Programme UNITWIN/Chairs UNESCO
Report on activity January 2011- May 2013

Period of activity: January 2011 - May 2013

Title of the chair UNESCO or the UNITWIN net: the Chair of Water Resources

Report is composed by: MATVEEV Arkady

Position / Title: Dean of the faculty of biology and soil sciences of Irkutsk State University, professor

I. Address *(if modified)*

	Address of the home institute	**Adress of responsible for the UNESCO chair /coordinator** *If different from the home institute*
MATVEEV Arkady Dean of faculty of biology and soil science of ISU Irkutsk State University 1, Karl Marx str. 664003 IRKUTSK Russia Tel : (395-2) 24.22.49 Fax : (395-2) 24.22.38 E.mail : matvbaikal@mail.ru	Irkutsk State University 1, Karl Marx str. 664003 IRKUTSK RUSSIA	idem

II. Resources available

1. Resources humanities

1. For administration of UNESCO chair and net

Name / Function	Salary total	Source of support
A. SMIRNOV, head of Water Resources UNESCO Chair A. MATVEEV, responsible for the teaching at UNESCO Chair of Water Resources M. CHPEISER, director executive of the Chair of Water Resources E. SILOW, professor of the Chair	**600 $ / month** **1200 $ / month**	Irkutsk State University (cf. annex 3) ; non-budgetary funds
E. BRUNAT, Vice-president for International and European relations Th. VILLEMIN, Dean of the faculty of Mountain Science	**3600 € / year** **4800 € / year**	University of Savoie (co-management of the Chair)
TOTAL (1800 $ x 28 months)	**50 400 $** **16 800 €**	Irkutsk State University University of Savoie

2. For the activities related with teaching and research

Function	Number	Total salary	Source of financing
Professors	4	**300 $ / month**	Irkutsk State University (cf. annex 1) ; Non-budgetary funds
Researchers	6		
Professors invited	2		
teachers	5		
Others			
TOTAL (300 $ x 28 months)		**8 400 $**	

2. Resources and materials

1. For administrative tasks

Instruments/Materials	Number	Total cost	Source of financing
Tables	2	2 000 $	Irkutsk State University (cf. annex 1) ; Non-budgetary funds
Computer + Printer	3	6 500 $	
Consumables		2 200 $	

TOTAL		**10 700 $**	

1. For the activities related with teaching and research

Sites / Material	**Number**	**Price**	**Sources of financing**
Local service to provide teaching	5	4 000 **$**	Irkutsk State University (cf. annex 1) ;
Local service to provide research	5	5 500 **$**	Irkutsk State University
Station biologic for researches (Baikal)	1	3 000 **$**	Irkutsk State University
Ship	1	7 000 **$**	Irkutsk State University / Governmental funds
Station at Archane (for students) serves as base for researches hydrologic and hydrochemical	1	2 000 **$**	Irkutsk State University
Materials for expeditions around Baikal	1	4 000 **$**	Irkutsk State University
Materials for expeditions to other lakes	1	4 600 **$**	University of Savoie / Irkutsk State University
TOTAL		**30 100 $**	

III. Activities

- **Target groups (Annex 2)**

Category	Number
Students going to be bachelors	30
3-year students	5

- **geographical coverage (Annex 3)**

Nationality: RUSSIAN

Region: Central Asia (region of Irkutsk)

Interregional: Buryat Republic, Chita region

International: France, Mongolia, Chine, United States, Canada, Switzerland

- **Sources of financing (Annex 1).**

Sources of financing	Type of organization / institution	Period	Amount ($)
Contribution UNESCO/United Nations Office for Project Services (UNOPS) Проект EMO/2012/008		January 2011 – Mai 2013	23 790 **$**

(IWC-78317) Selenga_delta			
Other contributions :	**Home University** : Irkutsk State University (Irkutsk, Russia) *(human **resources,** material resources)*	January 2011 – Mai 2013	99 600 **$**
	Home University : Irkutsk State University (Irkutsk, Russia) *(missions, voyages, publications)*	January 2011 – Mai 2013	36 000 **$**
	TOTAL		**135 600 $**
	Main Partner University (co-management of the Chair) : University of Savoie (27 rue Marcoz, CHAMBERY, France)	January 2011 – Mai 2013	5 200 **€**
	Financial Support for international exchanges in the framework of the UNESCO Chair University of Savoie (27 rue Marcoz, CHAMBERY, France)	January 2011 May 2013	25 000 €
	TOTAL		**30 200 €**
	Coopération Savoie-Sibérie : Ecologie lacustre ARC Environnement – region Rhône Alpes	July 2012 – May 2013	8 250 €
	TOTAL		**8 250 €**
	Organizations governmental :		

	State contract №111-12-513 with the Ministry of innovative development of Irkutsk region		58 070 $
	State contract №111-12-510 with the Ministry of natural resources and ecology of Irkutsk region		15 820 $
	TOTAL		**73 890 $**
Industry	Contract №111-07-645 with society with limited responsibility «Baikal Engineering»		4 000 $
	TOTAL		**4 000 $**
	TOTAL OF ALL CONTRIBUTIONS		**218 690 $** **38 400 €**

