Ministry of the Environment

ENVIRONMENT RESEARCH AND TECHNOLOGY DEVELOPMENT FUND FY2017

What is the Environment Research and Technology Development Fund?

Objective

To contribute to the promotion of environmental policy through research and technical development

The aim of the Environment Research and Technology Development Fund (ERTDF) is to collect scientific knowledge and accelerate technological development as necessary to promote policies such as global warming prevention, establishment of a sound material-cycle society and establishment of a society in harmony with nature, while ensuring security and safety through environmental risk management. The fund promotes research and development in the area of environmental issues overall.

Features

Adoption and execution of research proposals which meet administrative needs in accordance with environmental policies

The ERTDF is a policy-oriented, competitive fund. It calls for proposals from industry, academia and government institutes. Proposals are expected to meet administrative needs, and are competitively examined and selected by the committee and appropriate subcommittees.

The ERTDF strongly promotes research and development in accordance with strategic administrative needs. For example, the "Strategic Research and Development Area" consists of competition among research teams based on an outline for selecting research themes and project leaders established by the Ministry of the Environment.

Ensuring a transparent and fair evaluation process by using committees composed of outside specialists

The ERTDF comprises a committee and several subcommittees consisting of outside specialists. The committee is responsible for selection of proposals, intermediate evaluation and ex-post evaluation. Proposals are examined and selected by the committee and appropriate subcommittees in terms of the necessity and effectiveness of the research, and efficient use of funds.

To ensure transparent, fair and efficient fund management, the Ministry of the Environment refers to evaluation results to decide which research projects to adopt and allocate the research budget in order to support appropriate progress in the research projects.

Research Fields

In fiscal 2016, the seven former research fields have been reorganized and condensed to five fields in line with the "Promotion Strategy for Environmental Research & Environmental Technology Development" (Policy Recommendation Report of the Central Environmental Council in August 2015).

- **Common to All Fields / Cross-sectional through Different Fields**
  Presentation of visions and principles toward the realization of a sustainable society
  Values and lifestyle changes toward the realization of a sustainable society
  Discovery and utilization of new technology seeds that contribute to solving environmental issues
  Research and technical development that contribute to response to environmental issues caused by disasters
  Other related R&D

- **Low Carbon Field**
  Formulating low-carbon and sustainable scenarios that flexibly respond to climate change
  Research and technical development of measures to adapt to climate change
  Clarifying, forecasting and assessing measures in response to global warming phenomena
  Other related measures

- **Sound Material-Cycle Field**
  Establishing technical and social systems to promote the 3Rs (Reduce, Reuse and Recycle)
  Research and technical development to contribute to optimal waste disposal, extend the lifetime of disposal facilities and improve their function
  Establishing technology and systems to promote energy recovery from biomass waste
  Other related measures

- **Harmony with Nature Field**
  Research and technical development toward fulfilling scientific knowledge on conserving and contributing to biodiversity
  Research and technical development toward continued utilization of ecosystem services and conservation and restoration of linkages among forests, *Sato* (rural settlements), rivers and the sea
  Other related measures

• **Safe and Secure Field**
Research for promoting inclusive risk evaluation and management of chemical substances
Research for advancement, assessment and clarification of countermeasure techniques that manage and improve air, water and soil environments
Other related measures

*Research and technological development for CO_2 emission reduction at energy origin is funded by the Special Account for Energy Policy.

The ERTDF system is explained on the following Ministry of the Environment (MOE) websites:
http://www.env.go.jp/policy/kenkyu/index.html
http://www.env.go.jp/policy/kenkyu/suishin/gaiyou/index.html

Information on calls for proposals is provided at the Environmental Restoration and Conservation Agency's (ERCA's) ERTDF website:
https://www.erca.go.jp/suishinhi/

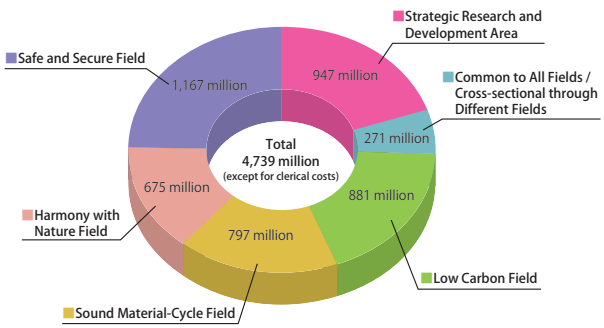
History of the ERTDF

The ERTDF originated through the integration of three competitive research funds, the Global Environmental Research Fund (GERF), the Environment Technology Development Fund (ETDF) and the Grant-in-Aid for Scientific Research about Establishing a Sound Material-cycle Society.
In fiscal 2012, the Rehabilitation Adoption budget was established, in addition to the General Adoption budget of the ERTDF funded by the general account. The former was funded by a special account for the Great East Earthquake Rehabilitation, and solicits proposals for "contribution to earthquake restoration and reconstruction." It was created to promote technical development and accumulation of scientific knowledge absolutely necessary for expediting rehabilitation in disaster areas. Researches which were funded by a special account for the Great East Earthquake Rehabilitation finished its term in fiscal 2014.

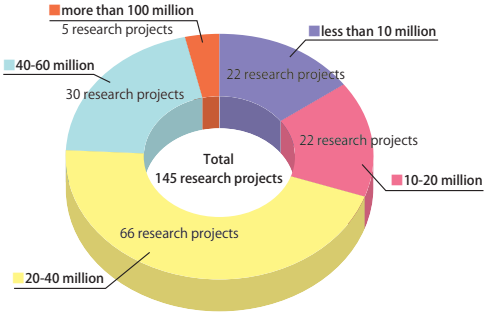
Number of Research Projects Underway and Budget in Fiscal 2017

Under the General Adoption budget, 55 new research projects have been launched in the Environmental Problem Research Area. The research projects conducted in fiscal 2017 comprise five strategic projects and 140 research projects.

Research Projects Conducted in Fiscal 2017



Budget allocated for research fields (unit: yen)



Numbers of research projects per budget size (unit: yen)

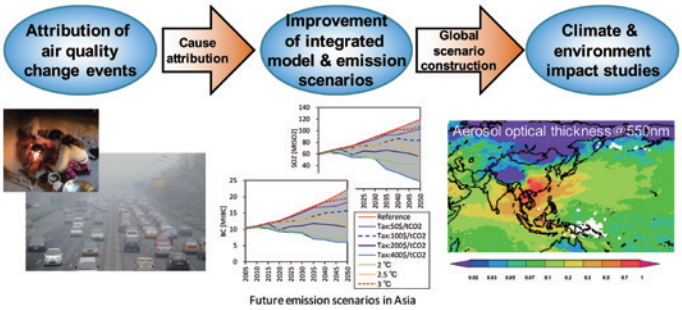
Evaluation of SLCP Environmental Impact and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway

(Period I: FY2014-2016)
(Period II: FY2017-2018)
Budget in FY2017: JPY 189,523,000

Teruyuki NAKAJIMA, Japan Aerospace Exploration Agency (cooperation of 12 institutions) <S-12>

Air pollution is a serious global problem, especially in Asia. Development of countermeasures is a pressing issue for society. Air pollutants include black carbon, tropospheric ozone, methane, hydrofluorocarbons (HFCs) and other components which warm the earth's systems, accelerating global warming. These pollutants are called SLCPs (Short-lived Climate Pollutants). Reduction of SLCPs is an important action to take for mitigating global warming. For this purpose, we have to decrease the large uncertainty involved in estimating the climate impacts of SLCPs that result from their complex characteristics and distributions. This project aims at reducing the uncertainty of SLCP impact estimates via the following activities for seeking optimum SLCP pathways and effective countermeasures for impact reduction:

(1) Cause and effect analysis of atmospheric quality change events and construction of an evaluation system.
(2) Improvement of integrated models and their application to developing future scenarios.
(3) Impact assessment of climate and environmental effects using numerical models.
(4) Development of an integrated operational system.
(5) Evaluation of the environmental effects and promotion of countermeasures to climate change.



