ISTC Japan Workshop

Hokkaido University Sustainability Weeks 2009

International Symposium on

Environmental Conservation of The Sea of Okhotsk:

Cooperation between Japan, China and Russia

国際シンポジウム

オホーツク海の環境保全に向けた日中露の取り組みにむけて

November 7 - 8, 2009

Conference Hall of Hokkaido University

11 月 7 日（土）～8 日（日）

北海道大学学術交流会館　第一会議室

Hosted by:

Pan-Okhotsk Research Center, ILTS, Hokkaido University
Slavic Research Center, Hokkaido University
Research Institute for Humanity and Nature (RIHN)
New Energy Resources Research Center, Kitami Institute of Technology
Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism
The International Science and Technology Center (ISTC)
Initiative for Sustainable Development, Hokkaido University

Co-hosted by:

Ministry of Education, Culture, Sports, Science & Technology Japan

主催者：

北海道大学低温科学研究所　環オホーツク観測研究センター
北海道大学　スラブ研究センター
総合地球環境学研究所
北見工業大学　未利用エネルギー研究センター
国土交通省　北海道開発局
国際科学技術センター
北海道大学「持続可能な開発」国際戦略本部

共催：

文部科学省

Objectives

The Sea of Okhotsk provides unique environment with respect to physical, geochemical and biological aspects based on its natural peculiarity being the southern boundary of the seasonal sea ice in the northern hemisphere. The biodiversity and the rich marine biological resources are not only of local but also of worldwide importance.

It has been believed that the Amur River plays an important role in the formation of Sea ice in such a low latitude ocean. Recently, both positive and negative impacts of the Amur River on the Sea of Okhotsk became apparent. The positive impact is the contribution of dissolved iron supplied by the Amur River to the primary production in the Sea of Okhotsk and neighboring Oyashio open water, and the negative one is contamination of polluted materials from the Amur River to the Sea of Okhotsk. These impacts suggest that the conservation of the Sea of Okhotsk and its neighboring Oyashio region can be accomplished only by considering the Amur River basin and the Sea of Okhotsk as single ecological system.

The Amur River basin has a vast drainage area of 2,051,500 km^2 and it is shared by Mongolia, China and Russia, in which more than 1 hundred million of people live. Rapid changes in land-use occurred in the later half of the 20th century might have affected on the discharge of dissolved iron and other substances. Growing industrial activities in the basin might have polluted the Amur River as clearly exemplified by the explosive accident occurred at a petrochemical plant in Chinese Jilin Province in November 2005. If this situation continues, the Sea of Okhotsk and the neighboring Oyashio region will be seriously impacted by the Amur River in near future.

Rapid expansion of global economy has increased export-import among the North East Asian countries which had been geopolitically less active in the 20th century. Wood trading, for example, became extremely active among Russia, China and Japan since the turn of 20th century, and sea products from the Sea of Okhotsk and the Oyashio region have been intensively consumed in China these days. On the contrary, enormous amount of Chinese agricultural products are being imported to Japan to satisfy its growing consumption of food. Therefore, North East Asian countries are interdependent economically and the necessity of conservation on natural environments on which economy depends becomes an urgent issue in this area.

This symposium provides an occasion for academic researchers to discuss how we can conserve this vast ecological linkage between the continent and the oceans for the future sustainability. Based on the scientific discussions during the symposium, the organizing committee would like to launch an international scientific board, "Amur-Okhotsk Consortium", to further discuss the sustainability of the Amur-Okhotsk system.

趣旨

北東アジアの縁辺海であるオホーツク海は、北半球における海氷発達の南限であるという自然を背景とし、海洋物理、海洋化学、海洋生物学的に他には例のない独自の環境を誇っている。海氷に依存する生物多様性に加え、世界でもまれにみる豊かな基礎生産に立脚する水産資源は、日露だけでなく、世界の重要な食糧資源供給地としての役割を担ってきた。

近年、このようなオホーツク海に対し、アムール川が与える影響が二つの側面からクローズアップされるようになった。ひとつは、アムール川を起源とする溶存鉄がオホーツク海や隣接する親潮域の基礎生産に果たす役割であり、もうひとつはアムール川（黒龍江）流域で排出される種々の汚染物質がオホーツク海に及ぼす影響である。両者はオホーツク海に相反する影響を与えるが、いずれにしろオホーツク海の自然環境を隣接するアムール川流域と切り離して考えることはもはや適切ではないという課題を我々に突きつけている。

面積 205 万平方 km を有する広大なアムール川流域は、モンゴル、中国、ロシアという三ヶ国によって領有され、その流域に住む人口は 1 億人を超える。20 世紀後半に起こった急速な土地利用変化は、溶存鉄の供給地である湿原の急速な減少をもたらし、急速な工業化の進展は、2005 年 11 月に起こった松花江流域の石油化学工場の惨事とそれに引き続くアムール川水系の汚染に代表されるように、国際河川アムール川の越境汚染を加速させている。この状態を放置すれば、遠くない将来、アムール川流域の環境劣化の影響がオホーツク海や隣接する親潮域に及ぶことは必至の状況にある。

二十世紀の後半から急速に進むグローバル化の影響は、ここ北東アジアにおいてもヒト・モノ・情報の流れに対する障壁としての国境を極めて低くした。木材を巡るロシア極東地域と中国・日本の関係、オホーツク海の水産資源消費者としての中国の台頭、黒龍江省で収穫される農作物の日本における消費など、この地域における経済活動は国境を越え、これらの地域の相互依存関係によって引き起こされる環境変化も広域にわたって影響を顕在化し始めている。

本シンポジウムでは、オホーツク海とは密接不可分なアムール川流域を含めた地域に関わる日中露の三カ国が、オホーツク海および隣接する海域の環境保全に対してどのように関わることができるか、ということを学際的に考えたい。シンポジウムを通じて展開される科学的な議論に基づき、将来のアムール・オホーツクシステムの持続可能性をより深く議論するための国際的な科学者ネットワークとしての「アムール・オホーツクコンソーシアム」の設立を試みることが本シンポジウムの目的である。

PROGRAM

Saturday Nov 7

09:15-09:30 Opening Address
Takeo HONDOH, *Executive and Vice-President, Hokkaido University*

Session 1 Physical backgrounds of the Amur River basin and the Sea of Okhotsk

Session Convener: **Naoto EBUCHI**, *ILTS, Hokkaido University*

9:30-9:55 Impact of the sea ice reduction in the Sea of Okhotsk on the North Pacific
Kay I. OHSHIMA, *ILTS, Hokkaido University*

9:55-10:20 Intermediate layer iron transport supporting the biological production in the Oyashio region
Jun NISHIOKA, *ILTS, Hokkaido University,* and **Takeshi NAKATSUKA**, *Graduate School of Environmental Studies, Nagoya University*

10:20-10:45 The Monitoring of the Sea of Okhotsk
Evgeny V. KARASEV, *Far Eastern Regional Hydrometeorological Research Institute*

10:45-11:10 Coastal waters study in Hokkaido – and especially, the Sea of Okhotsk –
Ryuji FUKUYAMA, *Hokkaido Institute of Environmental Sciences*

11:10-11:35 Elements in Aerosol at Hokkaido
Hideyuki OTSUKA, **Shinobu NIWA**, and **Masayuki AKIYAMA**, *Hokkaido Institute of Environmental Sciences*

11:35-12:00 Modeling of dissolved iron production and transport of the Amur River basin
Takeo ONISHI, *RHIN*

12:00-12:25 Modeling of the intermediate water and iron transport in the Sea of Okhotsk and the northern North Pacific
Humio MITSUDERA, *ILTS, Hokkaido University*

12:25-13:30 Lunch

プログラム

11 月 7 日（土）

9:15-9:30　開会の辞　**本堂武夫**　（北海道大学　副学長）

セッション 1　アムール川流域とオホーツク海の自然

座長：**江淵直人**（北海道大学低温科学研究所）

9:30-9:55　「オホーツク海の海氷減少が北太平洋に与える影響」
大島慶一郎（北海道大学低温科学研究所）

9:55-10:20　「親潮域の生物生産を支える中層鉄輸送」
西岡　純（北海道大学低温科学研究所）**中塚　武**（名古屋大学環境科学研究科）

10:20-10:45　「ロシア連邦によるオホーツク海の定常海洋モニタリング」
エフゲニー・カラシェフ（極東水文気象研究所）

10:45-11:10　「北海道周辺海域の沿岸海洋環境について」
福山龍次 (北海道環境科学研究センター)

11:10-11:35　「北海道における大気中金属成分」
大塚英幸, 丹羽　忍, 秋山雅行（北海道環境科学研究センター）

11:35-12:00　「アムール川流域における溶存鉄の生成と輸送モデリング」
大西健夫（総合地球環境学研究所）

12:00-12:25　「オホーツク海と北部北太平洋における中層水および鉄輸送モデリング」
三寺史夫（北海道大学低温科学研究所）

12:25-13:30　昼食

Session 2 Land-use changes in the Amur River basin and their impacts

Session Convener: **Zhigang DA**, *Heilongjiang Provincial Academy of Social Sciences*

13:30-13:55 Historical changes in land-use/Land cover in the Amur River basin
Sergey GANZEY, *Pacific Institute of Geography, FEBRAS*

13:55-14:20 Impact of land-use changes in iron transport
Muneoki YOH, T*okyo Univ. of Agriculture and Technology,* and **Hideaki SHIBATA** , *Hokkaido University*