1. Teaching/Formation/Research

- Title and possible result of every course
- Duration

List of courses

«Environmental safety on Water Resources»

	Discipline	Year/ Semestre	Lections	Lections	Practical work	Laboratory work	Test	Exam				Total

				hours/week	hours/semester	hours/week	hours/semester	hours/week	hours/semester	semester	hours	semester	hours	Individual work	Consultations	Independent work	
1	Baikal Science	3	6	2	30					6	4			4	2	26	68
2	General Ecology	3	6	2	30							6	7	4	2	26	69
3	La genèse des formations récifales	3	6	1	15					6	4			2	2	13	36
4	Hydrophysics	4	7	2	36							7	7	4	3	32	82
5	Physics of atmosphere	4	7	2	36					7	4			2	3	32	77
6	Chemistry of natural waters	4	7	2	36			2	36			7	7	9	6	48	148
7	Aquatic biology	4	8	1	15	1	15					8	7	4	2	24	67
9	Comparative methods of analysis	4	8	1	15			2	30	8	4	8	7	6	4	40	106
10	Aquaculture	5	9	1	18	1	18					9	7	4	4	32	83
11	The use of nature and its protection	5	9	2	36	2	36			9	4	9	7	10	7	60	150
12	Aquatic toxicology	5	9	1	18	1	18			9	4			4	4	30	78
13	Modeling of natural processes	5	9	1	18	2	36					9	7	6	4	48	119
14	Hydrogeology	5	9	1	18					9	4			2	2	16	42

15	Interaction of atmosphere and ocean	5	9	1	18					9	4			2	2	16	42
•	TOTAL				339		123		66		32		56	63	47	443	1169

- Target group

Students going to be bachelors of 2 – 3 years

- Partners

University of Savoie *(co-director of the UNESCO Chair of water resources)*

National University of Mongoly *(Ulaan-Baator)*

Institute of biology of development of RAS (Moscou) –Russia

The University of Bouriatia *(Ulaan-Ude)- Russia*

The Institute of fundamental and experimental biology of RAS *(Ulaan-Ude)- Russia*

Limnological Institute of RAS (Siberian branch) – Irkutsk, Russia

Institute of geochemistry of RAS (Siberian branch) – Irkutsk, Russia

Institute of Earth crust of RAS (Siberian branch) – Irkutsk, Russia

Institute of geography of RAS (Siberian branch) – Irkutsk, Russia

- Geographic structure allowing to exchange students, partners, participants...

Russia, France, Mongolia, (Chine, Germany are going to join)

- **Number of doctorates** : 5

2. Conferences/Congresses/Meetings

Table 1

Title	*Result awaited*	*Date and place*	*Partners*	*Total number of participants*	*Number of chair collaborators*	*Geography of participants*	*Sources of financing*
International Journey of Exergy	Presentation of results of many-year studies of mountain water-bodies	Paris, June, 2011	Paris Ouest University	More than100	1	Europe	Savoie University
Recent problems of reservoirs and their catchments	Attract attention to problem	Perm, July, 2011	Institute of inland waters of RAS	50	2	Russia	Own finances
Problems of ecology	Attract attention to problem of lakes comparison	Irkutsk, Baikal, September, 2011	Savoie University, University of Mongolia	100	1	World	Own finances
International Conference on "Modern problems of general parasitology"	Attract attention to the problem of parasite transport in aquatic system	2012 Moscow	Institute of general and experimental biology of SB	More than100	2	Russia, Mongolia, Germany, france, Poland	RFBR, RAS

			of RAS				
"Structure, functioning and ecological safety to the 80's anniversary of biologic, geographic and chemic departments of Buryat university	Attract attention to the problem of parasite transport in aquatic system	2012 Ulaan-Ude	Institute of general and experimental biology of SB of RAS	More than 50	2	Russia	RFBR, RAS
EcoSummit 2012 - Ecological Sustainability	Attract attention to the problem	Ohio, October 2012	Mongolian National University, CARRTEL-INRA	1000	1	World	Own finances
Conference devoted to 100 anniversary of FA Forel death	Attract attention to the problem	Geneva, September, 2012	Geneve university	100	1	Europe	Irkutsk University

Indicative list of published works made at university of Savoie (CARRTEL Laboratory) related to lakes (2011-2012)

RAPPORTS

CHASSERIEAU C., CAUDRON A., 2011 – Etude des population de truites sédentaires et migrantes sur le bassin du lac d'Annecy et évaluation des pratiques de gestion. Volet 1. Etat des populations sur les affluents. FDPPMA-INRA. Thonon : Station d'Hydrobiologie Lacustre ; rapport 299/11, 53 p.+ annex.