Flow of the SLCP impact study and seeking the reduction path ways

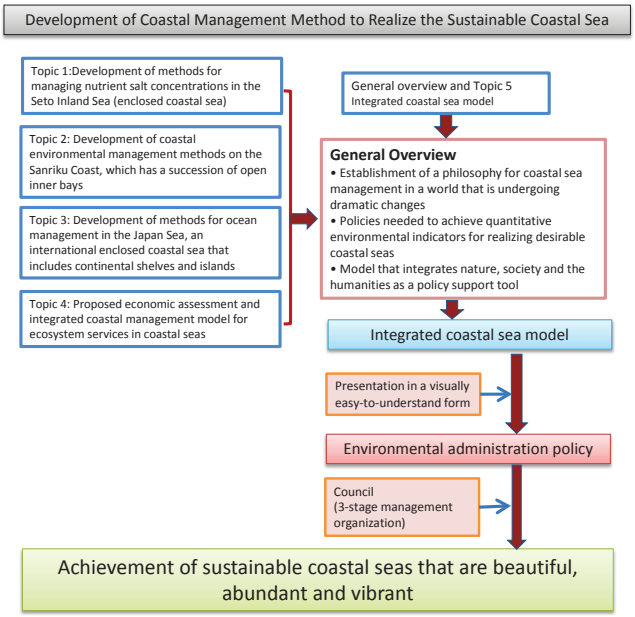
Development of Coastal Management Method to Realize the Sustainable Coastal Sea

(Period I: FY2014-2016)
(Period II: FY2017-2018)
Budget in FY2017: JPY 128,602,000

Tetsuo YANAGI, International EMECS Center (cooperation of 12 institutions) <S-13>

This project will involve a comprehensive examination of natural and human activity in and on coastal seas and the land areas that constitute their hinterlands in order to determine how these areas should be transformed from their present state to an appropriate status in terms of material circulation and ecotones. Specific actions will be proposed as methods for the environmental management of coastal seas in Japan. To create methods for environmental management of coastal seas near land areas, a policy must be established for the environmental management of coastal seas using the following as model areas.

(1) Seto Inland Sea (enclosed coastal sea)
(2) Sanriku Coast (open coastal sea)
(3) Japan Sea (international coastal sea)



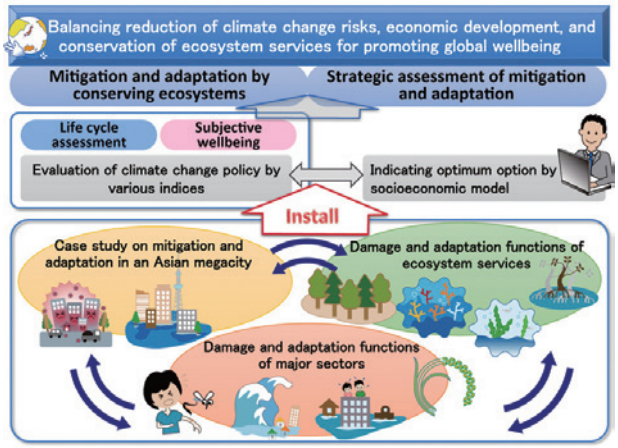
Strategic Research on Global Mitigation and Local Adaptation to Climate Change (MiLAi)

(Period I: FY2015-2017)
(Period II: FY2018-2019)
Budget in FY2017: JPY 277,664,000

Taikan OKI, The University of Tokyo (cooperation of 12 institutions)

<S-14>

How to improve the balance of investments in mitigation and adaptation will be assessed using various indices, including subjective wellbeing and livelihood assets, in addition to conventional economic indices, thereby supporting the development of an effective, efficient climate change policy based on environmental risk management under conditions of limited available resources.
We constructed a prototype damage function for main sectors for a cost-benefit analysis, and conducted the primary estimation of adaptation using fundamental information collected for estimating damage in the main sectors. In particular, we discovered the importance of a synergistic effect among coral, seaweed beds, tidal flats and mangrove breakwaters, and conducted an impact assessment for a cost-benefit analysis regarding the economy and health, using integrated measures of mitigation and adaptation in mega-cities. To evaluate these results, we investigated the limitations of analysis using the "Integrated Assessment Model Incorporating Global-Scale Climate Change Mitigation and Adaptation" integrated with a global hydrological model, and used this knowledge to organize future work. Moreover, we are developing an evaluation method using our cost-benefit analysis method integrated with metrics such as subjective wellbeing and disability-adjusted life years based on the limitations of existing techniques in integrated strategic evaluation.



Predicting and Assessing Natural Capital and Ecosystem Services through an Integrated Social-Ecological Systems Approach (PANCES)

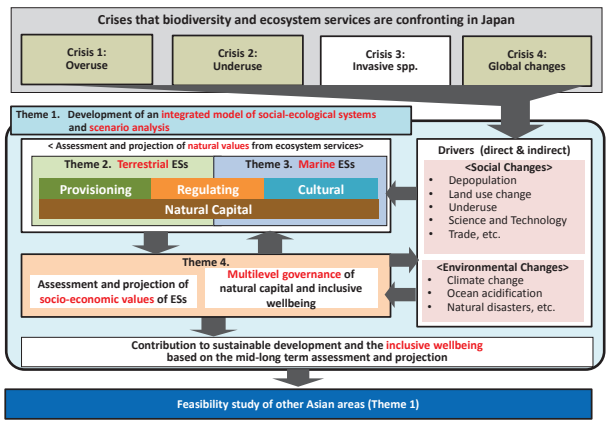
(Period I: FY2016-2018)
(Period II: FY2019-2020)
Budget in FY2017: JPY 189,994,000

Kazuhiko TAKEUCHI, The University of Tokyo (cooperation of 12 institutions)

<S-15>

This research project (PANCES) predicts and assesses future natural capital and ecosystem services (nature's contributions to people) and their natural and social-economic values by building an integrated model of social-ecological systems. By co-designing several future scenarios, we aim to explore better forms of society in harmony with nature. We will also identify effective measures for strengthening the interface between science and policy, which will eventually contribute to both domestic and international biodiversity policy and international frameworks such as the Intergovernmental Platform on Biodiversity and Ecosystem Services.
More than 100 researchers from 30 institutes (including research collaborators) in Japan are working together under the following four research themes.

(1) Development of an integrated model of social-ecological systems and strengthening of the science-policy interface
(2) Prediction and assessment of natural values from natural capital and ecosystem services of terrestrial ecosystems
(3) Prediction and assessment of natural values from natural capital and ecosystem services of marine ecosystems
(4) Prediction and assessment of social-economic values of natural capital and ecosystem services, and multi-level governance of natural capital.



Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

(Period I: FY2016-2018)
(Period II: FY2019-2020)
Budget in FY2017: JPY 161,485,000

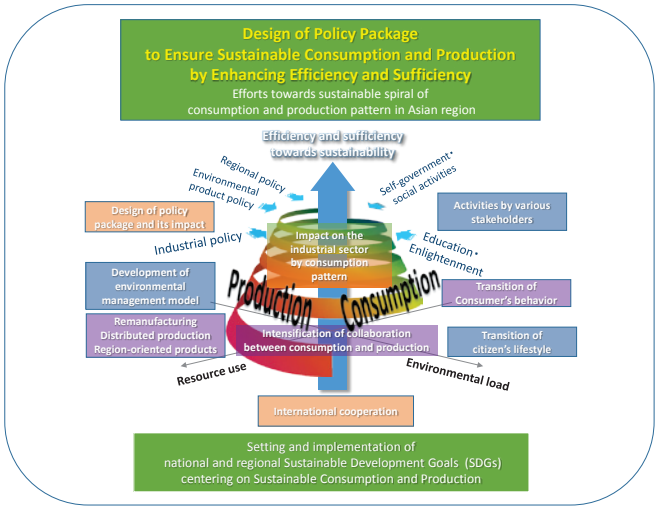
Masahiko HIRAO, The University of Tokyo (cooperation of 11 institutions)

