



Report on:
International Research-to-Practice Conference
WATER SUSTAINABILITY IN THE XXI CENTURY: CHALLENGES AND SOLUTIONS
Annual Meeting 2017, IGU Commission of Water Sustainability



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Attachments

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(1) Purpose of this report

The purpose of this report is to provide feedback to the Russian Foundation for Basic Research which financially supported the conference aiding the assessment of how aims and objectives of the conference were met. To this end a brief overview on relevant statistics and a summarising review of topics of presented papers are compiled. In addition indications are given on implications of the meeting for future research and follow up meetings.

(2) Problem statement and objectives of conference

With ever increasing pressure on fresh water resources in many regions worldwide due to rising demand by growing economies and populations often facing reduced water availability due to over-use and climatic variability a sound scientific understanding on how water resources can be used in an ecologically and economically sustainable manner is of growing importance. This conference aimed at bringing together a range of water specialists with geographical background as well as from other disciplines to explore in an integrated manner what the main challenges in achieving a sustainable water use are and how best it can be achieved. As a research-to-praxis event the meeting specifically aims to adopt an applied approach to facilitate the transformation of scientific insight into practical applications.

Apart from the envisaged scientific exchange and the planned peer-reviewed publication of selected papers the conference also was designed to facilitate close and personal networking among members during a 3-day field excursion which simultaneously offered unique insights into the work and knowledge of local water experts. As a standing feature of all Commission meetings we regard this type of thematic field trip as a particularly valuable and attractive component that fosters close and fruitful scientific and personal relations between members of the Commission.

Lastly, the Conference also served as annual meeting of the IGU Commission for Water Sustainability at which strategic and administrative issues relating to the Commission are to be discussed soliciting input from members.

(3) Conference details and statistics

Time and venue of conference

The conference was held from 16 to 21 of August 2017 at the premises of the International Ecological and Educational centre "Istomino" at the shores of Lake Baikal (located some 130 km from the City of Ulan-Ude in the Selenga River delta). For details of the research station please use the following link: <http://www.eu-interact.org/field-sites/observer-stations/russia/baikal-istomino-field-station/>.

Structure of conference

The conference consistent of two major parts: the paper presentations and discussion at various sessions and a 3-day field excursion led by local experts on water-related aspects of Lake Baikal as the world's single largest freshwater reservoir and unique ecosystem.

All papers were presented to the plenary in either English or Russian. In both cases simultaneous translation was provided.

In order to achieve a well-balanced programme the conference reflecting the interests and membership of the IGU Commission for Water Sustainability the Organising Committee included not only local scientists of the hosting organisation (Baikal Institute for Nature Management) but also scientists from other institutions and countries:

Frank Winde – Prof. Dr. habil., Chair IGU Commission for Water Sustainability, North-West University, South Africa

Nikolai Kasimov – Academician of the RAS, I vice-president of the Russian Geographical Society, President of the Faculty of Geography of the Lomonosov Moscow State University, Russia

Arnold Tulokhonov – Academician of the RAS, member of the Committee on International Affairs of the Federation Council of the Federal Assembly of the Russian Federation, scientific leader of the BINM SB RAS, Russia

Endon Garmaev – Dr. habil., Professor of the RAS, Director of the BINM SB RAS, Russia

Natalia Frolova, Vice Chair of the IGU Commission for Water Sustainability, Head of the Land Hydrology Department of the Faculty of Geography of Lomonosov Moscow State University, Russia.

Number and topics of sessions

The conference comprised of the following 5 different sessions covering water quantity as well as water quality and water management-related aspects:

1. Water resources in the conditions of changing climate
2. Water Management: Principles, Methods, Results
3. Water cooperation in transboundary river basins
4. Water Pollution and Health Impacts
5. Extreme hydrological events

Speakers

The list of speakers including affiliation, email address and topic of the presented paper is provided in Tab. 1.

Tab. 1: Speakers including affiliation, email address and topic of the presented paper
(pink name: member of Commission at the time of the conference, blue name: joined later)