14:20-14:45 Effect of wetland reclaimation on iron species
Baixin YAN, *NEGAE*

14:45-15:10 Chronic pollution of the Amur River with toxic organic matter
Lubov KONDRATYEVA, *Inst. Water and Ecol. Problems, FEBRAS*

15:10-15:35 The investigation and estimation on influences of Songhuajiang River's nitrobenzene leakage incident to fishery environment
Haijin LIU, *Chinese Academy of Fishery Sciences*

15:35-16:00 Development of environmental assessment for the impact of an oil spill and other accidental pollution on a marine ecosystem
Yuichi OSA and **Ruriko TAHARA**, *Hokkaido Institute of Environmental Science*

16:00-16:20 Coffee / Tea break

Session 3 Backgrounds and impacts of land-use changes in the Amur River basin

Session Convener: **Shinichiro TABATA**, *Slavic Research Center, Hokkaido University*

16:20-16:45 Trend of forest resources, policy and management in Khabarovsk Krai
Hiroaki KAKIZAWA , *Hokkaido University*

16:45-17:10 Characteristics of agricultural development on Sanjiang Plain
Hong PARK and Akihiko SAKASHITA, *Hokkaido University*

17:10-17:35 Chinese-Russian wood trade and economic cooperation in this field
Anquan FENG, *East China Normal University, School of Advanced International and Area Studies*

17:35-18:00 Foreign trade relations between Russia, China and Japan as factor of land use/cover changes in the Amur River Basin
Natalia MISHINA, *Pacific Institute of Geography, FEBRAS*

18:30-20:30 Banquet

セッション 2　アムール川流域の土地利用変化とその影響

座長：**笪　志剛**（黒龍江省社会科学院東北アジア研究所）

13:30-13:55　「アムール川流域の土地利用・被覆の歴史的変遷」

セルゲイ・ガンゼイ（ロシア科学アカデミー極東支部太平洋地理学研究所）

13:55-14:20　「土地利用変化が鉄輸送に与える影響」

楊　宗興（東京農工大学）**柴田英昭**（北海道大学北方圏フィールド科学センター）

14:20-14:45　「湿原干拓が鉄の様態に与える影響」

閻　百興（中国科学院　東北地理農業生態学研究所）

14:45-15:10　「有毒有機物によるアムール川の慢性的な汚染」

リュボフ・コンドラチェバ（ロシア科学アカデミー極東支部水・生態学研究所）

15:10-15:35　「松花江ニトロベンゼン漏洩事故による漁業への影響の調査および評価」

劉　海金（中国水産科学研究院）

15:35-16:00　「油汚染等の海洋生態系への影響評価の技術体系」

長　雄一, 田原るり子（北海道環境科学研究センター）

16:00-16:20　コーヒーブレイク

セッション 3　アムール川流域の土地利用変化の背景

座長：**田畑伸一郎**（北海道大学スラブ研究センター）

16:20-16:45　「ハバロフスク地方における森林資源・森林政策・森林管理の動向」

柿澤宏昭（北海道大学農学研究院）

16:45-17:10　「中国三江平原における農業開発の特質 －国有農場の水田開発に着目して－ 」

朴　紅（北海道大学農学研究院）

17:10-17:35　「中露の木材貿易と木材分野の経済協力」

封　安全（華東師範大学　国際関係・地区発展研究院）

17:35-18:00　「アムール川流域の土地利用・被覆変化の要因としての日中露貿易」

ナターリア・ミシナ（ロシア科学アカデミー極東支部太平洋地理学研究所）

18:30-20:30　懇親会

Sunday Nov 8

Session 4 Russo-Chinese attempt in conserving the Amur River

Session Convener: **Peter BAKLANOV**, *PIG/FEBRAS*

08:30-08:55 Amur River monitoring: main results and improvement problems
Alexey MAKHINOV, *IWEP/FEBRAS*

08:55-09:20 Water environmental equality situation and character analysis along Heilongjiang valley
Nanzhe SONG, *Environmental Monitoring Station, Heilongjiang Province*

09:20-09:45 International treaties in Amur River Basin and development of transboundary environmental policies
Eugene SIMONOV, *Dauria International Protected Area –DIPA*

09:45-10:00 Coffee / Tea break

Session 5 Russo-Japanese attempt in conserving the Sea of Okhotsk

Session Conveners: **Noriyuki OHTAISHI**, *Prof. Emeritus, Hokkaido University*, and **Hiroyuki MATSUDA**, *Yokohama National University*

10:00-10:25 Marine mammals in the Sea of Okhotsk ; abundance, consumption of resources, and outlook for future studies
Kirill A. ZHARIKOV, *Marine Mammal Laboratory, VNIRO*

10:25-10:50 Okhotsk Sea ecosystem: fishery production and research activities in Japan-Russia adjoining area
Orio YAMAMURA, **Kaoru HATTORI**, *Hokkaido National Fisheries Research*, and **Mari KOBAYASHI**, *Tokyo University of Agriculture*

10:50-11:15 Cetacean fauna, abundances and population dynamics in Okhotsk Sea, with some notes on future prospect of their conservations and managements
Hidehiro KATO, *Tokyo University of Marine Science and Technology*, **Tomio MIYASHITA**, *National Research Institute of Far Seas Fisheries*, and **Yoshihiro FUJISE** , *The Institute of Cetacean Research*

11:15-11:40 On the “Japan-Russia Cooperation on the Conservation of Ecosystems”, **Hiroyuki MATSUDA**, *Yokohama National University*

11:40-12:05 International study efforts on gas hydrates near cold seeps on the northeastern Sakhalin slope in the Sea of Okhotsk
Hitoshi SHOJI, *Kitami Institute of Technology*, **Young Keun JIN**, *Korea Polar Research Institute*, **Anatoly OBZHIROV**, *V. I. Il’ichev Pacific Oceanological Institute FEB RAS*, and **Boris BARANOV**, *P. P. Shirshov Institute of Oceanology RAS*

12:05-13:15 Lunch

１１月８日（日）

セッション 4　アムール川保全のための中露の取り組み

座長：**ピーター・バクラノフ**（ロシア科学アカデミー極東支部太平洋地理学研究所）

8:30- 8:55　「露中共同アムール川モニタリング：主要な成果と課題」
アレクセイ・マヒノフ（ロシア科学アカデミー極東支部水・生態学研究所）

8:55- 9:20　「黒龍江の流域の水環境状況と特性分析」
宋　男哲（黒龍江省環境保全局環境監視センター）

9:20- 9:45　「アムール川流域における国際協定および国境地域の環境政策の進展」
ユージーン・シモノフ（ダウリア国際保護区 DIPA）

9:45-10:00　コーヒーブレイク

セッション 5　オホーツク海保全に対する日露の取り組み

座長：**大泰司紀之**（北海道大学名誉教授）**松田裕之**（横浜国立大学）

10:00-10:25　「オホーツク海の海洋哺乳類：個体数、資源消費量、および将来の研究課題」
キリル・ザリコフ（VNIRO,海洋哺乳類研究室）

10:25-10:50　「オホーツク海洋生態系：漁業生産と日ロ隣接地域における生態系調査」
山村織生, 服部　薫（水総研セ/北海道区水産研究所）**小林万里**（東京農業大学）

10:50-11:15　「オホーツク海における鯨類多様性と資源動態及び資源保全と管理に関する展望」
加藤秀弘（東京海洋大学）**宮下富夫**（遠洋水産研究所）
藤瀬良弘（日本鯨類研究所）

11:15-11:40　「日露生態系保全協力について」**松田裕之**（横浜国立大学）

11:40-12:05　「オホーツク海サハリン斜面北東部の冷湧水付近に産するガスハイドレートの国際共同研究」
庄子　仁（北見工業大学未利用エネルギー研究センター）、**ヤンケウン・ジン**（韓国極地研究所）、**アナトリー・オブジロフ**（ロシア科学アカデミー極東支部太平洋海洋学研究所）、**ボリス・バラノフ**（ロシア科学アカデミー海洋学研究所）

12:05-13:15　昼食

Session 6 **Possible Chino-Japanese cooperation on the conservation of the Amur and Songhua Rivers**

Session Convener: **Baixing YAN**, *NEGAE*

13:15-13:40 Environmental technologies and experiences in the field of the environment developed in Hokkaido
Akiteru KAWAMURA, *Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism*

13:40-14:05 Sino-Japan trade and agricultural cooperation: review and prospects of cooperation between Heilongjiang Province and Hokkaido
Zhigang DA, *Heilongjiang Provincial Academy of Social Sciences*

14:05-14:30 The designation of the Sea of Okhotsk region and the cooperative relationships with each of the neighboring countries
Susumu YOSHIDA, *ERINA*

14:30-14:45 Coffee / Tea break

Session 7 **Conservation of the Sea of Okhotsk in multilateral relationship**

Session Convener: **Hiroaki KAKIZAWA**, *Hokkaido University*

14:45-15:10 The giant fish-breeding forest hypothesis and its conservation
Takayuki SHIRAIWA and **Yasunori HANAMATSU**, *RIHN*

15:10-15:35 Changes in attitudes of Sakhalin population towards the purity of the Okhotsk shore
Sergey PROKOPENKO, *Sakhalin State University*

15:35-16:00 Twenty four years of the International Symposium on Okhotsk Sea & Sea Ice
Masaaki AOTA, *Okhotsk Sea Ice Museum of Hokkaido*

16:00-16:25 HELCOM - 35 years of protecting the Baltic Sea
Nikolay VLASOV, *HELCOM*

16:25-16:50 Directions of sustainable development of Russian Far East
Peter Ya. BAKLANOV, *PIG/FEBRAS*

