDANOWICZ, PhD – mathematics, statistics, hydrology</li> <li>▪ Halina CZARNECKA, PhD – natural sciences, hydrography</li> <li>▪ Barbara NOWICKA, PhD – hydrology, physical limnology;</li> <li>▪ Jerzy SZKUTNICKI, PhD – hydrology;</li> <li>▪ Marta GLIŃSKA, MSc Eng. – environmental science</li> <li>▪ Agnieszka PIETRZYKOWSKA, MSc Eng. – meteorology;</li> <li>▪ Monika SAWICKA, MSc Eng. – meteorology;</li> <li>▪ Anna STRZELCZAK, MSc Eng. – agrometeorology;</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Łukasz CHUDY, MSc – hydrology, water management</li> <li>▪ Barbara GŁOWACKA, MSc – mathematics, GIS</li> <li>▪ Witold JAWORSKI, MSc – geography, GIS, models in hydrology, hydromorphology</li> <li>▪ Jolanta KRUPA-MARCHLEWSKA, MSc – hydrology, GIS</li> <li>▪ Michał MARCINKOWSKI, MSc – geography, GIS, models in hydrology, geostatistics</li> <li>▪ Sławomir WERESKI, MSc – hydrology, meteorology;</li> <li>▪ Monika ZANIEWSKA, MSc – hydrogeology</li> </ul>
<p><b>National projects of the Department of Hydrology:</b> (Title of project, source of funds, duration,)</p>	<ul style="list-style-type: none"> <li>▪ <b>„KLIMAT”</b> „Project Impact of climate change on environment, economy and society” (task 4.7 „FF type flash floods induced by heavy torrential rains”, POIG 2008-2012;</li> <li>▪ <b>„Monitoring, forecasting and simulation of natural hazards in Warsaw capital city”</b> chaired by H. Lorenc and J. Ostrowski under the ordered research project no. PBZ-MIN-011/013/2004. ”Models of municipal agglomeration risks, including emergency management on the example of Warsaw capital city”, 2006-2009;</li> <li>▪ <b>„Hydrological Manual for Engineers”</b>, internal project, 2007-2009;</li> <li>▪ <b>Water resources assessment in water bodies</b>, internal project, 2007-2009;</li> <li>▪ <b>Concept of new hydrological atlas of Poland</b>, internal project, 2007-2008;</li> <li>▪ <b>Multimodel approach in discrimination, regression and estimation problems</b>, internal project, 2007-2008;</li> <li>▪ <b>Project and implementation of the new database’s structures responsible for storage, selecting and updating data in SH</b>, October. 2008;</li> <li>▪ <b>Hydrological management and forecasting system (System of Hydrology and Modeling Project)</b> – in operational use in IMGW from 2006;</li> <li>▪ <b>Flood characteristics in Poland in 2006 and flood risk area assessment</b>. Analyse made for PZU S.A.; 24.11.2008-31.12. 2008;</li> <li>▪ <b>„Atlas of hydrographic division of Poland”</b> Project ordered by the Minister of Environment, 2005;</li> <li>▪ <b>„Computer system to assess water resources in ungauged agricultural catchments”</b> Research Project no. P06S 035 24 [Agreement no. 0820/P06/2003/24 dated 28 May 2003] (2003-2007);</li> <li>▪ <b>Maximum rainfall in Poland - design approach</b>, 1997-2001;</li> </ul>

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|  | <ul style="list-style-type: none"> <li>▪ <b>Integrated Hydrological Monitoring and Forecasting System for Vistula River Basin</b> – in operational use in IMGW from 1997.</li> </ul> |
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## **PROJECTS' AND ACTIVITIES' PROPOSALS**

### **Hydrological Forecasting Service**

- Efficiency of hydrological forecasts.
- Drought monitoring system.

### **System of Hydrology Centre**

- Projects related to exchanging, delivering and data storage.
- Project and testing new methodological solution in hydrology and water management using SH tools and functions.
- Creating new IT solutions for hydrology and water management, based on SH tools and SH databases.
- Creating tools supporting decision processes in crisis and emergency management connected with floods and other natural disaster.
- Projects dedicated to assure quality of hydrological and meteorological data.
- Projects aimed to presentation, visualization and usage of GIS for hydrological and meteorological data.

### **Centre of Hydrology**

- Extented determination of historic floods , including an inventory of flood marks to be used in flood prevention plans.
- Contribution to works on broadening thematic input to the digital map „Hydrotechnical structures of I, II and III classes”.
- Elaboration of integrated model for river basin.
- Regional analysis of statistical models for seasonal flood frequency.
- Evaluation of methods for estimation streamflow characteristics in ungaged basins.
- Support System for Risk Assessment of extreme hydrological events appearance (SSRA).
- Synthesis Two-level Bayesian Model for points and intervals hydrological forecasts (STBM).
- Mathematical Models for Prediction and Assessment of floods and low flows. (WMMPA).
- Hydrological atlas of Europe.
- Transboundary water collaboration in Europe.
- Maximum rainfall statistical modeling.
- Hydrological characteristics and their dynamics and variability in space.