CHASSERIEAU C., CAUDRON A., 2011 – Suivi pluriannuel de la population de truite commune sur la basse Dranse. Campagne 2010. FDPPMA-INRA. Thonon : Station d'Hydrobiologie Lacustre ; rapport 303/11, p.+ annex.

COMMISSION INTERNATIONALE POUR LA PROTECTION DES EAUX DU LEMAN, C.I.P.E.L. – 2011 - Rapports sur les études et recherches entreprises dans le bassin lémanique. Programme quinquennal 2006-2010, campagne 2010. Lausanne : CIPEL, 201 p.

COMMISSION INTERNATIONALE POUR LA PROTECTION DES EAUX DU LEMAN, C.I.P.E.L. – 2012 - Rapports sur les études et recherches entreprises dans le bassin lémanique. Programme quinquennal 2011-2015, campagne 2011. Lausanne : CIPEL, Avaibable on WWW.PECHEHAUTESAVOIE.COM/TELECHARGEMENT1_BIS.PHP?CATEG=5

DOMAIZON I., GERDEAUX D., LAINE L., LAZZAROTTO J., PERGA M.-E., RIMET F., 2012 -Suivi de la qualité des eaux du lac d'Annecy. Rapport 2011. SILA (éd.) et INRA-Thonon. P. + annexes.

DOMAIZON I., GERDEAUX D., LAINE L., LAZZAROTTO J., PERGA M.E., RIMET F., 2011. Suivi de la qualité des eaux du lac d'Annecy. Rapport 2010. SILA (éd.) et INRA. Thonon. 61 p.+ annexes.

JACQUET S., BARBET D., CACHERA S., CAUDRON A., COLON M., GIREL C., GUILLARD J., HEBERT A., KERRIEN F., LAINE L., LAZZAROTTO J., MOILLE J.-P. PAOLINI G., PERGA M., PERNEY P., RIMET F., 2012 - Suivi environnemental des eaux du lac du Bourget pour l'année 2011. Rapport INRA-CISALB-CALB, 220 p.

JACQUET S., RIMET F., PERGA M.-E., PAOLINI G., KERRIEN F, GIREL C., CACHER S., LAZZAROTTO J., PERNEY P., LAINE L., SOTTON B., BARBET D., 2011 - Suivi environnemental des eaux du lac du Bourget pour l'année 2010. 168 p.

POULAIN T., GUILLARD J., 2011 - Présentation et guide d'utilisation du système acoustique de classification des substrats lacustres : RoxAnn GD-X – guide d'utilisation. Programme d'études Onema/INRA 2011, 18 p.

Table 2

Отформатировано: По центру

Kind of activity	Title of paper	Authors	Edition	Year	Number of pages	Type of document	Pedagogic material	Language	Summary
Research	Current state of chemical pollution of lake Baikal: sources and agents	E.A. Silow, P.A.Orlow	Vestnik IrGSCHA. – 2011. – Iss. 45, September. – P. 32 – 37.	2011	5			Russian	Chemical pollution of Baikal is discussed
Research	Long-Term Dynamics of Lake Baikal Pelagic Phytoplankton under Climate	L. R. Izmest'eva, E. A. Silow, and E. Litchman	Inland Water Biology. – 2011. – Vol. 4, No. 3. – P. 301–307. © Pleiades	2011	7			English	Dynamics of algae in Baikal is observed

	Change		Publishing, Ltd., 2011. ISSN 1995_0829						
Research	Eco-Exergy use for ecosystem health assessment	E.A. Silow, A.V. Mokry, S.E. Jørgensen	*International Journey of Exergy*. – Paris: Paris Ouest University, 2011. – 22 p. Available from http://leme.u-paris10.fr/exergy/files/17_06_11/SilowA.pdf	2011	22	Conference materials		English	Principles of exergy use for ecosystem health assessment are given
Research	Case studies of Eco-Exergy use for ecosystem health assessment	E.A. Silow, O. Anneville, B. Montuelle, A.V. Mokry, F.-L. Xu	*International Journey of Exergy*. – Paris: Paris Ouest University, 2011. – 18 p. Available from http://leme.u-paris10.fr/exergy/files/17_06_11/SilowB.pdf	2011	18	Conference materials		English	Examples of exergy use to evaluate ecosystem health are given.

Research	. Comparative analysis of production characteristics of phytoplankton of Volga and Angara reservoirs	N.M. Mineeva, L.S. Kraschuk, L.R.Izmest' eva, E.A. Silow	Modern problems of reservoirs and their catchments. T. 4. Aquatic ecology. (Proc. of Internat.Conference). – Perm: Perm State Un-ty, 2011. – P. 97 – 100. (ISBN 978-5-7944-1643-5)	2011	4	Conference Materials		Russian	Comparative analysis of production of several reservoirs
Research	Essays of environmental chemistry: textbook	E.A. Silow	Irkutsk: East-Sib Acad of Education, 2011. – 176 p.	2011	176			Russian	Textbook is devoted to environmental chemistry
Research	Some Applications of Thermodynamics for Ecological Systems	E.A. Silow, A.V. Mokry, S.E. Jørgensen	J.C. Moreno-Pirajan (Ed.). Thermodynamics - Interaction Studies - Solids, Liquids and Gases. – Vienna: InTech, 2011. – P. 319-342. ISBN: 978-	2011	23			English	Methods of thermodynamics in ecology are described