16:50-18:00 **General discussion and conclusion**

Chairman: **Takayuki SHIRAIWA**, *RIHN*

The role of International Science and Technology Center, ISTC

Comment: **Yu TAKAGI**, *ISTC*

18:00-18:15 Closing Address
Keigo YANAGIYA, *Deputy Director, Development Administration Department (for Planning Affairs) , Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism*

セッション 6　黒龍江・松花江保全のための日中の取り組み

座長：**閻　百興**（中国科学院東北地理農業生態学研究所）

13:15-13:40　「北海道の環境技術や環境分野での経験」
川村晃輝（国土交通省　北海道開発局）

13:40-14:05　「中日農業・経済貿易における協力：北海道と黒龍江省の協力展望」
笪　志剛（黒龍江省社会科学院東北アジア研究所）

14:05-14:30　「オホーツク海圏の位置づけと周辺各国との協力関係」
吉田　進（環日本海経済研究所）

14:30-14:45　コーヒーブレイク

セッション 7　多国間の枠組みによるオホーツク海の保全

座長：**柿澤宏昭**（北海道大学農学研究院）

14:45-15:10　「巨大魚付林とその保全」
白岩孝行・花松泰倫（総合地球環境学研究所）

15:10-15:35　「オホーツク海沿岸の環境に対するサハリン住民の意識変化」
セルゲイ・プロコペンコ（サハリン州立大学）

15:35-16:00　「オホーツク海＆海氷国際シンポジウムの２４年」
青田昌秋（北海道大学名誉教授）

16:00-16:25　「ヘルシンキ委員会―バルト海環境保全の３５年」
ニコライ・ヴラソフ（ヘルシンキ委員会）

16:25-16:50　「ロシア極東地域の持続可能な発展の方向性」
ピョートル・バクラノフ（ロシア科学アカデミー極東支部太平洋地理学研究所）

16:50-18:00　**総合討論**

座長：**白岩孝行**（総合地球環境学研究所）

コメント：「国際科学技術センター(ISTC)の活動について」
髙木　優（国際科学技術センター）

18:00-18:15　閉会の辞　**柳屋圭吾**（国土交通省　北海道開発局開発監理部次長）

Impact of the Sea Ice Reduction in the Sea of Okhotsk on the North Pacific

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Abstract. The Sea of Okhotsk is the southern limit of sea ice in the Northern Hemisphere. This is because the cold pole in the Northern Hemisphere is located in the upwind region of the Sea of Okhotsk. When sea ice is formed, most of the salt content is rejected from the ice and thus cold, saline and dense water is released into the ocean below. Since large amounts of sea ice are formed in the Sea of Okhotsk, the densest water on the surface of the North Pacific is produced there. Sinking of this dense water creates the vertical circulation (overturning) down to the intermediate depths (approx. 200 to 800 m deep) in the North Pacific. The Okhotsk thus plays a role as the pump of the North Pacific. We found that the water temperature in the intermediate layer of the Okhotsk has increased over the past five decades while the oxygen has decreased. This means that sinking of cold oxygen-rich surface water into the intermediate layer has decreased. These signals have spread to the North Pacific along the pathway of the seawater flowing out of the Okhotsk. The Okhotsk is sensitive to global warming: over the past 50 years, sea ice production has decreased by about 20% and dense water sinking has thus declined, thereby weakening the overturning in the North Pacific. The weakened overturning possibly affects the iron circulation, since the iron in the western North Pacific presumably originates from the dense (intermediate) water from the Okhotsk, further from the Amur River. Recent studies suggest that iron is a substantial factor in determining biological productivity. Current global warming, through sea ice reduction, might decrease the iron supply in the North Pacific as well as in the Okhotsk, thus reducing levels of biological productivity and fishery resources.

Intermediate Layer Iron Transport Supporting the Biological Production in the Oyashio Region

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Abstract. Atmospheric dust has been thought to be the most important source of iron supporting annual biological production in the Western Subarctic Pacific (WSP). Our study clearly indicates that there is another important source of iron for WSP. We conducted observations in the Sea of Okhotsk and found that iron was re-suspend from the sediments of the north-western continental shelf area. This source of iron is transported by ventilation processes, which are driven by sea-ice formation in the Sea of Okhotsk, and which distributes the iron to wide area of the intermediate layer in the WSP. Furthermore, we observed a clear seasonality in dissolved iron concentrations in the surface waters of the Oyashio region. The surface waters are significantly influenced by high iron concentrations in the intermediate waters through diffusion and winter mixing. Therefore, in addition to the traditional view of dust input, iron transported into the mesopelagic zone by ventilation of intermediate waters should be considered as an important source of iron for phytoplankton blooms in the Oyashio region.

The Monitoring of the Sea of Okhotsk

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State Establishment "Far East regional Hydrometeorological Research Institute" (FERHRI),

Federal Hydrometeorology and Environmental Monitoring Service, (ROSHYDROMET), Vladivostok, Russia

Abstract. Since the 1960s of 20th century FERHRI has been caring out complex researches of physical properties of waters of the Sea of Okhotsk in the field of hydrological, meteorological and ecological monitoring.

As a result of generalization of this information there is a creation of E-Manual over the Sea of Okhotsk which is available on website: http://rus.ferhri.ru/okhotsk (in Russian only).

At the same time, besides the general climatic information on hydrological, meteorological and ecological mode of the Sea of Okhotsk, some results on climatic changes in the region of sea were obtained.

The analysis has shown that the general tendency of warming in atmosphere in the area of Sea of Okhotsk is being observed during last decades and traced in deep-water, change of ice coverage and level, and other parameters.

Coastal Waters Study in Hokkaido – and Especially, the Sea of Okhotsk –

Ryuji FUKUYAMA[1], Katsunori ANEZAKI [1], Sei-ichi SAITOH [2], and Hideki MINAMI [3]

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Abstract. The Sea of Okhotsk and its catchment are among the most vulnerable areas to human activities. A great deal of pollutants such as chemical compounds, acid materials etc. involved in aerosol is accumulated in this famous graveyard of low pressure system. Furthermore, these pollutants discharge in Amur River after a previous accumulation in the catchment area. Recently, the Tsushima warm current has been melting the sea ice, and frequently intruding into the Sea of Okhotsk during winter season. These phenomena are getting more and more remarkable due to global warming. We are actually investigating the water quality and substrates around Hokkaido coastal sea areas, using the satellite-derived imageries and the analyzed in situ data. From these investigations, the new findings are as follows:

1. The phytoplankton blooming triggered by fresh water from the Ishikari River, and its movement into the Sea of Okhotsk were observed by satellite-derived imageries using SeaWiFs of the year 1999. Transportation of pollutants by the northern movement of the ocean polar front is expected to increase into the Sea of Okhotsk.
2. The results of the chemical compounds such as POP's, analyzed in the substrate of the Sea of Okhotsk, indicated the possibility of POP's accumulation in the Sea of Okhotsk. The high level of POP's in the Sea mammals' fat of this sea area was reported by the Institute of Cetacean Research in 1996.
3. The frequency of precipitation of more than 100mm has been high during this decade. This was followed by the increase of the loading of pollutants, such as organic substances and nutrients, discharged from inland to the Okhotsk coastal sea areas. The stratification in lagoons in the nearby Sea of Okhotsk is lengthened by the global warming. This heavily affects the aquiculture industry through the evolution of nutrients and sulfides at the lake bed.

Elements in Aerosol at Hokkaido

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Abstract. Including Fe with that has serious role in breathing and photosynthesis, many elements are essential for life. On the other hand, many elements have toxicity when those are extremely concentrated. And the cancer-causing elements give us a due risk in proportion to its concentration. In addition, it become clear that atmospheric suspended particulate matter become toxic when this particulate size is smaller to sub micrometer. Moreover, it is worried about the integrated effects of metal components on human health. Accordingly, it is very important to estimate the behavior of metal components in aerosol during long-term. Furthermore, it can be calculated the source attribution of aerosol when the composition of metal components is monitored in ambient air and emission sources. Therefore, we are investigating about aerosol and these components during long-term in some background and urban area over Hokkaido for estimating the effects of local source and long-range transported. From our results, it is suggested that the transported air pollution including the yellow sand phenomena, from the Asian continent and Honshu Island of Japan, influence in east-end background areas like cape Ochiishi. In particular, the concentrations of Al and Fe are increased when an air mass flowed in from the Asian continent. The tendency becomes more remarkable since 2000, caused by high frequency of the transportation of yellow sand. In addition, in while the majority of metal components show lower concentration in Ochiishi than in Rishiri according the distance from the continent, some elements show a different tendency. This suggests that the influences of each local emission can not be ignored.

Modeling of Dissolved Iron Production and Transport of the Amur River Basin

Takeo ONISHI

Research Institute for Humanity and Nature, Japan

Abstract. Recent research showed that iron limits phytoplankton growth in the Western Subarctic Pacific and that significant part of it originally comes from the Amur River. It is also revealed that the crucial processes of producing dissolved iron are reductive release of ferrous iron and formation of iron complex with organic compound in wetland. However, drastic conversion of wetland into cultivated land in China part during the last half of 20th century may have great impact on iron production. To assess the land cover conversion impact on dissolved iron production in terrestrial area, a numerical model which simulates dissolved iron production and transport in the Amur River is developed.