Given name, surname	Topic of paper	Affiliation	E-mail
Lanhui Zhang	<i>Physically-based adjustment factor for precipitation estimation in large arid mountainous watershed, Northwest China</i>	Key Laboratory of West China's Environmental System (Ministry of Education), College of Earth and Environmental Sciences, Lanzhou University, China	lh Zhang@lzu.edu.cn
Maria Kireeva	<i>Water regime transformation under the influence of changing climate on the European part of Russia</i>	Lomonosov Moscow State University, Faculty of Geography, Russia	kireeva_mb@mail.ru
Dmitry Magritsky	<i>Water resources of the Russian Arctic rivers under the influence of climate changes and large-scale water management</i>	Lomonosov Moscow State University, Faculty of Geography, Moscow, Russia	magdima@yandex.ru
Svetlana Patsaeva	<i>Optical properties of colored dissolved organic matter in different aquatic systems</i>	Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia	spatsaeva@mail.ru
Chansheng He	<i>Water Saving Potential in arid Northwestern China</i>	Lanzhou University, China; Western Michigan University, USA	he@wmich.edu
Leonid Korytniy	<i>Cartographic support of water resource management</i>	V.B. Sochava Institute of Geography SB RAS, Irkutsk, Russia	kor@irigs.irk.ru
Shuguang Liu	<i>Construction of Spongy City Under the Fast Development of Urbanization in China</i>	Tongji University, Dpmnt. of Hydraulic Engineering, Shanghai, China, Key Laboratory of Yangtze River Water Environment, Ministry of Education, Vice Director	liusgliu@tongji.edu.cn
Elena Ilicheva	<i>The current state of the water erosion system of the Selenga river basin</i>	V.B. Sochava Institute of Geography SB RAS, Irkutsk, Russia	Lenail3663@mail.ru
Natalia Frolova	<i>Evaluation of water balance in large Russian river catchments with the help of the satellite system of the earth's gravity field measurement (GRACE)</i>	Lomonosov Moscow State University, Faculty of Geography, Moscow, Russia	frolova_nl@mail.ru
Buren Scharaw	<i>Urban Water Management in Northern Mongolia</i>	Fraunhofer IOSB Institutsteil Angewandte Systemtechnik (AST), TU Ilmenau, Germany	buren.scharaw@iosb-ast.fraunhofer.de
Frank Winde	<i>Climatic controls on water quality and health: a case study from the southern Kalahari desert</i>	North-West University, Vaal Triangle Campus, Vanderbijlpark, South Africa	frank.winde@nwu.ac.za
Chaomeng Dai	<i>Comparative analysis of terms and migration mechanisms of chemical components in natural-technogenic soils in the east regions of Russia and China</i>	Tongji University, Dpmnt. of Hydraulic Engineering, Shanghai, China	daichaomeng@tongji.edu.cn
Heejun Chang	<i>Assessing Urban Flood Risk in a Changing Climate</i>	Portland State University, Portland, Oregon, USA	changh@pdx.edu
Julia Hall	<i>Hydroclimatic Extremes in Europe: Spatial-</i>	Institute of Hydraulic Engineering	hall@hydro.tuwien.ac

	<i>temporal Characteristics of Floods and Droughts</i>	and Water Resources Management Vienna University of Technology, Vienna, Austria	at
Guihui Zhong	<i>Flood Hazard Map and Flood Risk Management in Taihu Basin of China</i>	Tongji University, Dpmnt. of Hydraulic Engineering, Shanghai, China	Guihui_zhong@tongji.edu.cn
Elena Krasnova	<i>Coastal meromictic lakes on different stages of isolation from the White Sea</i>	Lomonosov Moscow State University, Faculty of Biology, Moscow, Russia	E.d.krasnova@mail.ru
Svetlana Agafonova	<i>River ice within the arctic zone of Western Siberia in current climate conditions</i>	Lomonosov Moscow State University, Faculty of Geography, Moscow, Russia	sv.andreevna@mail.ru
Mr Endon Garmaev	<i>International cooperation in transboundary rivers basins</i>	Baikal Institute of Nature Management SB RAS, Ulan-Ude, Russia	garend1@yandex.ru
Arnold Tulokhonov	<i>Main results of the expedition "Miri" on Lake Baikal"</i>	Baikal Institute of Nature Management SB RAS, Ulan-Ude, Russia	AKTulohonov@binm.ru
Cai Yi	<i>Tempo-spatial analysis of the interaction between river water and groundwater in the Heihe River basin, China</i>	Tongji University, Dpmnt. of Hydraulic Engineering, Shanghai, China	caiyi@tongji.edu.cn

In addition to speakers there were also guest attending the various sessions bringing the total number of participant to well over 30. Apart from members of the Commission the meeting also attracted colleagues which were not yet registered members. Of these some joined the Commission through filling-in a template sent out by the chair immediately after the conference (Tab. 1).