			953-307-563-1. Available from http://www.intechopen.com/articles/show/title/some-applications-of-thermodynamics-for-ecological-systems						
Research	Trade fishery species of Irkutsk region	A.N. Matveev, V.P. Samusenok, A.I. Vokin et al.,	Baik. Zool. Journ. 2012, #2 (10), P. 16-29.	2012	15			Russian	Review of industrial fishes of Irkutsk region
Research	Long-term dynamics of eco-exergy in Geneve lake	E.A.Silow, O.Anneville, B. Montuelle	Vestnik IrGSCHA. – 2012. – Iss. 48, February. – P. 39 – 44.	2012	6	Conference materials		Russian	Analysis of exergy in Geneve lake is fulfilled
Research	Tasks of comparative study of long-term dynamics of Baikal and Khubsugul	E.A. Silov Boldguiv	Vestnik IrGSCHA. – 2012. – Iss. 48, February. – P. 45 – 51.	2012	7	Conference materials		Russian	The task of comparison of Baikal and Khubsugul dynamics is faces
Research	. Climate change and lake Baikal	L.R. Izmestyeva,	EcoSummit 2012 -	2012	1	Conference materials		English	Main changes in lake Baikal plankton are

	plankton	E.V. Pislegina, S.V. Shimaraeva, E.A. Silow	Ecological Sustainability. Posters. – Ohio, 2012. – P. 77.						analysed
Research	The comparative study of long-term dynamics of lakes Khovsgol and Baikal ecosystems to distinguish between global climate change or regional perturbations effect	O. Jensen, B. Mendsaikhan, B. Boldgiv, E.A. Silow	EcoSummit 2012 - Ecological Sustainability. Posters. – Ohio, 2012. – P. 78.	2012	1	Conference materials		English	Comparative analyses of changes in Baikal and Khubsugul is fulfilled
Research	Human impact on the lake Baikal: The present state	E.A. Silow	EcoSummit 2012 - Ecological Sustainability. Posters. – Ohio, 2012. – P. 495.	2012	1	Conference materials		English	Technic impact on lake Baikal is analysed
Research	The lakes Baikal & Geneva pelagic community exergy analysis	E.A. Silow, O. Anneville, A. Mokry, B. Montuelle	EcoSummit 2012 - Ecological Sustainability. General. – Ohio, 2012. – P. 341.	2012	1	Conference materials		English	Comparison of lakes Baikal and Geneve is fulfilled

Research	Exergy changes in lakes around the world under pressure from global change	E.A. Silow	Archives des Sciences. – 2012. – V. 65. – P. 209 – 214.	2012	6	Conference materials		English	The problem of exergy dynamics resemblance is discussed
Research	Biota of waterbodies of Baikal rift zone	V.V. Takhteev, E.A. Sudakova, A.N. Matveev et al.	Saarbrücken: Palmarium Academic Publishers, 2012. – 302 c.	2012	302			Russian	Composition of fauna of waterbodies of Baikal rift zone is viewed
Research	Baikal Science : Textbook for students of natural faculties of universities in 2 books.	Eds :O.T. Rusinek, V.V. Takhteev,D. P. Gladkochub, T.V. Khodger, N.M. Budnev	Novosibirsk: Nauka, 2012. – 1114 P. Book 1. – P. 1–468. Book 2. – P. 469–1114.	2012	1114			Russian	Fundamentals of Baikal science are given
Research	Specific diversity of parasites of burbot from Baunt lakes	Zh.N. Dugarov, N.M. Pronin, M.D. Batueva, T.G.Burdukovskaya, A.N. Matveev, V.P.Samusenok	Proc. Of Conf.. «Modern problems of general parasitology»	2012	2	Conference materials		Russian	Materials on parasites of burbot are presented

Research	Parasites of fishes of upper stream of Barguzin	Zh.N. Dugarov, N.M. Pronin, L.D. Sandueva, K.A. Prosekin, A.N. Matveev, V.P. Samusenok	« Structure, functioning and ecological safety »	2012	2	Conference materials		Russian	There materials presented dealing with parasites of fishes from upper Barguzin

Indicative list of published works made at university of Savoie (CARRTEL Laboratory) related to lakes (2011-2012)

PAPERS PUBLISHED IN PEER REVIEW JOURNALS:

ALRIC B., PERGA M.E., 2011, Effects of production, sedimentation and taphonomic processes on the composition and size structure of sedimenting cladoceran remains in a large deep subalpine lake : paleo-ecological implications. Hydrobiologia, 676, 1, p. 101-116.