<S-16>

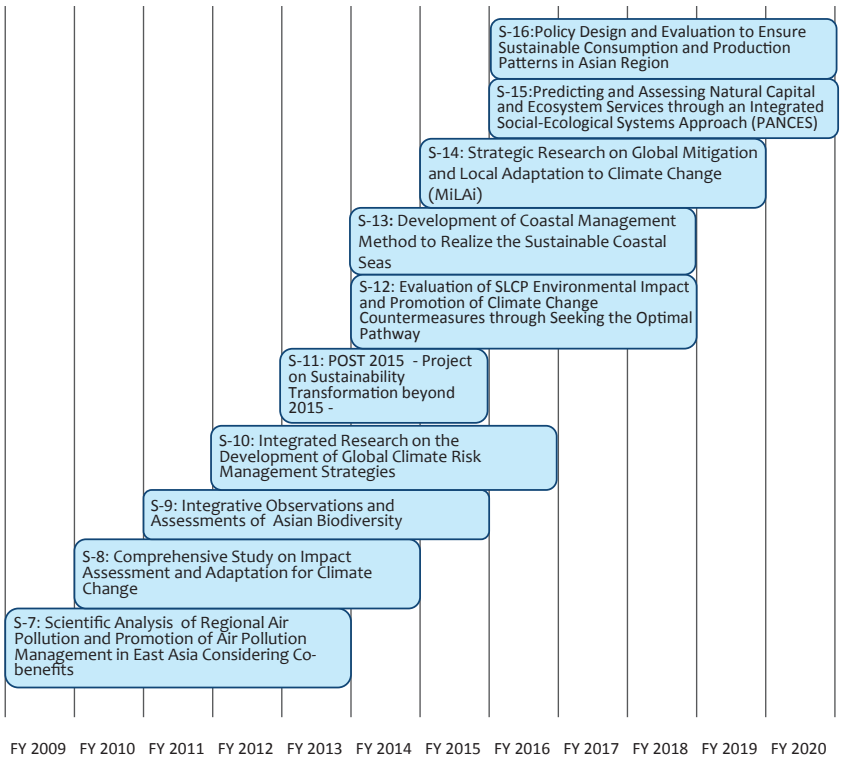
The Rio+20 Conference in 2012 confirmed that Sustainable Consumption and Production (SCP) is a cornerstone of sustainable development. At the United Nations Sustainable Development Summit in 2015, a set of 17 Sustainable Development Goals (SDGs) was adopted with SCP as an important goal (Goal 12).

To achieve SCP within the planetary boundaries, various stakeholder practices will be essential. In addition to an efficiency approach where energy- and resource-efficient products are promoted, we have to design and implement a new sufficiency policy by indicating appropriate structures of consumption and production and by changing consumers' lifestyles.

The project consists of four research themes and will present policy packages for achieving SCP by means of various stakeholders' practices, considering characteristics of individual nations or regions, including their economy and lifestyles. We will evaluate the effect of policy packages by employing economic model analysis and life-cycle analysis. The outcome of the project will contribute to achievement of SCP through policy planning in Asia, including Japan, and to policy dialogues with Asian countries.



Strategic Research and Development Area - Projects and Research terms -

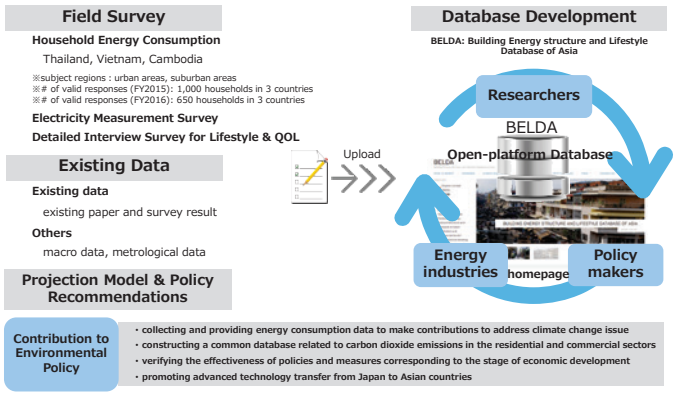


Development of the Platform on Energy Demand Structure and Forecasts in Asian Residential and Commercial Sector

(FY2015-2017)
Budget in FY2017: JPY 35,177,000

Hidetoshi NAKAGAMI, Jyukankyo Research Institute Inc. (cooperation of 2 institutions) <1-1502>

Energy consumption is expected to increase with economic growth among the emerging and developing countries of Southeast Asia. Nevertheless, data collection related to energy consumption lags; therefore, it is of utmost importance to establish an energy consumption database by end-use sector as an essential requirement for climate change policy-making in these countries. In this study, we have been carrying out the following surveys in Thailand, Vietnam and Cambodia: 1) detailed information about energy use per household, 2) measurement study to understand the electricity consumed by major household appliances as well as the total amount of electricity consumed by homes, 3) lifestyle and quality of life, and 4) energy use in commercial buildings. Our goals are to construct a common residential and commercial energy consumption database for Southeast Asia by adding existing surveys of household energy use, population, economic and meteorological statistics to our survey results; and, jointly with specialists in Japan and Southeast Asia, to provide climate change policy recommendations corresponding to stage of economic development. Developing the above-mentioned database will contribute to energy demand analysis, research and development, low-carbon city planning, climate change policy-making, and the transfer of advanced technologies from Japan to the rest of Asia.

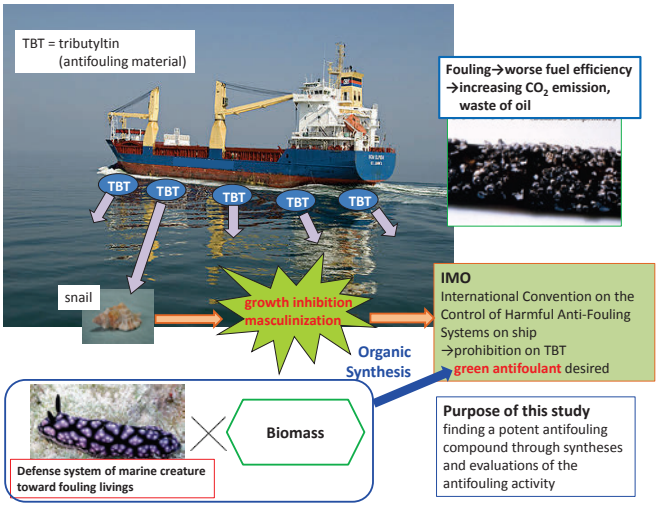


Development of Biomimetic and Biomass-recycling Antifouling Material

(FY2016-2017)
Budget in FY2017: JPY 3,015,000

Taiki UMEZAWA, Hokkaido University <1RF-1601>

This research focuses on finding a potent antifouling compound through synthesis and evaluation of antifouling activity. Fouling, an undesirable accumulation of organisms on sea-immersed structures such as ship hulls, often causes serious troubles, such as oil wastage and increased CO_2 emissions. Organotin compounds including tributyltin (TBT) have been utilized since the 1960s as antifouling materials. The use of the organotin compounds, however, was banned by the International Maritime Organization (IMO) because of high toxicities against marine organisms, causing imposex and masculinization. Most current alternative antifouling agents contain copper, and some reports have pointed out negative influences of copper on ocean environments or ecosystems. Natural products obtained from marine creatures are also being noted as potent candidates due to observable antifouling activity and low toxicity. We envision an isocyanide functional group, often found in natural antifouling products, and plan the introduction of isocyanide into marine biomass in order to create a green antifouling material for sustainable use of oceans.