In total 20 papers from speakers representing 6 countries from 4 continents (Africa, Asia, Europe, North America) were presented. Due to unforeseen circumstances registered participants from Armenia and Romania could unfortunately not attend (Tab. 2)

Tab.2: Countries represented by speakers

No.	Country	No. of speakers/country
1	Austria	1
2	China	5
3	Mongolia	1
4	Russia	10
5	South Africa	1
6	USA	2
	Total	20

As usual, participants from the host country and from countries in close proximity are accounting for the majority of speakers. Yet, with papers from North America, Europe, South Africa and Mongolia the conferences managed to achieve a significant degree of geographical coverage.

Topics covered

The distribution of all papers across the 5 different topical categories of the sessions are listed in Tab. 3.

Tab. 3: Topical category (session theme) and study areas of presented papers

Session	No. of papers/ session* (% of total no.)	Study areas
(1) Water and climate	4 (20%)	NW-China European Russia Russian arctic Western Siberia
(2) Water management	6 (30%)	Russia (2x) Qinghai-Tibet Plateau (China) NW-China Mongolia

(3) Transboundary catchments	2 (10%)	Russia Selenga basin
(4) Water pollution and health	4 (20%)	Southern Kalahari Desert (South Africa) E-Russia/China White Sea (Russia)
(5) Floods and droughts	4 (20%)	Taihu Basin (China) Jiu River (China) continental Europe USA
Total	20 (100%)	

** allocation based on main theme as reflected in title, aspects relating to other session topics may also be covered*

Regarding the thematic distribution of papers the emphasis of the meeting was on water management in the widest sense (30% of all papers) followed by water quantity aspects related to climate change (22%) and hydrological extreme events (20%). Water quality aspects were addressed in 4 papers (20%) with the remainder covering transboundary water issues. Interestingly, within the water quantity-related papers a focus on urban water issues emerged even though this was not a dedicated theme.

Naturally, the geographical focus of the presented research reflected the speaker's countries of origin resulting in most papers addressing areas located in Russia and China as the two countries where most speaker hail from. However, with case studies from North America, Africa and Europe there was also a wide spread of hydrologically and climatologically very different areas present.

Field trips

Three different field trips on water-related aspects of Lake Baikal were conducted forming a highlight of the conference. This includes a boat trip through the Selenga River delta, a visit of the ecotrail at the Baikal State Biosphere Reserve at Tankhoy and a boat trip with overnight stay at a floating hotel to the Chivyrkuy Bay Nature Reserve including a visit to the nearby hot springs. A fourth trip was organised to the monastery of Posolsk beautifully appointed at the shore of the lake. For snapshot from these trips please refer to the website of the Commission (www.igu-water.org).

Commission matters

Members of the Steering Committee met informally during breaks to discuss strategic and administrative aspects of the Commission. The chair used the opportunity to introduce the revamped website of the Commission to the Members.

In order to harvest ideas and input from participants a formal request was made during the conference to provide comments on a pre-drafted conference report. Among others this initiated spontaneous meetings of participants discussing the conference and how to keep the momentum it generated. The inputs of members have been considered in this report.

(4) Summary

(i) Preparation and organisation of the conference

All participants, member of the Commission and non-members alike, agreed unequivocal that the conference was exceptionally well organised and prepared by the local conference committee under the leadership of Prof. Endon Garmaev and his most capable assistant Mr. Alexander (Sasha) Ayurzhanayev (aaayurzhanayev@yandex.ru) and his colleague Oyuna. We also would like to say special thanks to Academician prof. Arnold Tulokhonov who graced the meeting with his keynote address.

We also wish to express our sincere gratitude to the organisers for having hosted an event marked by exceptional hospitality and personal warmth which made this conference a very memorable and special event in the long list of Commission's meetings. It not only facilitated scientific exchange but also brought participants closer together stimulating discussions and plans on joint papers and future projects. Special mentioning must be made of the attention to detail such as the provision of conference bags packed with maps of the area, note pads and touch screen pens with the Commissions logo, the specially crafted gifts, excellent catering even during the field trips, the personal fetching of all participants from the airport and the general diligence in making logistical and administrative arrangements before and during the conference.

The meeting also succeeded in expanding the member base of the Commission by attracting a number of non-members who subsequently joined the Commission.

A documentary on the conference and water issues related to Lake Baikal produced by the Commission member Dr Maria Kireewa was broadcasted at TV Channel Russia 24 on 4 September 2017 (<https://www.youtube.com/watch?v=s7v3imiGbH8>).

(ii) Presentations

The conference succeeded in attracting papers covering the full width of the envisaged spectrum of topics. In addition it achieved a good geographical representation of speakers and study areas with a focus being naturally placed on water issues in and around the host area (Russia, Eastern China, Mongolia). In accordance with the aims and objectives of the meeting the sustainable management of water resources attracted the largest number of papers followed by climate impacts and hydrological extreme events such as floods and droughts.