ANNEVILLE O., BERTHON V., GLIPPA O., MAHJOUB M.-S., MOLINERO J.C., SOUISSI S. 2011, Ontogenetic dietary changes of whitefish larvae: insights from field and experimental observations. Environ. Biol. Fishes, 91, p. 27-38.

BERDJEB L., GHIGLIONE J.-F., JACQUET S., 2011, Bottom-Up versus Top-Down Control of Hypo- and Epilimnion Free-Living Bacterial Community Structures in Two Neighboring Freshwater Lakes. Appl. Environ. Microbiol. 77, 11, p. 3591-3599.

BERDJEB L., GHIGLIONE J.-F., DOMAISON I., JACQUET S., 2011 , A 2-Year assessment of the main environmental factors driving the free-living bacterial community structure in Lake Bourget (France). Microb. Ecol., 61, 4, p. 941-954.

BERDJEB L., POLLET T., DOMAIZON I., JACQUET S., 2011, Effect of grazers and viruses on bacterial community structure and production in two contrasting trophic lakes. BMC Microbiology, 11 : 88 18p.

BUITENHUIS, E. T., LI, W., LOMAS, M., KARL, D., LANDRY, M., JACQUET, S., 2012, Bacterial biomass distribution in the global ocean, Earth Syst. Sci. Data Discuss., *2012*, (5) : 301-315.

BUITENHUIS, E. T., LI, W., VAULOT, D., LOMAS, M., LANDRY, M., PARTENSKY, F., KARL, D., ULLOA , O., CAMPBELL, L., JACQUET, S., LANTOINE, L., CAVEZ, F., MACIAS, D., GOSSELIN, M., MAC MANUS, G., 2012, Picophytoplankton biomass distribution in the global ocean, Earth Syst. Sci. Data Discuss., *2012*, (5) : 201-242.

CAUDRON, A., CHAMPIGNEULLE, A., VIGIER, L., HAMELET, V., GUYOMARD, R., 2012, Early effects of the strategies of creating a genetic refuge and direct translocation for conserving and restoring populations of native brown trout , Freshwater Biology, *2012*, 57, (8) : 1702-1715.

DEVAUX A., FIAT L., GILLET C., BONY S., 2011, Reproduction impairment following paternal genotoxin exposure in brown trout (Salmo trutta) and Arctic charr (Salvelinus alpinus) Aquat. Toxicol., 101, p. 405-411.

GALLINA N., ANNEVILLE O., BENISTON M., 2011, Impacts of extreme air temperatures on cyanobacteria in five deep peri-alpine lakes. J. Limnol. 70, p. 186-196.

GALLINA N., M. BENISTON S. JACQUET., 2012, Will Lake Geneva turn red in the future? A possible scenario for the development of the cyanobacterium Planktothrix rubescens. Limnology and Oceanography (July 2012)

GERDEAUX D., 2011, Does global warming threaten the dynamics of Arctic charr in Lake Geneva? Hydrobiologia. 660, 1, p. 69-76.

GREGORIO V., BUCHI L., ANNEVILLE O., RIMET F., BOUCHEZ A., CHEVRE N. 2012, Risk of herbicides mixture as a key parameter to explain phytoplankton fluctuation in a great lake: the case of lake Geneva, Switzerland. Ecotoxicology DOI:10.1007/s10646-012-0987-z

JACQUET, S., 2012, La diversité des virus aquatiques, Pour la Science, 2012, 415, 34-42.

JEPPESEN E., MEHNER T., WINFIELD I.J., KANGUR K., SARVALA J., GERDEAUX D., RASK M., MALMQUIST H. J., HOLMGREN K., VOLTA P., ROMO S., ECKMANN R., SANDSTRÖM A., BLANCO S., KANGUR A., RAGNARSSON STABO H., TARVAINEN M., VENTELÄ A.-M., SØNDERGAARD M., LAURIDSEN T.L., MEERHOFF M., 2012 ,Impacts of climate warming on the long-term dynamics of key fish species in 24 European lakes. Hydrobiologia, 694, p. 1-39.

LARRAS F., BOUCHEZ A., RIMET F., MONTUELLE B., 2012, Assessment of Species Sensitivity Distribution of benthic diatoms to herbicides using single species bioassays. PLoS ONE 7(8) p. e44458

MARANON , E., CERMENO, P., LASATA, M., TADONLEKE DZATCHOU, R., 2012, Temperature, resources and phytoplankton size structure in the ocean, Limnology and Oceanography, *2012*, 57, (5) : 1266-1278.

MONTUELLE, B., ANNEVILLE, O., CHAMPIGNEULLE, A., DOMAIZON, I., DORIOZ, J. M., GUILLARD, J., JACQUET, S., PERGA, M.-E., 2012, Dynamique de la biodiversité lacustre et changement global : les lacs périalpins, Innovations Agronomiques, 2012, 23, 3-18.

PARVATHI, A., ZHONG, X., JACQUET, S., 2012, Dynamics of various viral groups infecting autotrophic plankton in lake Geneva, Advances in Oceanography and Limnology, *2012*, 3, (2) : 171-191.