A model which consists of two modules was constructed. One for dealing with the physical process that calculates runoff (TOP-RUNOFF), and the other for dissolved iron production process (TOP-FE). Accuracy of TOP-RUNOFF without any calibration is fairly good except for catchments affected by anthropogenic impact such as dam. TOP-FE was formulated as a function of water content which is the prognostic variable of TOP-RUNOFF, saturation duration time which represents the degree of redox condition, and topographic index a/tanb. Calculated values were validated by using dissolved iron data observed at several points. The result showed that the model can predict annual dissolved iron flux. However, inter-annual variability of dissolved iron flux was much larger than that of simulated dissolved iron flux.

The main reason of this discrepancy was supposed to be attributed to no consideration of flooding process especially in flood plains. Incorporating flooding process into the model actually improved the accuracy in predicting inter-annual variability of dissolved iron flux. Thus, soil saturation not only by ponding but also by flooding was proven to be important in dissolved iron production.

Modeling of the Intermediate Water and Iron Transport in the Sea of Okhotsk and the Northern North Pacific

Humio MITSUDERA

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Abstract. The Amur River mouth is located at the northwestern shelf of the Sea of Okhotsk. Dense Shelf Water (DSW) is produced over the area, when brine is rejected as sea ice forms. DSW intrudes into intermediate depths (200-500m) along the Sakhalin coast. This intermediate layer intrusion forms the lower limb of a meridional overturning circulation in the Sea of Okhotsk that is enhanced by strong tidal mixing near the Kuril Islands and closed by a surface wind-driven circulation that returns relatively saline water to the DSW formation regions. DSW mixes a lot of materials such as iron when it forms over the shelf. This water supplies a lot of materials including iron to the Sea of Okhotsk, and finally exports to the intermediate layer of North Pacific Ocean.

A series of numerical experiments is conducted to investigate dynamics of this overturning that incorporats the intermediate-layer circulation. The effects of wind, air temperature, Amur River discharge and tidal mixing along the Kuril Island were examined and were all found to influence the overturning. In particular, it was found that stronger wind forcing enhances the DSW intrusion because 1) intensified circulation increases northward salinity flux from the Kuril Islands where saline water upwells from the intermediate layer, and consequently raises background salinity in the northern shelves where DSW forms, and 2) the DSW volume flux from the northern polynyas increases under increased winds. Then, simulations with observed forcing were carried out to investigate which effects are responsible for recent warming in the intermediate layer. It was found that not only air temperature rise but also fresh water flux increase onto the sea surface are important for the intermediate layer warming.

We are currently coupling this model with material circulation, aiming toward representing the iron circulation. For the first step, CFC circulation was simulated and validity of model physics was evaluated. It is confirmed that the model simulated the observed CFC well. This model is now developed to couple with a P-Fe circulation model.

Historical Changes in Land-Use/Land Cover in the Amur River Basin

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Abstract. All distinctions in the economic and nature protection policy of the neighboring states are well reflected and shown within trans-boundary river basins. The parts of trans-boundary geosystem of one country can experience an essential negative influence from rash decisions in the field of nature use and nature protection policy of the neighboring state.

The Amur River basin covers the territories of Russia, the Peoples Republic of China, Mongolia and Democratic People's Republic of Korea and occupies about two million км^2. The most intensive development of the basin territory has started since the middle of the 19th century. We compiled two maps of land use in the Amur River basin in the 1930-1940s and in the early 20th century. Essential changes occurred in distribution of the Amur River basin for 70-years.

Negative dynamics is marked for forest lands, meadows, wetlands and mountain tundra (golets), the share of which has decreased by 5.5 %, 5 %, 6.3 %, and 0.4 % respectively. The share of sparse forests, bushes has increased slightly, whereas that of arable lands has increased considerably by 11.3 %. The felling area has increased by six thousand км^2, and fire sites by 10.0 thousand км$^{2.}$

The basic features in the change of land use within national parts of the basin in Russia, China and Mongolia are analyzed. The comparative analysis of land use peculiarities of the countries for the last 70 years has been done.

Belonging of this territory to one river system of the Amur River basin, common structures and functioning of its landscape framework conditions close interrelation of ecological processes on a vast area. It is demanded to take into account all these phenomena in the models of inexhaustible nature use and sustainable development. It seems that within trans-boundary basins it is necessary to aspire to extremely possible agreement and coordination in regional nature use and sustainable development of boundary areas.

Impact of Land-Use Changes in Iron Transport

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Abstract. Iron is fundamentally insoluble during ordinary weathering process in land, but could be transported by river after solubilization under certain terrestrial situations such as wetlands, where Fe is reduced to produce soluble Fe^{2+} and more stable organic Fe complex form. Lowland area is widely distributed along the Amur Basin. Sanjiang plain in China side is a typical lowland with an elevation as low as 40 to 60m, surrounded by Songhua River, Usuri River and Amur River. Most of this vast area is nowadays converted to upland fields and paddy fields. We have investigated the impact of such land-use changes in iron transport. Upland fields, formed after reclamation by drainage, proved to have an oxidized condition with high Eh, where little iron solubilization takes place. Paddy fields had lower dissolved iron concentrations in both surface and soil interstitial waters throughout a year and a shorter period of reductive condition due to agricultural water managements. Controlled water drainage and negligible water penetration into soil may result in reduced iron transport from paddy fields, though utilization of ground water with high dissolved iron concentrations for irrigation could have a reverse effect. Presence of peat layer observed in most terrains suggests a predominance of wetlands in Sanjiang plain. Current ground water tables were found to be greatly lowered in most regions, which is possibly due to a reclamation by water drainage. Such alterations in land condition from wetlands likely result in a decrease in river transport of dissolved iron as observed in a major branch river for these decades.

Effect of Wetland Reclaimation on Dissolved Iron Species

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Abstract. With wetland reclamation in Sanjiang Plain since mid-1950s, both of wetland and agriculture ecosystem had experienced greatly changes which had been resulting in the changes either in macro-environment or micro-environment involving decreases of rainfall, soil moisture and soil organic matter, increases of soil temperature, Eh and pH. This research investigated the concentrations and chemical forms of dissolved iron in agricultural waters and wetland waters, including groundwater, paddy waters, canal waters, marshy waters, marshy streams and main stream with Cross-Flow Filtration(CFF) method. The purpose is to reveal the species of dissolved iron under wetland reclamation. The results show that the concentrations of dissolved iron in marshy waters and streams were higher than agricultural waters. The higher concentrations of total dissolved iron were observed in marshy rivers, Yalv R. (1.359 mg/L) and Bielahong R.(0.807 mg/L) resulting from higher DOC contents. Wetland waters and marshy rivers play an important role of the iron source for iron supplement to main rivers. Low molecular weight(LMW, <0.01μm) iron was the major fraction of dissolved iron both in marshy waters and streams, and 71% of LMW iron was in organic form in wetland. Moreover, wetland plants played an important role in controlling the rate and mobility of iron in surface water and soil by rhizosphere oxidation and uptake. There were noticeable differences in the concentrations and species of iron in the different vegetation covering area in marsh land. The concentration of dissolved iron in Calamagrostis angustifolia meadow were higher than that in Carex lasiocarpa marsh implying particulate iron would more readily release from soils and sediment in the environment. The concentrations of high molecular weight(0.05-0.7μm) and medium molecular weight iron (colloid iron, 0.01-0.05μm) increased in paddy waters and canal waters. The highest concentrations of ferrous and LMW were observed in groundwater because of reductive conditions. Ferrous account for 80.45% of total dissolved iron in groundwater. However, Ferrous in the paddy waters and canal waters were only 0.147 mg/L and 0.176 mg/L, respectively. The concentrations of HMW and MMW iron in paddy waters and canal waters were a little higher than that of in groundwater. Concentrations of HMW and MMW iron in river waters vary from 0.017 to 0.197 and 0.025 to 0.063 mg/L, respectively. The average concentration of ferrous in the marshy river is 0.090 mg/L, about two times higher than that of in the main rivers (Songhua R., Amur R. and Ussuri R.). The concentrations of total dissolved iron decreased 62.5% from groundwater to canal waters due to the formation of precipitate. Since 1964, the concentration of dissolved iron was decreased sharply with wetland reclamation. Hence, wetland reclamation in Sanjiang Plain reduces the output of dissolved iron, especially LMW iron and influences finally iron transportation and transformation to Amur River and adjacent Okhotsk Sea. Therefore, it is imperative to take care of wetland ecosystem in all the basin of the Amur River.

Chronic Pollution of the Amur River with Toxic Organic Matter

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Abstract. The research results of correlation between the level of water, bottom sediments and ice pollution and the bioaccumulation of toxicants in fish are presented. According to monitoring data benzene derivatives and volatile chlorine-containing substances accumulated in bottom sediments, ice and hydrobionts constitute main risk factors in the river freezing period. Maximal concentrations of methylbenzene were registered after the ice break in the bottom sediments at the right bank lowers the Sungari juncture. In summer time different compositions of benzene derivatives (ethylbenzene, xylene and toluene) remained in fish of this river passage. The Sungari River also discharged stable polycyclic aromatic hydrocarbons. The dominant substance stretching up to the water-inlet in Khabarovsk was benzo(b)fluoranthene. Moreover, spectral methods, chromatography and chomatomass spectrometry of benzene derivatives revealed different pollutants accumulated in the bottom sediments and fish. Phthalate, naphthalene, highly toxic anisole and benzothyozole, as well as fluorine and phosphorus - containing pesticides of a new generation were identified in fish.

Response reactions of the Amur hydrobionts much depend on the total impact of toxic substances regularly discharged from the Sungari (chlorophenols, polycyclic aromatic hydrocarbons, trace metal ions). Ecological risks for Amur hydrobionts caused by the technogenic accident in the Sungari Basin (November, 2005) are enhanced by the additional effect of the regular chronic pollution of the Amur River in recent years. Various classes of toxic substances, revealed in all components of the Amur ecosystem threaten fish resource regeneration and population health in the region.