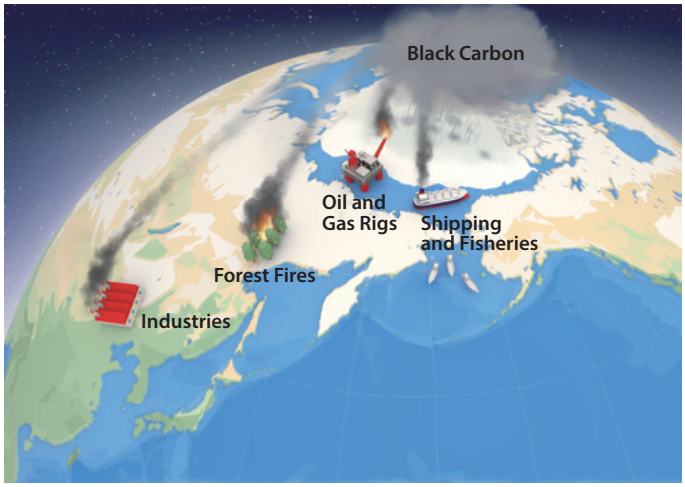


Impacts of Short-Lived Climate Pollutants from Asia on the Arctic Climate and Environment

(FY2015-2017)
Budget in FY2017: JPY 30,351,000

Hiroshi TANIMOTO, National Institute for Environmental Studies (cooperation of 2 institutions) <2-1505>

The dramatic environmental and climatic changes in the Arctic have raised international concern in recent years. On the other hand, great socio-economic possibilities have emerged for the exploitation of ocean resources by the opening of the Arctic Ocean route. Under such circumstances, Japan became an observer in the Arctic Council in 2013. Currently, there is an urgent need for strategical and scientific knowledge in order to establish an international framework for the study of the Arctic region. Under the Arctic Council, Task Force on Black Carbon (BC) and Methane has been launched, and the research focusing on Asia, which is a huge source of BC emissions, is greatly needed. The present study concentrates on short-lived climate pollutants such as BC, emitted from anthropogenic (human activities) and natural (forest fires) sources, the pathways, efficiencies and frequency of long-range transport to the Arctic region. Our aim is to contribute to international efforts by providing such important information on the environment and climate of the Arctic region.

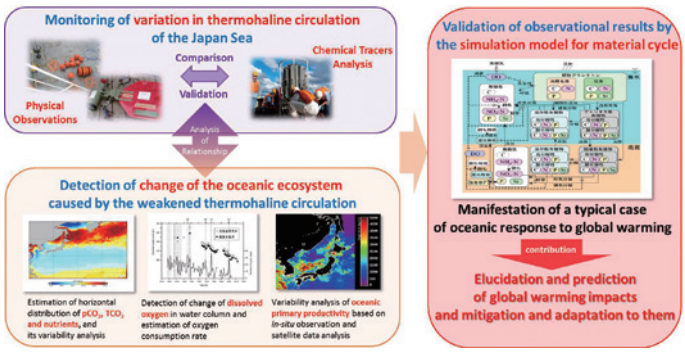


Global Warming Impacts on Thermohaline Circulation and Subsequent Biogeochemical Change in the Japan Sea

(FY2016-2018)
Budget in FY2017: JPY 39,335,000

Takafumi ARAMAKI, National Institute for Environmental Studies (cooperation of 3 institutions) <2-1604>

In policy decisions for the mitigation of and adaptation to global warming impacts, it is important to predict them accurately. Moreover, it is critical, especially for Japan, which is surrounded by seas, to understand and predict the impacts on the oceanic environment early on. The Japan Sea is called a "miniature ocean," because it has its own thermohaline circulation which is similar to that of the open ocean. Therefore, it may be possible to detect oceanic responses to warming impacts in a relatively short time by monitoring physical and biogeochemical conditions in the Japan Sea. In fact, it has been learned that the thermohaline circulation of the Japan Sea has been weakening since the 1960s. In this study, we are trying to quantitatively detect impacts on oceanic ecosystems such as biological productivity and the carbon cycle caused by the weakened thermohaline circulation using observational methods and a simulation model. The results will be used in elaborating the global warming impacts prediction model as a manifestation of a typical case of oceanic response to global warming.



Study on the Accumulation Mechanism of Cesium in the Amorphous Phase around Mineral Particle in Incineration Bottom Ash and its Application

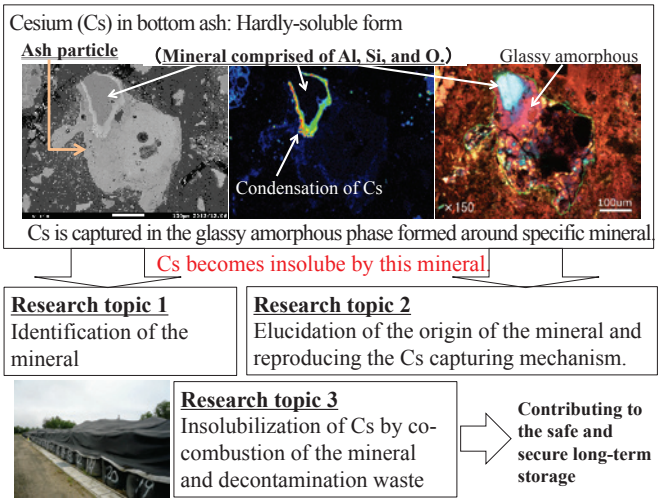
(FY2015-2017)
Budget in FY2017: JPY 3,740,000

Yasumasa TOJO, Hokkaido University

<3K153015>

Waste contaminated with radioactive cesium (Cs) will be strictly managed (stored) for a long time hereafter. The important thing in this long-term management is that Cs never escapes from its storage sites. For this purpose, Cs should have less-soluble or insoluble properties, especially if it comes in contact with rainwater, etc. From previous studies, it was found that Cs in incineration bottom ash is nearly insoluble. The reason is that it is captured in a glassy amorphous phase, forming on the surface of one or more specific minerals in the ash particles. If we can identify these minerals concretely, there is a possibility that they could be utilized for thermal treatment of decontamination waste.

In this study, three objectives are set. The first is to use various microscopic techniques to identify the mineral or minerals capturing Cs. The second is to elucidate the origin of such minerals, namely, to clarify whether they originate from waste or are synthesized during incineration. The third is to achieve insolubilization of Cs contained in decontamination waste by co-combustion with these minerals.



A Study for Reinforced Clinker-free Concrete Elements Comprising By-product Additives and Recycled Cement Produced from Wasted Fresh Ready-mixed Concrete

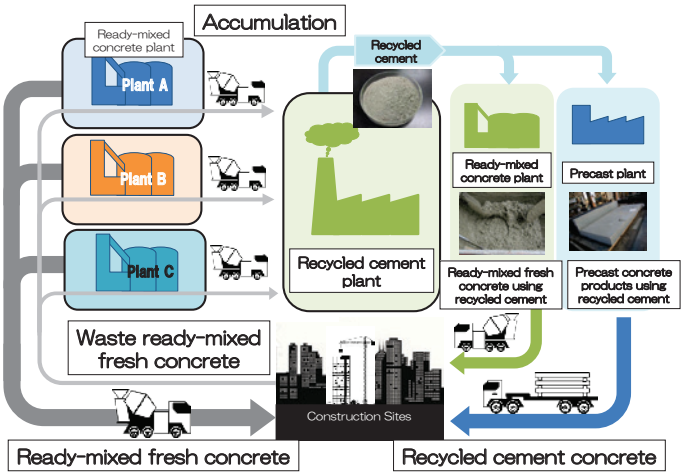
(FY2015-2017)
Budget in FY2017: JPY 2,992,000

Tetsushi KANDA, Kajima Technical Research Institute

<3J153001>

"Waste ready-mixed fresh concrete" refers to a surplus of concrete unused at construction sites and returned to the ready-mixed concrete plant. Most of this has been treated as industrial waste. In this study, we have established a revolutionary concrete manufacturing technology developing recycled cement using waste ready-mixed fresh concrete as a raw material, and reusing it as concrete to achieve ultimate resource recycling. Recycled cements undergo considerable quality degradation according to the degree of progression of hydration reactions in the returned concrete. A newly introduced production line has enabled processing before hydration reactions can advance in waste ready-mixed fresh concrete, and with the simultaneous use of a set-retarding agent, the manufacture of high quality recycled cement has become possible.