PISTOCCHI, C., SILVESTRI, N., ROSSETTO, R., SABBATINI, T., GUIDI, M., BANESCHI, L., BONARI, E., TREVISAN, D., 2012, A simple model to assess nitrogen and phosphorus contamination in ungauged surface drainage networks : Application to the Massaciuccoli lake catchment, Italy, Journal of Environmental Quality, *2012*, 41, (2) : 544-553.

POLLET T., TADONLÉKÉ R.D., HUMBERT J.-F., 2011 - Comparison of primer sets for the study of Planctomycetes communities in lentic freshwater ecosystems. Environ. Microbiol. Rep. 3, 2, p. 254-261.

POLLET T., TADONLÉKÉ R.D., HUMBERT J.-F., 2011, Spatio-temporal changes in the structure and composition of a less-abundant bacterial Phylum (Plancomycetes) in two perialpine lake. Appl. Environ. Microbiol., 77,14, p. 4811-4821.

RIMET, F. 2012, Recent views on river pollution and diatoms, Hydrobiologia, *2012*, 683, 1-24.

RIMET, F., BOUCHEZ, A., 2012, Biomonitoring river diatoms : implications of taxonomic resolution, Ecological Indicators, *2012*, 15, (1) : 92-99.
SOTTON B., DEVAUX A., GIVAUDAN N., GUILLARD J., DOMAIZON I., BONY S., ANNEVILLE O., 2012 - Short-term uptake of microcystin-LR by Coregonus lavaretus: GST activity and genotoxicity, Ecotoxicology, 21, p. 1788-1796.

SOTTON, B., GUILLARD, J., BONY, S., DEVAUX, A., DOMAIZON, I., GIVAUDAN, N., CRESPEAU, F., HUET, H., ANNEVILLE, O., 2012, Impact of toxic cyanobacterial blooms on Eurasian perch (Perca fluviatilis): experimental study and in situ observations in a peri-alpine lake, Plos One, *2012*, 7, (12) : 1-12.

TADONLEKE, R., MARTY, J., PLANAS, D., 2012, Assessing factors underlying variation of CO^2 emissions in boreal lakes vs. reservoirs. FEMS Microbiology Ecology, *2012*, 79, 282-297.

THOMAS R., BERDJEB L., SIME-NGANDO T., JACQUET S., 2011 - Viral abundance, production, decay rates and life strategies (lysogeny versus lysis) in Lake Bourget (France) Environ. Microbiol. 13 (3), p. 616–630.

TREVISAN D., QUETIN P., BARBET D., DORIOZ J.-M., 2012 . POPEYE: A river-load oriented model to evaluate the efficiency of environmental policy measures for reducing phosphorus losses. .J. Hydrol., 450-451, p. 254-266

Missions / Study missions / Traineeships

Table 4

City (country)	Aim of mission	duration	Financial source	Result of mission
University of Savoie, Thonon, Le Bourget, France	Research-teaching	2011 (one week in June)	Univ. Savoie (travel, food and logging)	Delivering of lectures at UNESCO Chair of University of Savoie, CARRTEL-INRA in Thonon
University of Savoie, Thonon, Le Bourget, France, Versoix, Geneve, Switzerland	Research-teaching	January-February 2012	ISU (travel) Univ. Savoie (food and logging)	Delivering of course of lectures in Le Bourget. Work with TEMPUS application. Signing of agreement on joint work with Geneva University.
Thonon, Le Bourget, France	Research-teaching	June, 2012	ISU (travel) Univ. Savoie (food and logging)	Resigning of agreement with Savoie University. Discussion on joint research projects.
Versoix, Geneve, Switzerland	Research	September, 2012	ISU	Participation in the conference, devoted to 100 years of FA Forel Death
Irkutsk, Russia	Research	September, 2011	Univ. Savoie (Travel) ISU (Food and logging)	Visit of the ISU facilities, discussion on joint research projects.

Invited professors

Number	Duration of stay	Institution of visitor	Sources of money
1 professor	3 weeks (2011)	Christian-Albrecht Univ.(Kiel)	Travel due to money of Kiel University, staying at Baikal – for the money of ISU
4 professors	3 months (2012 г.)	Wellesley College, Michigan University,	Grant from NSF of USA

		University of California (Santa-Barbara) (США)	
1 professor	2 weeks (2012)	Geneva University (Switzerland)	Travel – grant from Switzerland, staying at Baikal – for the money of ISU

Indicative list of published works made at university of Savoie (CARRTEL Laboratory) related to lakes (2011-2012)

BOOKS or CHARTERS OF BOOKS

BALVAY G., DRUART J-C., JACQUET S., 2012 - Le lac du Bourget : ses eaux et sa biologie. Editions Quae, 140 p.