The Investigation and Estimation on Influences of Songhuajiang River's Nitrobenzene Leakage Incident to Fishery Environment

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Abstract. A water pollution incident was happened in Songhuajiang River, China in 2005, this incident evoked society to take serious consideration of fishery ecological environment protection and seafood safety. The Chinese government paid great attention to this incident, and sent a special working team to conduct investigation and deal with the pollution. Fishery Research Institute and other departments carried out a project named "ecological environment estimation and strategy research on Songhuajiang River's water pollution incident". The investigation team surveyed the residue level of nitrobenzene of fishery product in mainstream of Songhuajiang River and analyzed the fish sample, water ample and cultivation water body in the pond along the river. The enrichment and releasing experiments were carried out on nitrobenzene in fish and bait biology and a series of simulation experiments on toxicological effects were developed. The impact of pollution incident on fishery resources and ecological environment was completely assessed. Speaker has briefly introduced the findings of the investigation.

Development of Environmental Assessment for the Impact of an Oil Spill and Other Accidental Pollution on a Marine Ecosystem

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Abstract. About 5,000 oil-contaminated seabirds were found along the Okhotsk Sea coast in Hokkaido from February to April, 2006. Unfortunately, the runoff source of oil has not yet been determined. For solutions of these problems, we tried to advance researches and developments as given below.

1) Chemical analysis of environmental pollutants – drifting oils, for example –

We collected oil-contaminated seabirds, oil balls and oils in drums that were found in the Okhotsk Sea coast area. Each oil sample was identified by each composition of hydrocarbons. Both the oils that adhered to the seabirds and one of oil balls were estimated as a sort of heavy fuel oil. However, the oils in the drums were lubricants. Therefore, the oils in the drums and ones adhering to the seabirds were unrelated. Because we cannot solve marine pollutions without the international cooperation, we need to consider an international common process of chemical analysis, data sharing and prevention for various environmental pollutions.

2) Land-Ocean Integrated Geographical Information System (GIS)

One of our aims is the integration of the marine ecosystem information into the existing GIS for understanding land ecosystem. First, we made prototype of information system, by that we can collect, accumulate and share information of driftage (ex. died seabirds). By using a camera in mobile phone, a local resident can send positional information and image of driftage to central database system on the Internet. Second, we developed the buoy system for tracking oil spillage or other pollutions by GPS technology in real time. Third, for studying the interaction between land and marine ecosystems, we simulated dynamics of river water temperature with changing watershed ecosystem (ex. clear-cutting of floodplain forest). Forth, we obtained a background data of seabird population (ex. density at sea) by fisheries research vessels and overlaid theirs distributions with the ocean color images by satellites. We estimated the some relationships among the seabird distribution, the sea surface temperature and/or chlorophyll a concentration. Finally we would like to present an outline of Land-Ocean Integrated GIS.

Trend of Forest Resources, Policy and Management in Khabarovsk Krai

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Abstract. In Khabarovsk Krai, it is commonly acknowledged that forest resources have been degraded. The ratio of younger forest and soft broadleaf forest has continued to increase. Major causes for the degradation of forest are considered to be the fire, followed by logging activities. Statistics showed that about 70 to 90% of forest fire was caused by human activities. Logging activities have been targeted on accessible and high quality forest, and were carried out in high-grading with improper method. So far, the forest development strategy in the Russian Far East is “Cut and Run”, and considered as not sustainable.

Frequent change of forest policy and administration system, negatively affect to forest management. New Forest Code was enacted in 2007. Under new code, forests are still Federal property but authority for managing it is delegated to the Regional level. Forest management organization was also fundamentally reorganized, and former management unit was split into administration body and operation body, and the latter was corporatized. This reform brought further turmoil to forest management.

Another issue which affects forest management is timber trade. Timber export form the Russian Far East has rapidly increased after Ruble crisis in 1998, especially to China and estimated amount of export to China was 8.4 million m^3 in 2007. Russia is intended to introduce 80% log export tax and this policy has potentially major effect both on forest management and industry in Khabarovsk Krai.

Characteristics of Agricultural Development on Sanjiang Plain
- State Farm Paddy Field Development from a Macroscopic Perspective -

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Abstract. This paper is intended to elucidate from a macroscopic perspective the characteristics of the rapid development of irrigation and drainage systems and paddy fields on the Sanjiang Plain along the upper Amur River basin, which is one of the world's three largest wetlands. Before setting out on this project, the authors have used the findings of their analysis of the paddy field development process at one state farm (Xinhua Farm) to take a microscopic approach to shed light on the development of paddy fields by farms and "zhigong" farmers (general farm laborers who became farmers (households)) and their roles in subsequent rice production. Because paddy field management on the Sanjiang Plain is very broad, but its rice producing techniques and economic structure have a certain definite form, the microscopic approach to understanding the paddy field development process and rice farming management structure on the level of farmers could be considered a success.

Based on such microscopic analysis, this paper assumes a macroscopic perspective to reveal the characteristics of the rapid development of irrigation and drainage systems and paddy fields on the Sanjiang Plain, based on a collection of materials and statistical data on paddy field development. In so doing, the authors put a focus on state farms, the existence of which characterized the extensive project to develop an irrigation and drainage system in the area. The entities involved in this project were stratified: on the first stratum was a national project for comprehensive land development; on the second stratum were the Bureau of Agricultural Reclamation, which manages state farms, and its Agricultural Reclamation Administration branch; and on the third stratum were zhigong farmers. The existence of these stratified entities was a condition made necessary by the nature of this project, i.e., development of a large wetland. Being at a point where three major rivers meet, the Sanjiang Plain is a flood plain, and so major infrastructure development was required, thereby necessitating this national project for flood control. The unique existence of the local government, which administers the political as well as economic vehicle of state farms, also contributed to the promotion of agricultural development. It was also the existence of zhigong farmers, who assumed the superiority of individuals and had the economic accumulation which brought this project to success that helped to stabilize rice production with an underground water irrigation system.

Chinese-Russian Wood Trade and Economic Cooperation in This Field

Anquan FENG

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Abstract. Wood resources are important strategic materials and play important roles in national economic development. Recently, with the sustained development of the Chinese economy, the requirements for wood have increased tremendously. Additionally, China is a country relatively lacking in wood resources, which means that the market needs cannot be met by domestic supply, and that the contradiction between the supply and demand is continuously expanding. Usually, overseas import is one of the effective ways to solve this problem.

Russia owns the most abundant forest resources in the world, occupying 30% of the total amount of world-wide export in crude wood, and already is the largest importer of Chinese crude wood and board now. For the past few years, in order to promote the wood industry and reward the export of wood ware with high added value, the government of Russia unveiled some fresh policies such as the restriction of log exports, which has had a huge influence on the progress of the Chinese wood industry. Moreover, the progress of the Chinese wood industry has been further influenced since the 2008 global economic crisis. Therefore, clarifying the cooperation in wood resources between both countries is beneficial to the development of the Chinese wood industry and Chinese-Russian wood trade.

Foreign Trade Relations between Russia, China and Japan as Factor of Land Use/Cover Changes in the Amur River Basin

Natalia MISHINA

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Abstract. The main part of the Amur River basin (over 90%) belongs to the Russian Far East and Northeastern China. Due to economic-geographical and geopolitical location of the Amur River basin in the 20th century economic development of its Russian and Chinese parts was determined both by internal factors and external influence of neighboring countries and foreign markets. To identify the role of foreign trade between Russia, China and Japan as external driving force of forest and agricultural land use and land cover changes in the Amur River basin, data on total output, domestic consumption and export of forest and agricultural products were analyzed. External influence was considered as the direct and indirect factor of land use/cover changes. Interaction of external influence with internal economic and political situation in the Russian Far East and Northeastern China was examined for the last 100-120 years. As a result periods of significant external effects on forests utilization and agricultural lands development in the Russian and Chinese parts of the basin were determined and characterized. Present-day situation in the Russian part of the basin was explored on the more detailed spatial level of administrative units (Krais and Oblasts).

Amur River Monitoring: Main Results and Improvement Problems

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Abstract. The development of a water resource monitoring system is one of the priorities of the Russian government policy in the sphere of water resource use, regeneration and protection. At present the assessment of the state of water objects in the Russian Far East is implemented under the United State System for natural environment observations. Khabarovsky krai branches of the Russian Ministry of Nature, Hydrometeorological Service, Nature Inspection, Ministry of Education and Science and Ministry for Emergency Situations lead this work. The research institutes of the Far Eastern Branch of the Russian Academy of Sciences, Far Eastern Agriculture Research Institute, Far Eastern Water Industry Company and other organizations contribute much to water resource monitoring as well. Water monitoring data, provided by big water consuming industrial companies, are also very important. Thus by now a stable system to monitor surface water objects has been created. It is implemented on the local, territorial, regional (Amur Basin) and federal levels.

The Amur River has a complicated hydrologic regime due to specifics of natural factors that infuence the river runoff formation. Many of these factors produce a negative effect on water quality in the Middle and Lower Amur. Thus the issues of water consumption safety in conditions of significant anthropogenic impact on water resources are very urgent.

The Russian-Chinese Coordinating Commission and the Expert Work Group were formed. They worked out the Plan for transboundary water objects such as the Amur, Ussuri, Argun, Razdolny rivers and the Lake Khanka. Regular water and bottom sediment sampling in 10 selected sites and water analysis of 40 water quality indicators were planed. These indicators allow estimating surface water pollution with industrial, agricultural and household wastes. This monitoring has been carried on since 2002.