In addition, this technology was evaluated by a third party evaluation agency as an admixture in conformity with Japan Industrial Standards (JIS) through the building technology performance evaluation system. This has enabled the technology to be applied to construction as a concrete or precast product with the JIS mark. We will continue to develop recycled cement concrete, contributing to the establishment of a resource-recycling society.



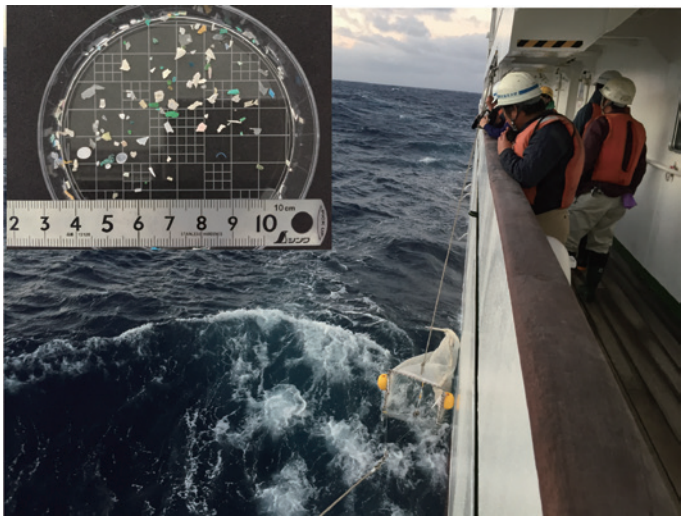
Study on Behavior and Environmental Risk of Microplastics Drifting in Coastal Waters and Open Oceans

(FY2015-2017)
Budget in FY2017: JPY 43,481,000

Atsuhiko ISOBE, Kyushu University (cooperation of 4 institutions)

<4-1502>

Of particular concern in recent years has been marine pollution from plastic debris (including microplastics) worldwide, as stated in the leaders' declaration of the G7 Elmau Summit, followed by the G7 Toyama and Bologna Environment Ministers' Meetings. On the basis of standardized and harmonized methods, field surveys were conducted in the present study to quantify microplastic abundance on beaches, and pelagic microplastic abundance in coastal waters, marginal seas around Japan, and open oceans from the Southern Ocean to Japan, as well as persistent organic pollutants included in microplastics. Our task is to establish a reliable numerical transport simulation for microplastics, which can be used for predicting microplastic abundance in the future, and for evaluating the environmental risks of marine plastic pollution. The objective of the present study is to estimate the period in which the marine plastic pollution reaches the "point of no return" in the actual ocean, and to support consensus formation for materializing a society where plastics are drastically reduced in everyday life.



Studies on Gut Bacteria of Japanese Rock Ptarmigans for Its Potential Use in *In-situ* and *Ex-situ* Conservation Protocol

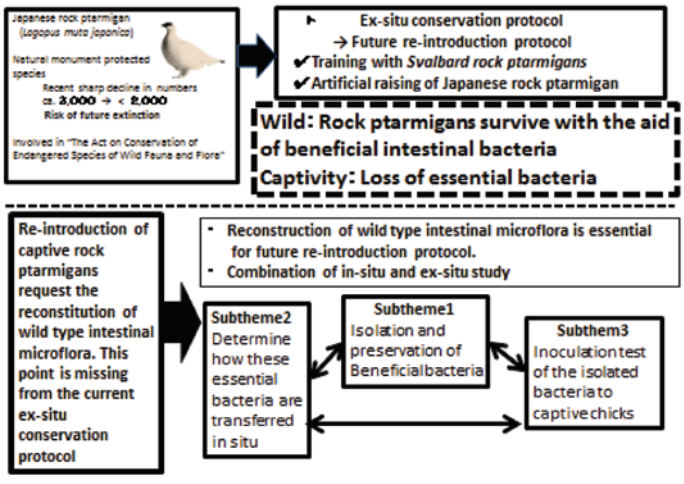
(FY2016-2018)
Budget in FY2017: JPY 12,830,000

Kazunari USHIDA, Kyoto Prefectural University (cooperation of 3 institutions)

<4-1604>

The Japanese rock ptarmigan (*Lagopus muta japonica*), which is a Natural monument protected species of Japan. This bird has been designated as a National endangered species due to their recent sharp decline of population size. Both *in-situ* and *ex-situ* conservation programs are currently working; collecting the eggs from the nest and artificial raising of chicks were successful, but there are still many problems to be overcome for the future re-introduction. The loss of wild type beneficial bacteria under the captive condition suggests the difficulties not only in feeding wild and natural food resources to captive birds, but also in reintroduction of artificially raised birds into natural habitat. In this project, we isolate the indigenous bacteria of rock ptarmigans and identify their functionality in order to use as probiotics for the artificially raised chicks. In addition, careful observation on the wild rock ptarmigans reveal how these essential bacteria are transferred from mothers to chicks.

We therefore develop the reconstruction of wild type intestinal microflora in captive rock ptarmigans to prepare future re-introduction protocol.



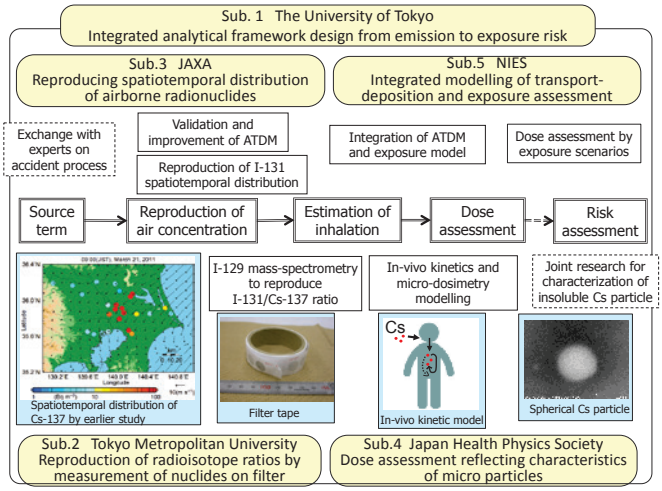
Interdisciplinary Study on Inhalation Exposure and Risk Assessment Focusing on Suspended Particles Derived from the Nuclear Accident

(FY2015-2017)
Budget in FY2017: JPY 35,502,000

Yuichi MORIGUCHI, The University of Tokyo (cooperation of 5 institutions)

<5-1501>

A large amount of radioactive substances was emitted into the environment from the accident at the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station (TEPCO-FDNPS). Because of the limited availability of direct exposure dose measurement data at early stages after the accident, a large uncertainty remains in the estimated dose for risk assessment. This study aims to accumulate the knowledge required to reduce this uncertainty in early exposure doses by integrating two approaches: experimental science to measure radionuclides in airborne micro-particles collected during the early phase after the accident, and numerical modelling of atmospheric transport and deposition, assessment of exposures and doses to describe processes from environmental emissions to health impacts. In particular, by reproducing the spatiotemporal distribution of iodine-131 by measurement of iodine-129 collected on the filter tapes of continuous air pollution monitoring stations and by considering physicochemical properties of insoluble radio-cesium particles, this study attempts to estimate exposure doses with higher precision. The strength of the study team lies in its interdisciplinarity, as a wide variety of expertise is necessary for risk assessment of radioactive substances.