CHORUS I., DOKULIL M., LAMMENS E, MANCA M., NASELLI-FLORES L., NIXDORF B., PERSSON G., SCHINDLER D., STRAILE D., TARTRAI I., TADONLEKE D. R., WILLEN E., 2011 -. Restoration responses of 19 lakes: are total phosphorus thresholds common? In: Chorus I. & Schauser I. (eds) Oligotrophication of Lake Tegel and Schlachtensee, Berlin: Analysis of system components, causalities and response thresholds compared to responses of other waterbodies, p. 84-102, Umweltbundesamt, Germany (online publication, see http://www.uba.de/uba-info-medien-e/4144.html)

Activity of chair collaborators, connected with the dissemination of information on Chair work:

- Holding during 2011 – 2012 years International schools for junior researchers “Ecology of great waterbodies and their catchments” with participation of students and post-grades from Russia, Germany, Switzerland and USA.
- Holding field summer practice for the students of Wellesley-college in 2011.
- Organization of every-year scientific conference in ecology and biology for students of Irkutsk (2011, 2012).
- Organization and holding of every year Olympiad in biology among Irkutsk students (2011, 2012).
- Participation as jury members in Irkutsk municipal, regional Olympiads in biology, ecology and Baikal science.
- Delivering public lectures for schoolchildren of Irkutsk on water resources during “week of science”, organized by the University every year.
- Participation in 12 TV programs, devoted to nature protection and rational use of biological resources of lake Baikal and other water bodies.

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Отформатировано: Отступ: Слева: 0,63 см, без нумерации

Global results of Chair activity

1. Edition of textbook “Baikal science” in 2 volumes for students of natural faculties of universities (2012)
2. Edition of monograph Silow E.A. Some Applications of Thermodynamics for Ecological Systems / E.A. Silow, A.V. Mokry, S.E. Jørgensen // J.C. Moreno-Pirajan (Ed.). Thermodynamics - Interaction Studies - Solids, Liquids and Gases. – Vienna: InTech, 2011. – P. 319-342. ISBN: 978-953-307-563-1. Available from http://www.intechopen.com/articles/show/title/some-applications-of-thermodynamics-for-ecological-systems
3. Edition of monograph Rare species of plants and animals of Irkutsk city / Eds: V. V. Popov, A.N. Matveev. – Irkutsk: «Time to travel», 2011. – 159 p.
4. Edition of monograph Fishery melioration of waterbodies / A. N. Matveev, V.P. Samusenok, A.L. Yuriev, A.I. Vokin, R.S. Andreev. – Irkutsk: SB RAMS, 2011. – 44 c..
5. Edition of monograph Takhteev V.V. Biota of waterbodies 0f Baikal rift zone / V.V. Takhteev, E.A. Sudakova, A.N. Matveev et al.; – Saarbrücken: Palmarium Academic Publishers, 2012. – 302 p.
6. Organization in 2011 – 2012 two complex expeditions on study of systematics and ecology of salmonids in Baikal rift zone jointly with Institute of biology of development (Moscow), Institute of problems of ecology and evolution (Moscow), Institute of general genetics (Moscow) and Institute of systematics and ecology of animals (Novosibirsk)
7. Organization in 2011 – 2012 International Schools for Junior Researchers «Ecology of large waterbodies and their catchments” with participation of students from Germany, Switzerland and USA.
8. Getting PhD by postgrads M.V.Pastukhovym (supervisor A.N. Matveev) on mercury accumulation (2012) and by A.V. Mokrym (supervisor is E.A. Silow on phytoplankton organization (2011).
9. Fulfillment of State contract with Ministry of innovation of Irkutsk region on “Assessment of anthropogenic influence on fishery productivity of waterbodies of Irkutsk region to determine of complex steps for sustainable reproduction of valuable species of fishes in modern conditions”.
10. Fulfillment in 2012 within the program of UNO development the contract EMO/2012/008 from 01/06/2012 research work devoted to “Study of questions, connected with health of benthic zone in Selenga delta” where changes in benthos due to pollution will be noted.

V. Main activities for future

№	Content	time	Financial support	
			ISU	Others (UNESCO, grants,

				sponsors etc)
1	Development of concept of development net UNITWIN, including: – widening the e-learning and research activities through the net, in particular with the University of Savoie and an enlargement towards new active members (including in Switzerland, Maghreb and Central Asia where potential partnerships have been already identified) - technologies transfers in water resources use and process - opening to the cooperation with firms	2013 (and 2013 – 2016)	2 000	3 000
2	Determination of prior tasks in researches till 2018 together with countries participating in the network. Organization of workshops and seminars (in the same vein of the Summer Schools already existing with the University of Savoie and the University of Kiel for example…)	June - August - October 2013	6 000	6000
3	Organization of events devoted to International year of cooperation in water resources	2013	5 000	8 000
4	Organization of web-page for students, PhD-students and junior researchers from net at www.isu.ru, www.lake.baikal.ru. Libraries, textbooks etc, useful information	2013	5 000	5 000
5	Continuation of complex interdisciplinary researches of mountain lakes of Baikal zone and French Alps (a book is going to be published early 2014 edited by the State University of Irkutsk and the University of Savoie devoted to a multi-disciplinary comparison between the Siberian lakes and the French Alps –see below)	Every year	43 300	45 000
6	Fulfillment of complex ecological and molecular-genetic studies of salmonids in centers of their formation in Eastern Siberia and French Alps jointly with University of Savoie, Institute of genetics, Institute of systematics and	Every year	40 000	45 000