Unique, rather detailed and exclusively reliable data were obtained during special emergency monitoring activities to mitigate Amur pollution after the accident at the chemical plant in Jilin in November 2005. Still the existing monitoring system should not exclude scientific activities, including international, to assess the impact of water and bottom sediment pollution in the Amur, as well as s terrigenous, dissolved and biogenic matter discharged from the Amur on the Okhotsk Sea ecosystems.

Water Environmental Equality Situation and Character Analysis along Heilongjiang Valley

Nanzhe SONG, Liming JIA, and Ximin GIANG

Environmental monitoring central station of Heilongjiang province, China

Abstract. With the increasing development of valley economy, water environment pollution and water resources shortage along Heilongjiang valley were becoming more terrible. The thesis investigated and analyzed environmental equality along Heilongjiang valley regarding the harmonious development between environment and economy as the aim from the view of water environment, and evaluated water environmental equality along Heilongjiang valley,and also indicated water environment pollutional characters along Heilongjiang valley. It had pratical meanings to make reasonable plans and to promote the process of fathering contaminated valleies and also had important pratical value and guidance to investigate water environmental sustainable development along Heilongjiang valley.

International Treaties in Amur River Basin and Development of Transboundary Environmental Policies

Eugene SIMONOV

Dauria International Protected Area –DIPA; Daursky Zapovednik., Nizhnii Tchasuchei. Ononskii Rayon, Zabaikalsky Kray, Russia

Abstract. The Amur River basin, divided between three countries, provides ecological services important for other countries and the whole world. Integrated river basin management (IRBM) in the Amur-Heilong could be accomplished through international cooperation, a worthy objective of which would be an agreement and plan for protecting the entire Amur-Heilong River ecosystem. Despite Amur's importance in biodiversity, fisheries and food production, wetlands conservation, climate change adaptation, etc. no international treaties have been signed that could provide solid basis for IRBM on Amur. One of reasons for that – drastically different cultures, population density and mode of economic development and water use in Russia, China and Mongolia, who signed a multitude of bilateral agreements, but do not have trilateral mechanism to protect common river ecosystem.

Long-term conservation programs carried by multilateral (GEF, UNDP) or non-governmental (WWF) organizations have been used to promote the idea of transboundary river conservation and management, but have very limited influence on water management and land-use decisions in the basin.

From many multilateral conventions the Ramsar Convention is one of the most relevant policy tools in the Amur-Heilong basin with 15 wetlands already listed under convention. The Ramsar Convention Regional Initiative approach provides a suitable framework for multilateral cooperation on transboundary IRBM regime and transboundary environmental flows for wetland conservation.

Since Songhua toxic spill in 2005 rapid formation of new regime of cooperation and competition over transboundary waters has started in Amur River basin. I analyze which cooperation mechanism and regulation concepts could provide better platform for conservation and management of transboundary river ecosystem.

Marine Mammals in the Sea Of Okhotsk: Abundance, Consumption of Resources, and Outlook for Future Studies

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Abstract. Marine mammals play an important role in the Okhotsk Sea ecosystem. They are very abundant in the region, and being high-level predators, consume significant amount of living marine resources. 7 pinniped and about 20 cetacean species inhabit Sea of Okhotsk. Total population of pinnipeds is estimated about 1.5 millions, while abundance of cetaceans is unknown but considered to be over 100,000 individuals. Each marine mammal species has its own ecological preferences, so the range of their diets is very wide and include fish, cephalopods and crustaceans. Annual consumption of prey only by pinnipeds is estimated by different authors from 1.5 to 1.8 million tons, cetaceans also consume up to 2.4 million tons, including over 1 million tons of fish. Therefore, total amount of living resources, used each year by marine mammals in the Sea of Okhotsk appears to be close to 5 million tons (about three times more than fishery catch). There is no whaling in Okhotsk Sea now; commercial sealing is also very insignificant comparing with period of 1960-1990. Harvest operations gave opportunities to collect vast data on age-sex structure, reproduction and other population parameters, so there is a lack of information at present time. Therefore, assessments of marine mammal abundance in the Sea of Okhotsk and monitoring of their populations still remain an urgent task, but nowadays, complex ecosystem approach becomes more and more important. That is why climate changes, prey distribution and abundance, pollution and other environmental parameters should be taken into account in marine mammal studies. Another item is protection of endangered species such as western gray whales. Satellite tracking and tagging is especially crucial to study their migrations. In this case international cooperation is necessary to ensure effectiveness of the studies.

Okhotsk Sea Ecosystem: Fishery Production and Research Activities in Japan-Russia Adjoining Area

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Abstract. The Okhotsk Sea coast of the Hokkaido Island, extending as long as 700 km (excluding the Northern Territories), yields 30 - 40 % and >10% of total fishing production in Hokkaido Island and Japan, respectively. The total fishery production in this area has been rather stable fluctuating between 0.4 - 0.5 million metric tons in the last two decades. However, the major species has changed gradually from walleye pollock to scallop and salmon. In the early 1980s, the catch of walleye pollock exceeded 0.2 million tons decreased to 30 - 40 thousand tons by the mid-1990s. The catch of salmon (mainly chum salmon) and scallop supplemented the decrease, accounting for >80% of total catch in the last decade. The decrease of walleye pollock is accountable mainly to the shrink of the fishing ground in the Russian EEZ, rather than collapse of the fishing stock. The increases in scallop and salmon are accountable to the prevalence of stock enhance programs (both species) and declining of the high-sea gillnetting in the 1980s (salmon).

In the Japanese EEZ of the Okhotsk Sea, an annual stock survey has been carried out for demersal stocks including walleye pollock and king crab. However, both species are distributed widely in the Okhotsk Sea extending far north of the Japanese EEZ, making it difficult to monitor the status of the entire stocks. So a cooperative survey with Russia is anticipated. Pinnipeds, including seals, fur seal and Steller sea lion, are causing more conflicts with fisheries in the Hokkaido waters. We also mention Japan-Russia joint survey for pinniped rookeries recently made in the Russian waters.

Cetacean Fauna, Abundances and Population Dynamics in Okhotsk Sea, with Some Notes on Future Prospect of Their Conservations and Managements

Hidehiro KATO[1], Tomio MIYASHITA[2], and Yoshihiro FUJISE[3]

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Abstract. Japan has been conducting systematic cetacean sighting survey in western North Pacific including Okhotsk Sea since 1989. Through those cruise a total of 11 cetacean species have been identified, whose richly cetacean fauna were especially noted. Of those data sets for four species were good enough qualities for abundance estimation as being 19,200 (CV 0.31) for minke whales, 5,000 (CV0.32) for fin whales, 920 (CV 0.43) for right whales, 443,000 (CV 0.11) for Dall's porpoises which allow some population analyses incorporating ecosystem aspects, and we preliminary examine direction of ecosystem modeling approaches in Okhotsk Sea and adjacent waters. Because Okhotsk Sea provides very important habitats not only as feeding grounds for most of species but also as breeding grounds for some species, future prospect of their conservation and management are discussed.

On the “Japan-Russia Cooperation on the Conservation of Ecosystems”

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Abstract. According to an international consensus, the global biodiversity is now being seriously lost and the rate of biodiversity loss is still accelerating. The Convention on Biological Diversity (CBD) set the 2010 Target to halt or reduce the rate of biodiversity loss by 2010 significantly decrease rate of decline for the biodiversity at global, region and state level by 2010 Strategic plans. Unfortunately, it is known that this target is not satisfied. The 10th Conference of Parties for /CoP10) will be held in Nagoya, October 2010. At the CoP10, we will make the Post 2010 Target that is a more specific, measurable, ambitious, realistic and time-bound. Based on such a serious recognition, we seek a broader scope for biodiversity conservation.

As the Amur-Okhotsk Project called the forestry in the catchment of Amur river the “Giant Fish Breeding Forest”, the relationship between terrestrial and ocean ecosystems is important for fisheries resources . Japanese fishers have paid effort on forestation for several centuries. Such forest is called fish breeding forest. Therefore we usually need international cooperation for ecosystem conservation, despite the fact that catch quota of fisheries is usually defined by nation.

The Shiretoko Peninsula in Japan was designated a UNESCO World Heritage Site in 2005. Fishers in Shiretoko site exploit walleye pollock in Nemuro waters. Fishers in Shiretoko region paid efforts to maintain their sustainable fisheries. Because the Nemuro stock of walleye pollock is also utilized by Russian fisheries, Japanese fishers needs to cooperate with Russian fishers and scientists for sustainable fisheries in this region. The IUCN’s technical evaluation report for the nomination of Shiretoko World Heritage documented the clear and apparent similarities between the environment and ecology of the Shiretoko Peninsula and the Kunashiri and Itrup Islands. This report also addressed the possibility for the future development of these regions as a more broad-scale “World Heritage Peace Park.” Coastal fishers in the Shiretoko area are also concerned about the effects of Russian fisheries on the Nemuro stock of walleye pollock. Japan and Russia have been in conflict over the national boundary between the two countries. Despite these disagreements, UNESCO can register a world heritage site that is multi-national and includes a boundary under international dispute in accordance with the Convention on World Heritage. We know one Biosphere Reserve of UNESCO’s Man and Biosphere Program that includes national boundary under international dispute, Seaflower at Columbia.

International Study Efforts on Gas Hydrates near Cold Seeps on the Northeastern Sakhalin Slope in the Sea of Okhotsk

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Abstract. Gas hydrates in marine sediments are potential energy resources and important reservoirs of greenhouse effect gas. Field observations conducted in 1991 revealed the existence of near-sea-bottom hydrates close to cold seeps NE off the Sakhalin in the Sea of Okhotsk.