Development of an Endocrine Disruptor Screening System Using Molecular Imprinting Materials and Exact Mass Spectrum

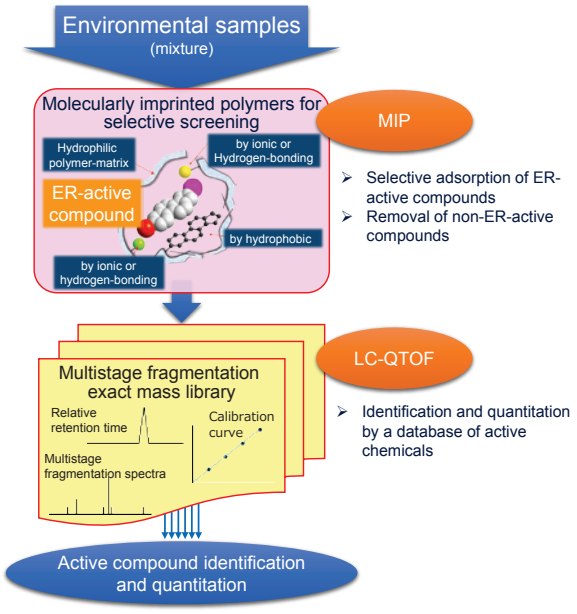
(FY2015-2017)
Budget in FY2017: JPY 33,441,000

Daisuke NAKAJIMA, National Institute for Environmental Studies (cooperation of 2 institutions)

<5-1552>

Some chemicals present oestrogenic activity by binding to cell receptors. Molecularly imprinted polymer (MIP) technology can recognise structural and chemical properties of certain chemical moieties. In this study, we employed MIP technology to screen oestrogenic chemicals (ER-active chemicals). We also developed a database that consists of two-stage fragmentation exact mass spectra and analytical parameters for compounds known to show oestrogenic activities in recombinant yeast assays. Combining these two technologies, we have been constructing an easy, high-throughput system for the identification and quantification of oestrogenic compounds in environmental samples and industrial products.

This system will enable rapid environmental and health risk assessment of chemicals and their mixtures as well as prioritisation of in vivo testing of endocrine disrupting chemicals.



Innovative Research and Development Area for Younger Researchers

"Innovative Research and Development Area for Younger Researchers" is a classification of projects involving young researchers that emphasize novelty, creativity and innovativeness.

Examination of Marine Protected Areas Based on the Prediction of Northward Migration of Coral Reef Organisms Using Gene Flow Analysis

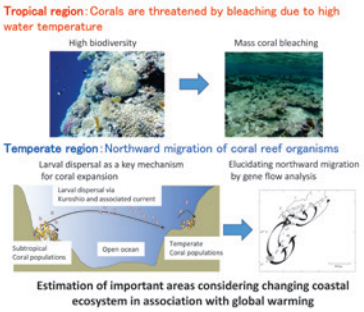
[Harmony with Nature Field]

(FY2015-2017)
Budget in FY2017: JPY 11,441,000

Nina YASUDA, University of Miyazaki (cooperation of 3 institutions)

<4RF-1501>

While corals in tropical and subtropical regions are highly degraded through coral bleaching, they are expanding northward in temperate areas due to global warming. This study identifies important areas and critical environmental factors for species' distribution by integrating population genetic (genomic) analysis with a species' distribution model and predicting future changes in coral distribution due to global warming. The final aim of this study is to provide scientific knowledge for preventing extinction of threatened coral species and designing effective measures for Marine Protected Areas listed in the Aichi Targets of the Conference of the Parties 10.



Development of Processes for Efficient Biogas Production from Organic Wastes by Induction of Electric Syntrophy

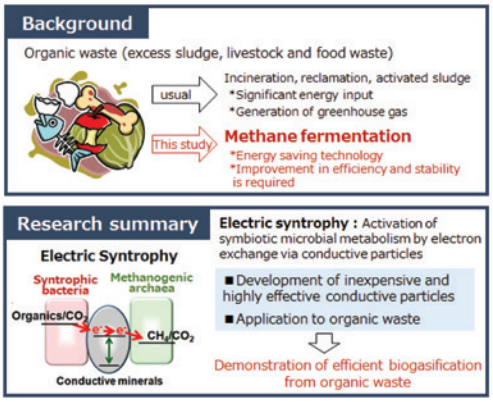
[Sound Material-Cycle Field]

(FY2016-2017)
Budget in FY2017: JPY 6,033,000

Souichiro KATO, National Institute of Advanced Industrial Science & Technology

<3K162002>

Methane fermentation using anaerobic microorganisms is now widely used as an energy-saving and energy-recovery technology for waste and wastewater treatment. Further improvements in the methanation rate, efficiency and process stability are required, however, especially in the treatment of organic waste including solid compounds. Our research group has discovered a novel microbial metabolism called electric syntrophy, in which electron exchange via conductive particles such as iron minerals promotes symbiotic metabolism, including methanogenesis, among multiple microorganisms. This study aims to develop a system for artificially inducing methane generation through supplementation with inexpensive conductive materials, based on the electric syntrophic principle, for highly rapid, efficient and stable organic waste decomposition and bio-gasification.



Comprehensive Molecular Identification of COD Composition in Lake by High Resolution Mass Spectrometry

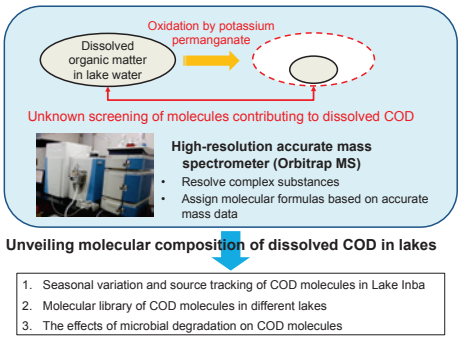
[Safe and Secure Field]

(FY2016-2017)
Budget in FY2017: JPY 6,059,000

Ikuro KASUGA, The University of Tokyo

<5RF-1601>

The compliance rate of COD in lakes was approximately 59% in FY2015. To elucidate COD issues in lakes, in-depth characterization of the dissolved organic matter specifically contributing to COD is required. The composition of COD, however, remains unknown since dissolved organic matter is a complex mixture of various substances. In this study, high-resolution accurate mass spectrometry is applied to elucidate the molecular-level composition of dissolved organic matter contributing to COD. New findings on the composition and behaviors of the explored COD molecules are expected to promote a deeper understanding of water quality pollution mechanisms in lake environments.



List of Research Projects Couducted in FY2017

Project Code / Research Title

Strategic Research and Development Area
total 5 research projects

S-12 / Evaluation of SLCP Environmental Impact and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway

S-13 / Development of Coastal Management Method to Realize the Sustainable Coastal Sea

S-14 / Strategic Research on Global Mitigation and Local Adaptation to Climate Change (MiLAi)

S-15 / Predicting and Assessing Natural Capital and Ecosystem Services through an Integrated Social-Ecological Systems Approach (PANCES)

S-16 / Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

Common to All Fields / Cross-sectional through Different Fields
total 14 research projects

1-1501 / Risk Governance through the Cooperation of a Risk Evaluation Technology and the Institutional System

1-1502 / Development of the Platform on Energy Demand Structure and Forecasts in Asian Residential and Commercial Sector

1-1601 / Development of Models for Resource Use and Waste Managemnet and Evaluation of Effectiveness of Policies towards a Sound Material-cycle Society

1-1602 / Development of Aquatic Ecosystems Monitoring System that Seamlessly Connects Field Investigation and Robot, Sensor and Communication Technology

1-1603 / Integrated Approach for Dissemination of Decentralized Domestic Wastewater Treatment System in Southeast Asia

1-1604 / Development of Innovative Resource Recycling System Using the Functions of Black Soldier Fly (Hermetia illucens)

1RF-1601 / Development of Biomimetic and Biomass-recycling Antifouling Material

1RF-1602 / Practical Application of Multi-channel Radioactivity Depth Distribution Measuring System and Establishment of Its In-situ Measurement Technique

1-1701 / A Study on the Removal and Fixation of Radionuclides by Coprecipitation with Barite

1-1702 / Study on Stabilization Technique of Wastes Polluted with Radioactive Cs and Sr for Interim Storage and Final Disposal

1-1703 / Developing Indicators, Economic Valuation Methodologies and Models for Assessment of Business Impacts on Biodiversity

1FS-1701 / Feasibility Study on Chemical Risk Assessment and Management System as Disaster and Emergency Response

1RF-1701 / The Regional Implementation of Sustainable Development Goals by Japanese Local Governments

1RF-1702 / Development of All-around Analysis Technique for Liquid and Solid Samples Using Laser Spectroscopy in High Temperature Plasma

Low Carbon Field
total 27 research projects

2-1501 / Study on Indicators to Assess Progress of Climate Change Policies at National Level