	ecology of animals SB RAS			
7	Organization of complex interdisciplinary expedition to study Selenga basin	2013-2015 г.г.	23 400	25 000
8	Edition of monographs, textbooks, papers on themes of chair	Ежегодно	12 000	13 000
9	Preparation of book “Lake Baikal and alp lakes” (in French and Russian” together with net co-supervisor of the Chair – the University of Savoie	2013	4 500	5 000
10	Edition of book @Lake Baikal and alp lakes” (in Russian and French) together with University of Savoie (200 pages).	2014	8 000	9 000
11	Organization of field teaching-research station for water resources in Bolshie Koty and delivering research-practical workshops there	2013 - 2014	40 000	30 000
12	Organization of International Schools for junior and senior researchers on “Ecology of large waterbodies and their catchments” with participation of Russian and foreign students in Russia and in Alps.	Every year	12 000	14 000
13	Organization of language training of students for further exchange between participants	Every year	8 000	9 000
14	Creation of interuniversity net on educational and research cooperation in the field of water resources	2014	22 000	25 000
15	Creation of computer data bank on biological, hydrological, hydrochemical of ecosystems of large waterbodies and mineral sources	2014	5 000	5 000
16	Development of international master program in water resources management.	2014	6 000	8 000
17	Organization of second international symposium Ecosystems and natural resources of mountain countries “Baikal. Current state of surface and underground hydrosphere of mountain countries” with active participation of junior researchers	2015	6 000	25 000

18	Clearance for an international master programme devoted to water resources management and development	2015	7 000	8 000
19	Development of double diploma program (master programs) focusing on «Sustainable development and Water resources management»	2015-2016	9 000	9 000

VI. Chair development perspectives

It is clear that over the recent years already and without doubt for the next future that the world is facing and will face a severe crisis in the field of water resources. Fresh water is the leading factor in the most actual problems, including health, agriculture and rural development, energy supply, urbanization... Very often this crucial resource suffers from incorrect or approximative management and from hyper exploitation. At present and more than ever, the activity of UNESCO Chair of Water Resources must contribute to serve humanity tasks and duties, to the main principles of sustainable development of Baikal region, as one of the most important reserves of pure and fresh water. Irkutsk State University in collaboration with its main partners –including the University of Savoie in France, in the framework of the Chair development must work to unify and stimulate activities of several key institutions studying different aspects of water resources in Russia and abroad. The University of Irkutsk and main partners must coordinate and facilitate the exchanges of experience and good practices, must push the development of methods, production of programs, lectures and courses, must improve the skills and preparation of specialists, must train the trainers.

Thus, the main directions of chair development are, notably in deep cooperation with the University of Savoie in France:

- Creation of new methods, research programs, lectures, courses, textbooks, exchange of advanced students, professors and researchers (importance of an up-date website),
- Elaboration of scientific and academic materials including articles and books and textbooks to be published and largely disseminate in English, Russian and French languages mainly.
- Support the setting-up and the development of MOOCS through the net as well as the e-learning devoted to interdisciplinary lectures and courses (development education for distant students).
- Preparation, training and re-training of high level specialists in water resources.

- The confirmation and the development of multi-lateral Summer Schools (with the University of Savoie in France, the University of Kiel in Germany etc…).
- Analysis, prognosis and prediction of waterbodies state and their impact on the economic growth and socio-economic development, including parameters of their chemical, physical, biological and ecological state in relation with global changes.
- Estimation of climate change influence on the state of water resources.
- Study of anthropogenic eutrophication of waterbodies and waterflows, situated in regions with different conditions. Analysis of income and storing of nutriments.
- Determination of degree of technical impact on surface, as well as underground waters. Estimation of physical, chemical and biological pollution.
- Creation of new analytical prediction, prognostic and imitation models to analyze and predict the quality of surface and underground waters.
- Development of the co-operation with the Franco-Siberian Centre of research of Tomsk (both the State University of Irkutsk and the University of Savoie are among the co-founders).
- Development of local co-operations of the University of Irkutsk in particular with the Academy of Sciences.
- Development of cooperation with the 'real economy': internships for the students, jobs placements and creation of activities (some sponsoring of activities from certain solid and renowned firms will be searched in Russia and Europe mainly).
- Applications to international tenders (including programs financed by the European Union) will be envisaged.
- Development of socio-economic and juridical studies devoted to the Water Resources management and impacts on Human development (both at the regional and worldwide levels, through comparative analysis, research and observation) : importance of cross-cutting approaches and lessons learnt.