In this context the important of cities as main human habitats are reflected too with papers specifically addressing urban water issues. However, aspects related to the sustainability of water use such as pollution and associated health risks were also well represented. In almost all cases presented the applied aspect of using science to solve real world challenges was evident often stressing also social aspects as key components of finding sustainable solutions to technical and physio-geographical water issues.

Special attention received the presentation by Julia Hall on trends of climatic changes and the frequency of flood events in Europe which was based on a paper recently accepted for publication by Science. The Commission wishes to congratulate Julia and her co-authors on this achievement.

Based on the above we believe the meeting achieved what it set out to do and served to keep the newly found momentum of the Commission. All presentations will be available as pdf on the website of the Commission (www.igu-water.org).

(iii) Field trips

The importance of local field trips as an unique opportunity to learn on site from local experts and to informally connect with colleagues cannot be over-emphasised and continues to serve as a major attraction for members to attend Commission meetings held independently from larger IGU events. Given the unique importance of Lake Baikal as the world's single largest freshwater reservoir containing approximately 20% of all freshwater resources and deepest lake on earth (1642 m reached by the Russian submarine 'Mir') and the increasing challenges to water flow and quality arising from human impacts and natural changes the conference venue was indeed a very fitting and appropriate place to meet for group of scientists concerned with water sustainability.

In this regard the trips to various Nature Reserve at different parts of the eastern shore of the lake was a unique experience ranging from insights into hydrological dynamics and aquatic habitats to geomorphology and tectonics-related phenomena such as the thermal springs and uplift of land. A trip to the Ushkan Islands with a colony of endemic seals (called Nyerpa) had to be cancelled on short notice due to strong winds. This did not in any way dent the excellent impressions all participants took home from theses exciting and well organised field trips during which large distances (several hundreds of kms) had to be covered – frequently by using sub-optimal roads. Each stop en route was made a special experience with the Russian colleagues always preparing out of nowhere the nicests snacks and a range of beverages, some of which not purely consisting of water despite their name suggesting so ('wodka' is a diminutive form for 'water' in Russian ;-)).

(5) Identified priority areas for future activities

It is envisaged to continue with the vision of the Commission and build on the encouraging results of this conference. A first step will be to report on the outcomes on our website and archive the associated records such as the conference programme and the abstracts and delivered presentations, where possible. In a second step, the possibility of publishing selected papers from the meeting in a dedicated special issues of a peer-reviewed journal or book series will be explored.

With the sustainability concept generally gathering importance, specifically in the field of water resources utilization, we believe that the identified areas of research as reflected by this and earlier conferences of the Commission, are still very much relevant.

During the conference first talks were held to explore opportunities for collaboration between the Tongji University of Shanghai (China) and the Fraunhofer Institute of Ilmenau (Germany) and as well as of colleagues from USA, Austria and Germany on the possibility of writing a joint position paper on the role of Geography in the water sciences.

Furthermore, Leonid proposed to explore the applicability of the GIS-methodology specifically developed by the Geographical Institute Irkutsk for the Hydrological Atlas in the Baikal Region to other catchments. This is certainly a proposal worth following up.

(6) Proposal for future follow-up meetings

The next annual meeting of the Commission will be held in 2018 as part of the IGU conference in Quebec (Canada). For that event the Commission will propose sessions in due course.

Attachments

First circular, conference programme, photos



Conference participants in front of the Research Station 'Istomino' of the Baikal Institute for Nature Management

(from left: Svetlana Agafonova, Elena Krasnova, Svetlana Patsaeva, Alexander Ayurzhanayev, Buren Scharaw, assistant of Alexander, Elena Ilicheva, Julia Hall, Frank Winde, Endon Garmaev, Chaomeng Dai, Maria Kireeva, Shuguang Liu, Leonid Korytniy, Cai Yi, Chansheng He, Lanhui Zhang, Guihui Zhong, Heejun Chang, Natalia Frolova)



The conference venue: Research station 'Istomino' of the Baikal Institute for Nature Management in Ulan Ude (Republic of Buryatia, Russian Federation)



The upper yellow circle directly at Lake Baikal indicates the location of the research station Istomino



Shortly before embarking on the three boats of the research station to explore the Selenga delta



Out of the Selenga delta into the open waters of Lake Baikal



Julia presenting on trends in flood frequency in Europe



Chansheng presenting on water saving measures for irrigated land in NW China



At the visitor centre near Tanchoi