2-1502 / Improvement of Methane Emission Estimate from South Asia Using GOSAT and Development of an Emission Mitigation Proposal

2-1503 / Studies on Possible Changes of Climate and Precipitation Systems in East Asia and around Japan Associated with the Global Warming

2-1504 / Development of the Regional-scale Assessment System of Carbon Dynamics in Bornean Peat Ecosystems

2-1505 / Impacts of Short-Lived Climate Pollutants from Asia on the Arctic Climate and Environment

2-1506 / Improving Database of Historical Ocean Subsurface Temperature Observations and its Climatological Evaluation

2RF-1501 / Evaluating Impact Assessment of Forest Disaster Using Terrestrial Laser Scanner

2RF-1502 / Development of Urban Form Model and Its Planning Theory for Eco-Livable City

2-1601 / Evaluation Study on the Soil Carbon Changes through the Land Use Changes between Forest Land and Cropland and its Application to GHG Inventory

2-1602 / Asian Precipitation — Highly-Resolved Observational Data Integration towards Evaluation (APHRODITE) of the Extreme Events

2-1603 / Comprehensive Research on Carbon Capture and Storage Legal Framework, Policy and Strategy

2-1604 / Global warming impacts on Thermohaline Circulation and Subsequent Biogeochemical Change in the Japan Sea

2-1605 / Assessing and Projecting Greenhouse Gas Release from Large-scale Permafrost Degradation

2RF-1601 / Development of the Comprehensive Simulation Model of Sun-Induced Fluorescence for Estimating the Ecosystem-level Photosynthesis

2-1701 / Development of an Integrated Observation and Analysis System for Monitoring Greenhouse Gas Sources and Sinks

2-1702 / Integrated Analyses of Climate Policies for Simultaneous Realization of the Paris Agreement and the SDGs

2-1703 / Black Carbon and Dust Particles in the Arctic: Behavior in Association with Global Radiative Forcing

2-1704 / Multi-model Analysis of Long-term Climate Policy of Japan: Mitigation Pathways and Uncertainties

2-1705 / A Comprehensive Study on Response and Feedback of Asian Forest Soil Carbon Flux to Global Warming

2-1706 / Transition Strategies to the Renewable City - To Resiliently Cope with Climate Change and Large-scale Natural Disasters -

2-1707 / An Ex-post Analysis of Carbon Pricing and the Proposal of Policy Options to Achieve the Japanese Long-term GHG Emissions Reduction Target

2-1708 / Development of Pluralistic Evaluation System of Vulnerability to Climate Change for Local Environmental Planning

2-1709 / A Research for Validity Evaluation of HFC and GHG Reducing Measure for Ozone Layer Recovery

2-1710 / Development of a Monitoring and Evaluation System of the Methane Budget for Different Source Categories in East Asia toward Intended Emission Reduction

2-1711 / Low Carbon Re-development Planning of Municipalities: Development and Application of Analytical Models coupling Resources and Energy Use

2-1712 / Development of Coastal Disaster Reduction Assessment Method by Green Infrastructure Considering Climate Change

2RF-1701 / Study of Super-Typhoon Response to Global Warming in the Asian Region Using Global Non-hydrostatic Model

Sound Material-Cycle Field

total 39 research projects

3K153001 / Waste Prevention-System Analysis and Application
3K153002 / Study on Sustainability Assessment and Strategy for Improvement of Solid Waste Management System
3K153003 / Estimation of Substance Flows and Environmental Emissions of Chemicals Associated with Waste Incineration
3K153004 / Proposal of Disposal Standard for Long-term Environmentally-Sound Management of Mercury Waste
3K153006 / Application of Used Reverse Osmosis Membrane to Reclamation of Industrial Wastewater in Emerging Countries
3K153008 / Assessment of Sustainable Adaptation Measures to Manage Disaster Waste from Great Earthquake against Related Social Risks
3K153009 / Organization of Comminution and Separation Technologies for More Efficient Recycling System
3K153010 / Development of Anhydride-modified Resins Using the Properties of Recycled Plastic Containers and Packaging
3K153011 / A Trash Bin as a Gateway of Used Products to Waste Management System: Serviceability Analysis and Design Effect on Waste Disposal Behaviors
3K153012 / Development of a Dry Process for Refining Gallium Compound from Used LED Devices
3K153014 / Development of Novel Biofuel Production Process and Design Tools for its Sustainable Implementation
3K153015 / Study on the Accumulation Mechanism of Cesium in the Amorphous Phase around Mineral Particle in Incineration Bottom Ash and its Application
3J153001 / A Study for Reinforced Clinker-free Concrete Elements Comprising By-product Additives and Recycled Cement Produced from Wasted Fresh Ready-mixed Concrete
3K163001 / New Assessment Indicators and Indicator Framework for Establishing a Sound Material-Cycle Society
3K162002 / Development of Processes for Efficient Biogas Production from Organic Wastes by Induction of Electric Syntrophy
3K163003 / Development of the Utilization System for Captured Animals "Wild boar and Sika deer" by Appropriate and Efficient Processing
3K162004 / Selective Fragmentation of Photovoltaic Panels by High Voltage Pulse and Subsequent Physical Separation
3K163005 / Study on the Environmentally Sound Management of Wastes Containing Newly Listed POPs
3K163006 / Development of Quantitative Estimation Procedure for Disaster Debris in the Catastrophic Disasters in Collaboration with Disaster Prevention Research
3K163007 / Development of New Treatment Technology for Exhaust Gas Generated by Waste Incineration Using Carbonate Type Mg-Al Layered Double Hydroxides
3K162008 / Development of a Novel Recycling System for Precious Metals and Rare Metals Using Organic Aqua Regius
3K163009 / Study on Policy, Consciousness and Behavior to Improve the Effectiveness, Safety and Reliability of Disaster Waste Management
3K163010 / Development of PGM Recycling Processes without Emissions of Toxic Substances Including Nitrate-Nitrogen
3K163011 / Large-scale Disaster Waste Treatment and Management System Considering Disaster and Region Characteristics
3K162012 / Establishment of Appropriate and Efficient Disposal System for Captured Wildlife
3-1701 / Long-term Environmentally-sound Management of Treated Waste Consisting of Elemental Mercury in an Aboveground Facility
3-1702 / Principles and Practical Implementation of Quality Control for Recycling Waste Gypsum Board
3-1703 / Development of Advanced Recycling Technology for Fly Ash to Enable Cement-free Concrete
3-1704 / Material Flow Analysis of Prefectures to Promote Sound Material Cycles by Use of Data in Official Reports Collected for Waste Management
3-1705 / Research of Creation and Practice of High Value-added Recycling Technology on Waste Plastics
3-1706 / Modification of Recycled Resin Using Nanocellulose-based Waste Materials
3-1707 / Test and Design Methods for Safe and Sustainable Inert Waste Landfills
3-1708 / Development of Rational Recycling Technology for Laminated Hard-to-Handle Panels such as PV and LC
3-1709 / Study on Technologies and Social Systems for Efficient Utilization of Heat Recovered from Waste
3-1710 / Development of Organic Solvent Free Separation Techniques to Create High Efficiency Recycle Systems for Critical Metals
3-1711 / Recovery of Carbon Fiber from CFRP by Two Stage Low Temperature Gasification
3RF-1701 / Separation Process Development for Poly (Vinyl Chloride) and Copper Recovery from Wire Harness
3J173001 / Practical Development of Resilient Landfill for Prompt Recovery Restoration from Earthquake
3J173002 / Development of Surface Treated Wood Powder for WPC Using