The New Energy Resources Research Center, Kitami Institute of Technology has been collaborating with scientists from Russia (V. I. Il'ichev Pacific Oceanological Institute FEB RAS and P. P. Shirshov Institute of Oceanology RAS), Korea (Korea Polar Research Institute, KORDI) and other countries, to investigate the distribution, amount and characteristics of hydrate accumulations and the role of the fluid discharge for the hydrate formation. Multidisciplinary field operations include hydro-acoustic survey, side-scan-sonar survey with sub-bottom profiling, sparker seismic survey, and sediment coring and water column sampling. Core and water analyses include measurements of gas composition, stable isotopes, carbonates, ionic concentrations in pore water, and SEM, Raman and calorimetric observations on gas hydrates.

Geophysical survey results reveal that gas chimney images in seismic reflection profiles were traced to connect BSR line and seepage structures. Both pull-up and disturbed structures of BSR around the gas chimney images were interpreted as to be indications of significant heat flows caused by ascending fluid. On the other hand, almost no pull-up/disturbance of BSR was observed at one seepage structure, suggesting little water seepage. Core analyses results reveal that major composition of guest gas in hydrates is methane of microbial origin. Water enriched in deuterium is seeping from a depth below the sea bottom with gas at seepage structures, although little water seepage is suggested at one structure site.

The seep activity may vary with time. The structure with little water seepage, locating at the edge of a dense area of the seepage structures, might serve as an indicator for the long-term activity of the fluid seepage system off the Sakhalin.

Environmental Technologies and Experiences in the Field of the Environment Developed in Hokkaido

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Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Abstract. In recent years, along with the rapid economic growth of East Asia and others, what is concerned about is more increasing environmental impact.

Hokkaido has been appreciating a rich natural environment facing the Sea of Okhotsk known as one of the three major fishing grounds in the world and exporting the fishery resources to all over the world including China. It is a significant mission for us to conserve and pass down the environment for sure on to the next generation. The transboundary cooperation around the rim of Okhotsk is essential for it.

Hokkaido Development Bureau is currently doing a survey, to build a sustainable relationship around the rim of Okhotsk region, on the possible use of Environmental Technologies and experiences in the field of the environment developed in Hokkaido to the environmental issues in Russian Far East and northeast China.

Out of the survey results so far, we introduce some of the Environmental Technologies of Hokkaido that would be of use in those regions.

Sino-Japan Trade and Agricultural Cooperation: Review and Prospects of Cooperation between Heilongjiang Province and Hokkaido

Zhigang DA

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Abstract. In recent years, trade cooperation between China and Japan constantly makes a new record. Trade volume rose above 280 billion dollars in 2008 after surpassing 200 billon dollars in 2006. At the end of 2008, the projects directly invested in China by Japanese businesses were over 40,000 and total investment was up to 66.6 billion dollars. Though the financial crisis worsens the world economy, Sino-Japan trade still develops well. Now the two countries are just in a transitional period when the dependence of trade cooperation between each other increases more and more on the basis of strategically mutual benefits. Against this background, despite the fact that there are such problems as quality and security in farm produce and foods, the general development trend of agricultural trade is good and cooperation potential is great. Especially with the development of Sino-Japanese agricultural trade, the agricultural resources will be optimized so that it is very likely to realize the mutual and harmonious development in agriculture for two countries. Agriculture is a pillar industry for both Heilongjiang and Hokkaido to enjoy the competitive advantage and deepen the external cooperation. Moreover, there are other complementary strengths such as the creation of regional famous brand products and the cooperation in food processing technology in two regions. Agricultural cooperation between Heilongjiang and Hokkaido is supposed to be a drive to promote the cooperation in others fields. And the opened regional market will help to achieve the win-win target of Northeast Asia agricultural strategy.

The Designation of the Sea Of Okhotsk Region and the Cooperative Relationships with Each of the Neighboring Countries

Susumu YOSHIDA

Chairman of the Board of Trustees, Economic Research Institute for Northeast Asia (ERINA), Japan

Abstract. For the last few years, in an initiative by the Hokkaido Regional Development Bureau and Hokkaido University, an international conference on the Sea of Okhotsk has been held and scientific and technical exchange has taken place. The United Nations, triggered by the explosions at a chemical plant in Jilin City in November 2005, took up as an issue research into the prevention of pollution[1] of the Songhua, Ussuri, and Amur (Heilong Jiang) rivers.

According to the research of Hokkaido University, the drift ice leaving the Amur River for the sea flows on to Monbetsu in Hokkaido. The Monbetsu area, being a famous fishing ground, supplies seafood to the tables of Japan. In addition there is the Shiretoko ecosystem which was registered as a Natural World Heritage Site. Jilin, Harbin, Khabarovsk and Hokkaido are joined by an environmental bond.

Considering matters from the perspective of the environmental protection of the Sea of Okhotsk region, an international monitoring system is necessary which: tabulates the data from tests on wastewater coming from the cities located on the Songhua, Ussuri and Amur rivers and other small and medium-sized cities and industrial hubs together with the data from water-quality tests at the point where the Amur meets the sea and at Monbetsu; controls the whole; and allows the producing of forecast data.

Hokkaido possesses the geographical characteristic of being situated at a juncture connecting North America, Europe and East Asia. Consequently they raised the formation of a "Northern International Exchange Sphere" as one major measure in the Seventh-Term Comprehensive Development Plan of Hokkaido (4 July 2008). Russia's Far East, China's Heilongjiang and Jilin provinces and Japan's Hokkaido are located in the north and have many things in common in agriculture, livestock-raising, and other industries. Therefore, cooperative relationships have continued to be formed in the economic and societal spheres too.

In March this year I visited Heilongjiang Province at the request of its governor Li Zhanshu, and I participated in an investigative commission of 20 concerned persons, with a topic of what to do to further deepen relations with Japan. At that time what constantly came from the concerned parties, including Vice Governor Du Jiahao, was a comparison of the province with Hokkaido. The concrete topics were the problems of the development of agriculture and livestock-raising, food processing, the attraction of capital from warm regions, and administrative control.

The relationship between Hokkaido and Sakhalin is deeper still. In the relations regarding the natural gas and oil development on Sakhalin's continental shelf, Hokkaido has become a rear base[2] for supporting the development of Sakhalin I and Sakhalin II. Oil from Sakhalin I (250,000 barrels per day) has been supplied to Japan since October 2006, oil from Sakhalin II (150,000 barrels per day) since 13 December 2008, and natural gas since 29 March this year.

In the repair work of the area stricken by the August 2007 Sakhalin earthquake also, Hokkaido construction contractors have played a large role. The repairing of the harbor of Nevelsk is example of this. In addition, Hokkaido construction contractors have also taken part in the construction of liquefiers for Sakhalin II and of condominiums and houses.

Hokkaido has tied up friendship partnerships with Sakhalin Oblast and Heilongjiang Province, has

[1] On 13 November 2005 explosions occurred at a chemical plant in Jilin, and benzene was discharged. On 21 November Harbin took the measure of turning off the water supply for four days. On 25 November a state of emergency went into effect in Khabarovsk. In Khabarovsk they undertook a clean-up using activated charcoal.

[2] Ishikari, Wakkanai, Otaru, Hakodate, Soya, Rumoi, Abashiri, and others, have participated as rear support-bases for the Sakhalin oil and gas development.

formulated an economic cooperation development program with the Far Eastern region—Sakhalin Oblast, Primorsky Krai and Khabarovsk Krai—and has carried out exchange based upon that. In particular in relations with Russia, a consulate-general of Japan, the Hokkaido Government Sakhalin Representative Office, and a Hokkaido business center were established in Yuzhno Sakhalinsk in 2001, and in 2002 a Sakhalin representative office was set up in Wakkanai. In air routes the desire is also great for the establishment of routes linking Vladivostok and Khabarovsk with Hokkaido.

In this way mutual relationships don't stop at environmental protection, but are moving toward scientific and technological exchange, exchange between local authorities, and in addition, the expansion of economic and trade relations.

The Giant Fish-Breeding Forest Hypothesis and Its Conservation

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Abstract. The Amur–Okhotsk Project (AOP) attempted to create a new global environmental concept referred to as the "Giant" fish-breeding forest (GFBF) by expanding the traditional Japanese idea of Uotsuki-Rin (fish-breeding forest), which related upstream forest with the coastal ecosystem both physically and conceptually. The AOP found that primary production in the Sea of Okhotsk and Oyashio region depended on dissolved iron transported from the Amur River and its watershed. Therefore, the Amur River basin can be recognized as the "Giant" fish-breeding forest of the Sea of Okhotsk and the Oyashio region. This hypothesis presents new perspectives in global environmental issues: an ecological linkage between the continent and open sea, relating less dependent stakeholders in the system, and finding environmental common ground across coast lines and complex international boundaries. For the conservation of the GFBF we propose a new framework "North-Eastern Asia GFBF Partnership" by uniting existing conservation laws and institutions that were originally created to address various environmental problems in the system independently. On the basis of the scientific achievements with respect to the GFBF, we will also propose an "Agenda for the conservation of GFBF" through cooperation among Russia, China, and Japan.

Changes in Attitudes of Sakhalin Population towards the Purity of the Okhotsk Shore

Sergey PROKOPENKO

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Abstract. It is well known that the main problems of the sea of Okhotsk are caused by anthropological influence. In the middle of the XX century the principal damage was done by whaling flotillas and shoremen fishing herring and salmon. At the end of the XX century another powerful factor appeared, the factor of pollution by waste products thrown down to the sea of Okhotsk from the Amur River by Russian Far East and Chinese industrial enterprises.