Harmony with Nature Field

total 21 research projects

4-1501 / Spatial Prioritization of Protected Areas in East Asian Biodiversity Hotspots: Assessment of Conservation Bias and Long-term Effectiveness Based on Ecological Big Data
4-1502 / Study on Behavior and Environmental Risk of Microplastics Drifting in Coastal Waters and Open Oceans
4-1503 / Development of Techniques for Conservation of Endangered Species and Biodiversity in Forested Areas of Amami and Ryukyu Islands
4-1504 / Green Infrastructure in the Depopulated Society under the Climate Change, Evaluated by Biodiversity, Disaster Prevention and Social Acceptance
4-1505 / Development of Ecosystem-based Disaster Risk Reduction Methods Based on the Processes of Habitat Loss and Comprehensive Cost-benefit Evaluation Methods
4-1506 / Rehabilitation of Ecosystem Services on Degraded Tropical Peat Swamp Forest and Construction of the Implementation System of REDD+ Safeguard
4RF-1501 / Examination of Marine Protected Areas Based on the Prediction of Northward Migration of Coral Reef Organisms Using Gene Flow Analysis
4-1601 / Conservation Planning for SE Asian Tropical Forests Based on Assessments of Undescribed Tree Species Richness and Forest Management Policies
4-1602 / Development and Application of Environmental DNA Methods for the Estimation of Community Composition and Genetic Diversity in Aquatic Systems
4-1603 / Development of Bird Sensitivity Mapping for Reducing Bird Collision Risk Caused by Wind Power Mills
4-1604 / Studies on Gut Bacteria of Japanese Rock Ptarmigans for Its Potential Use in In-situ and Ex-situ Conservation Protocol

4-1605 / Optimum Conservation of Species Designated by the Endangered Species Preservation Act Using Information Obtained from Sequencing Breakthrough
4-1606 / Studies on Population Management and Habitat Restoration of Socio-Ecological Production Landscapes for the Successful Reintroduction of Crested Ibis
4-1701 / Scientific Clarification and Countermeasure to Ecological Impacts of Pesticides on Dragonflies
4-1702 / Problem Solving and Establishment of a Base for Restoring Natural Habitat of Rare Japanese Plant Species
4-1703 / Development of Verification Test Fish of a New Eradication Method, Gene-Induced Suppression for Alien Population (GSAP)
4-1704 / Development of Sika Deer and Wild Boar Population Estimation Model and Sustainable Management System under Heterogeneous Environment
4-1705 / Development of Multifaceted Evaluation Axis and Construction of Information Base for Conservation of Wetland Ecosystems
4-1706 / Development on Methods for Estimating Population Size of Deer with Ground and Remote Sensing Techniques
4-1707 / Development of in situ and ex situ Conservation Procedures for Endangered and Heritage Species in Amami and Ryukyu Islands
4RF-1701 / Effects of Ocean Acidification on Ecosystem Services: an Investigation Using a CO_2 Seep

Safe and Secure Field

total 39 research projects

5-1501 / Interdisciplinary Study on Inhalation Exposure and Risk Assessment Focusing on Suspended Particles Derived from the Nuclear Accident
5-1502 / Development of an Advisory and Assessment System for the Environmental Impacts of Aeolian Dust
5-1503 / Development of Onsite Soil Detection Method for 1,4-Dioxane Based on the Environmental Behaviors
5-1504 / Development of Low Cost and Energy Efficient Green Advanced Wastewater Treatment System for Small Scale Stockbreeding
5-1505 / Development of an Integrated Numerical Method for Prediction and Evaluation of 1,4-Dioxane-contaminated Groundwater Remediation
5-1506 / Development of Measurement Method of Semi-volatile Primary Aerosols by Isothermal Dilution at Combustion Sources
5-1551 / Biological Monitoring of Insecticide Exposure during Toddler Years as a Critical Period for Brain Development
5-1552 / Development of an Endocrine Disruptor Screening System Using Molecular Imprinting Materials and Exact Mass Spectrum
5-1554 / Effect of Fetal Exposure to Endocrine Disruptor on Sex Differentiation, Gonadal Function and Puberty: Elucidation of Gene-Environment Interaction on Sexual Development
5-1555 / Short-Term Health Effects on Infants of Asian Dust: Considering Fossil Fuel Related Air Pollution as an Effect Modifier
5-1556 / The Study about a New Evaluation System of the Ecological Effect with Chemicals
5-1557 / Estimation of Exposure Factors of Soil, Dust and Personal Care Products for Children and Pregnant Women
5-1601 / Establishment of a Reference Modeling for Source Apportionment and Effective Strategy Making to Suppress Secondary Air Pollutants
5-1602 / Evaluation and Management of Emerging Chemicals by the Comprehensive Monitoring Using Local Networks
5-1603 / Development and Application of Novel Microbial Source Tracking Tools for Waterborne Infectious Disease Control
5-1604 / Factors Controlling Enhancement of Urban PM2.5 and Development of a Supporting Method for Administrative Monitoring Data
5-1605 / Studies on PM2.5 Composition, Oxidative Potential, Health Hazard and Their Model Prediction
5-1606 / Determination of Natural and Anthropogenic Sources for Contaminants in Soils Using Instrumental Analyses and Leaching Tests
5-1607 / Evaluation of Organic Carbon Budgets in Lake Biwa for Management of Water Quality and Ecosystem
5-1651 / Identification of the Factors Responsible for the Health Effects of PM2.5 by Newly Developed Sampling Methods and Exposure Experiments
5-1652 / Determination of Exposure Source of Persistent Organic Pollutants (POPs) in Japanese Cohort Studies:Using Rapid and Simultaneous Analysis of POPs in Human Serum
5-1653 / Study on the Management of Anthropogenic Chemicals with the Consideration of Their Transformation Processes
5-1654 / Assessment of the Exposure and Effects of Antibacterial Substances such as Paraben and Triclosan on Allergy in Infants
5RF-1601 / Comprehensive Molecular Identification of COD Composition in Lake by High Resolution Mass Spectrometry
5RF-1602 / Development of the Differentiation Methods for Natural and Anthropogenic Source of Chromium (VI) Based on the Elution Rates
5-1701 / Behavior Analysis and Site Investigation Method of Chloroethylene and its Parent Substances in Soil and Groundwater
5-1702 / Understanding and Modeling on Methylation and Bioaccumulation of Mercury in Marine Ecosystems
5-1703 / Proposal of Regulation Program for Pesticide Residue in Succeeding Crops
5-1704 / Development of Measuring System on Mercury Exposure in the Contaminated Site and Its Surrounding Area
5-1705 / A Comprehensive Risk Management and Presentation of Toxicity Equivalency Factors of Unintentional Brominated Dioxin-like Compounds
5-1706 / Development of Simultaneous Analysis Methods for "Investigated Items" and Selection Procedures for Their Candidates for Water Environment Conservation
5-1707 / Development of a Multimedia Model for Predicting Spatiotemporal Distribution of Hydrogen Peroxide
5-1708 / Investigation on Removal Characteristics of PM2.5 in Flue Gas Treatment Equipments of Large Scale Plant
5-1709 / Research on Airborne Ultrafine Particulate Matters around an Airport Based on Advanced Analytical Techniques
5-1710 / Study on Method of Assessing the Annoyance by Tonal Components Contained in Wind Turbine Noise
5-1751 / A Study for Acute Effects of Stroke and Mortality Caused by PM2.5 and Coarse Particle
5-1752 / Mechanism Elucidation and Risk Management Modeling of Combined Exposure to Chemicals in Children
5-1753 / Combined Exposures to Environmental Chemicals and Effects on Allergies and Immunity
5RF-1701 / Development of Control System Based on Effective Concentration and Smart Device Detection for Water Preservation

Information on calls for proposals

Schedule

The schedule and arrangements are announced on the ERTDF webpages of ERCA and MOE.
The call for applications is announced from September to October.

Application Procedures

The necessary application forms for proposals can be downloaded from ERCA's ERTDF webpage. The proposals are accepted through the Cross-ministerial R&D Management System (e-Rad).

Selection of Research Projects

After the application forms have been checked, the Planning Committee for Environment Research and its subcommittees, composed of outside specialists, will evaluate the proposed research projects. First, the proposals will be narrowed down in an initial screening of the written descriptions. The remaining proposals will then be evaluated for final selection on the basis of interviews.
Notification of approved proposals will be made in March. The results of the evaluation will be sent to the applicants after the selections have been made.

Inquiry

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