At the end of the XX century and the beginning of XXI century waste disposal virtually ceased (the positive side of crises); rivers flowing into the sea of Okhotsk became purer. But oil and gas development works started in the Sakhalin offshore and the sea of Okhotsk is under the negative impact again.

Today on the territory of Sakhalin Region a definite work is underway on changing the attitude of population towards surrounding ecological system. It aims to give the idea that the man is not simply a user of natural resources, but the element of the environment that takes care about its preservation. At schools an educational course is introduced to give the youth ecological upbringing. During summer ecological camps for young people begin their activity in Sakhalin. Two public ecological organizations are actively taking part in the environmental protection of the sea of Okhotsk State and municipal government officers together with business representatives and community are studying advanced experience of environmental protection in other countries in order to implement the best technologies in Sakhalin.

Twenty Four Years of the International Symposium on Okhotsk Sea & Sea Ice

Masaaki AOTA

Okhotsk Sea Ice Museum of Hokkaido, Japan

Abstract. The first International Symposium on the Okhotsk Sea & Sea Ice was held in 1986 in Mombetsu City located in the Okhotsk Sea coast of Hokkaido. The remarkable feature of this symposium is that it is organized and managed annually by the volunteer groups in Mombetsu.

The objectives of this symposium are to promote the advancement of all ice-related studies such as oceanography, meteorology, marine biology and fisheries, remote censing and environmental preservation in the cold regions.

Several special international workshops such as “Workshop on the countermeasures against oil pollution in the Sea of Okhotsk”, “Forum: Global warming viewed from the Okhotsk Sea and the ocean around Okinawa”. After the closing down of the Sea Ice Research laboratory in 2004, the symposium has been continued , we are now making preparation for the 25th anniversary Symposium coming February. We earnestly request your participation.

HELCOM - 35 Years of Protecting the Baltic Sea

Nikolay VLASOV

HELCOM Information Secretary, Finland

Abstract. The Baltic Marine Environment Protection Commission, more usually referred to as the Helsinki Commission or HELCOM, is an international organization of the nine Baltic Sea coastal countries and the European Community, working to protect the marine environment of the Baltic Sea from all sources of pollution and to ensure the safety of navigation.

HELCOM is the governing body of the "Convention on the Protection of the Marine Environment of the Baltic Sea Area" (Helsinki Convention), which was signed by all the coastal countries in 1974, and updated in 1992. It is the first international agreement ever to cover all sources of pollution, whether from land, sea or air. The Helsinki Convention covers not only the sea, but also the surrounding drainage area, which compromises more than 1.7 million sq km.

The main tasks of HELCOM are to provide timely information about the environmental trends and the state of the marine ecosystem and to develop common objectives and actions, which the governments of the coastal countries must implement through their national environmental programmes and legislation.

For the past 35 years, HELCOM has served as the main environmental policy-maker for the Baltic Sea area. HELCOM efforts to reduce pollution and repair the damage to the marine environment have led to noticeable improvements in many areas.

In 2007, the HELCOM countries adopted an overarching Baltic Sea Action Plan to radically reduce pollution to the sea and restore its good ecological status by 2021. The plan is a first ever attempt by a regional seas commission to incorporate the ecosystem-based approach into the protection of the marine environment. It has already been heralded as a pioneer scheme for European seas.

Directions of Sustainable Development of Russian Far East

Peter Ya. BAKLANOV

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Abstract. In 2008 - 2009 a strategy of the development of the Far East, the Baikal and Irkutsk areas has being developed in Russia up to 2025. By our estimations the basic long-term factors of regional development, including sustainable development of the Far Eastern region are as follows:

- Big and diverse nature-resource potential of the region, including sea resources and, especially, renewable natural land and sea resources.
- Specific economic-geographical and geopolitical position of the Russian Far East, formation and functioning of its multidimensional contact structures and functions.
- Infrastructural and scientific and technical, innovative potential accumulated by the present stage of the development of the region. Priorities of long-term regional development have been defined on the basis of the analysis of the present state, the basic problems and factors of social and economic development of the region.

1. Sea economic complex including fishing economy, fish processing, marine culture, sea transport, shipbuilding, ship repair;
2. Forest economic complex, including deep processing of wood and non-wood resources, low-grade timber;
3. A mining complex, including gold mining, platinum, silver and diamonds;
4. Development of oil and gas extraction, oil and gas transportation, oil and gas processing and petro-chemistry;
5. Power development, including the hydroelectric and atomic power stations;
6. Development of the contact, including trans-boundary, structures and functions, including transit transportations, oil and gas pipelines, power circuits, etc.;
7. Development of the large scientifically-educational and innovative centers;
8. Development of various kinds of tourism, including ecological;
9. A market infrastructure, including international logistical centers, insurance companies, banks, exhibition centers, etc.

We have been estimated the conformity of the allocated priorities and available investment projects in the region.

Realization of these priorities of the regional development on the basis of long-term factors will allow us to enter a trajectory of sustainable development. Development of the territorial structures of economy and an exit on manufacture of a total regional product per capita estimated at over 10 thousand dollars, preservation of sufficient natural-resource potential and high qualities of environment in the region should become its preconditions. With this end it is offered to introduce the regional quality standards of regional development (economic, social and ecological) and organization of constantly operating monitoring system of regional development, including monitoring of nature use.

The Role of International Science and Technology Center, ISTC

Yu TAKAGI

International Science and Technology Center, ISTC,Russia

Abstract.

Background of Establishment

The International Science and Technology Center is an international organization that supports researchers in Russia and Commonwealth of Independent States (CIS) countries after the Cold War and contributes to converting their focus to activities in the general private sector. The organization was established in March 1994 based on the Treaty for the Establishment of the International Science and Technology Center signed by Japan, the USA, the EU, and Russia on November 27, 1992 (Korea and Canada joined the Treaty as supporters in 1998 and 2004, respectively). ISTC provides support to researchers in Armenia, Belarus, Georgia, Kazakhstan, Kyrgyz. and Tajikistan in addition to Russia.

Role of ISTC

There are five key objectives of ISTC activities: 1) Offering research funds to researchers in Russia and CIS countries so that they can participate in research activities in private sectors using their technology, 2) Contributing to the development of science and technologies in Russia, CIS countries, and related nations surrounding this region, 3) Supporting the introduction of a market economy in Russia and CIS countries, 4) Offering opportunities for researchers in Russia and CIS countries to participate in the global community of scientists and engineers, 5) Offering research-related information and support to various projects so that universities, research institutes, and private companies in the participating countries, including Japan, can utilize unique and excellent technologies in Russia and CIS. By doing so, ISTC works as a bridge to the government of the treaty countries, related international bodies, and private organizations.

Details of Activities

To achieve the above-mentioned objectives, ISTC has programs called the Regular Project and the Partner Project. In the Regular Project, the government of each country provides funding for excellent projects with significant policy needs. Conversely, the Partner Project is carried out based on the technical needs of partners (private companies, etc.).

The scope of funding for the Regular Project encompasses versatile areas including basic research, nuclear fusion, energy, nuclear safety, medicine, electric engineering, material technology, aerospace, and aviation technologies. Under the review of the Scientific Advisory Committee (SAC) members, including experts from treaty countries, a total amount of $800 million was granted to more than 2600 projects as research funds for researchers in Russia and CIS countries. Experts from universities and institutes of treaty countries take part in these programs to provide advice on the project progress. Furthermore, information and data accumulated as research results are shared among program participants and researcher exchange is promoted.

Recently, ISTC is placing an increased emphasis on the Partner Project, reflecting the activated moves of private organizations in Russia and CIS countries. ISTC provides various services to support matchmaking such as the offering of free scientific and technical information (seeds), tax reduction/exemption, support for customs clearance and the handling of intellectual properties associated with the project to ensure advantages for partners. In particular, tax reduction/exemption will serve as powerful instrument to reduce costs and expenses in comparison with those associated with R&D in the domestic arena. Further, ISTC will investigate the progress of each project and implement audits to guarantee the transparency of the project implementation.

Achievements Related to Japan

While Russia and CIS countries have unique technological potential developed independently, information on the organizations and their activities are still insufficient. Partly due to the difference in regulatory systems, many parties tend to be hesitant to start collaboration. To address this barrier, many foreign-based research institutes and private companies, including Japanese organizations, currently participate in collaboration activities through ISTC. So far, the Japanese Government supported approximately 220 Regular Projects. In terms of the Partner Project, 20 organizations have been involved in approximately 50 projects in total. ISTC is committed to make further efforts in promoting collaborations between research institutes in Russia and CIS countries and Japanese counterparts such as universities, research institutes, and private companies by playing a role of pilot in the frontier of collaboration. Specific project information can be accessed on our website. ISTC has compiled a database for information on past projects handled by ISTC. Information matching your interests can be accessed free of charge by keyword search.

(http://www.istc.ru/istc/istc.nsf/va_WebPages/TechnologySearchDBEng).

We sponsor the ISTC Japan Workshop on regular basis (approximately 5 times a year), where various subjects in science and technology are discussed. Using this opportunity, we invite researchers from Russia and CIS countries who report on the latest research trends. In addition, based on the advice of ISTC experts in each area, we make arrangements for individuals to contact and visit to local institutes. Please feel free to contact our staff. We have four dedicated staff members (two Japanese, two Japanese-speaking Russians) to serve your needs.

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