

3. Research activities

3.1 Research Project

3.1.1 DPRI's special research budget

Researches supported by the DPRI's special research budget in 2000 and 2001 were shown in Tables 3.1.1 and 3.1.2. These researches were carried

out with individual qualities of research divisions and centers. However, this research project was terminated in the fiscal year 2003.

Table 3.1.1 List of Researches conducted with budget in 2000

Division or Center	Title
IMDR	Integrated research for establishment of scientific urban disaster diagnosis
Earthquake Disaster Prevention	Development of Structural Health Monitoring and Strengthening Technologies
Research Division of Geo-disasters	Study on mechanisms of geo-disasters
	Monitoring of precursor events of rock slope failure in cultural heritage sites and hazard assessment
Fluvial and Marine Disaster Research Division	Development of an integrated water and sediment movement simulation system for a total river basin management
Division of Atmospheric Disaster	Change of atmospheric environment with extension of megalopolis
Research Center for Disaster Environment	Comprehensive observational studies of disaster environment
	Failures of coastal fills and submarine landslides triggered by earthquakes
Research Center for Earthquake Prediction	<u>Numerical Modeling of Tectonics of Southwest Japan Aiming to Forecast of the Nankai Earthquake</u>
Sakurajima Volcano Research	Evaluation on volcanic activity of Satsuma-iwojima and Kuchinoerabujima volcanoes and seismic activity around them
Disaster Reduction Systems	Empowerment of residents' awareness and government response ability

Table 3.1.2 List of Researches conducted with budget in 2001

Division or center	Title
IMDR	Integrated research for establishment of scientific urban disaster diagnosis
Earthquake Disaster Prevention	Study on earthquake hazard analysis in Uji campus using three-dimensional strong motion observation system
Research Division of Geo-disasters	Study on mechanisms of geo-disasters
	Rock-slide hazard assessment in Machu Picchu monument, Peru
Fluvial and Marine Disaster Research Division	Advanced hazard mapping based on an integrated water and sediment movement simulation system
Division of Atmospheric Disaster	Atmospheric disaster: Prediction and control of change of atmospheric environment in the urban area
Research Center for Disaster Environment	Comprehensive observational and experimental studies of disaster environment
	Performance of landfills in hilly residential areas subjected to earthquake shaking
Research Center for Earthquake Prediction	Observation and analysis of underground water behavior related to earthquake occurrence in the Yamasaki fault area
	A study on heterogeneity in the resistivity structure in and around the focal region of the 2000 Tottori-ken Seibu earthquake.
	Precise measurement of resistivity of rocks.

Sakurajima Volcano Research Center	Research on mechanism of phreato-magmatic explosions
Water Resources Research Center	construction of hydrological/ water resources/ economical database towards comprehensive river basin management and development of support system for sustainable water resources policy
Disaster Reduction Systems	Practical contribution to better accountability of disaster research results

3.1.2 Earthquake Prediction Research Program

(1) History and Outline of the Program

Kyoto University has been participating in the Earthquake Prediction Program since 1965. Disaster Prevention Research Institute has been in charge of this program with the Regional Observation Center for Earthquake Prediction Research established in the Faculty of Science in 1973 and has conducted observational research on seismicity and crustal deformation. The Research Center for Earthquake Prediction (RCEP) has been responsible for this research since the organizational reform in June, 1990.

Just after the Kobe earthquake in 1995, a critical review of the program was conducted among researchers in related fields and a recommendation to shift to more basic research was proposed. On the basis of these discussions the new Program of the Study and Observation for Earthquake Prediction was submitted and a new 5 year program was started in FY1999. This program aims at understanding the entire crustal process leading to large earthquakes and promotes collaborative studies under the following themes:

- (1) Study and observation of the processes in the Earth's crust leading to earthquakes,
- (2) Study and development of the monitoring system for crustal dynamics,
- (3) Development of new methods of numerical simulation on crustal dynamics and new observational technology,
- (4) Establishment of organizations for the new program.

(2) Researches related to this program in DPRI

In DPRI, RCEP and others related divisions are conducting the following studies.

- (1) Study and Observation of the Processes in the Earth's crust Leading to Earthquakes
 - Stationary processes of the Earth's crust in the regional scale
 - (a) Estimate of heterogeneous structure of the

Earth's crust and modeling of generation of large earthquakes

- Preparation processes in the crust leading to a large earthquake
 - (a) Quantitative evaluation of crustal activity on a spatio- temporally large scale
 - (b) Study on the stress accumulation process around the inland active faults
 - (c) Study on the recovering process of the faults
 - Study on the structure of the Nojima fault and its surroundings
 - (d) Study on the forecasting of great earthquakes along the Nankai trough
 - Ocean-bottom seismic observation in a steadily active area around the subduction zone
 - GPS traverse survey across the hinge line and numerical modeling of crustal deformations
 - Ground water observations aiming to the prediction of the Nankai earthquake
 - Study on the seismic and resistivity structures of crust and upper mantle
 - Imminent processes for a large earthquake
 - (a) Partly controlled experiments of earthquake prediction in South African gold mines
 - Focal and aftershock processes and generation of strong motions
 - (a) Evaluation of environments of source region of inland earthquakes
- (3) Development of new methods of numerical simulation on crustal dynamics and new observational technology
 - Observation technology
 - (a) Development of measurement methods of resistivity changes with high sensitivity
 - (4) Establishment of Organizations for the new Program
 - Utilization and archiving of information and data on earthquakes
 - (a) Improvement of the processing system of regional seismic data

- New seismic observation associated with the deployment of Hi-net

(a) Observation campaigns

(3) Publications

The products of the research under this program are not only presented in scientific meetings and published in journals in related fields, but are reported in the Coordinating Committee for Earthquake Prediction and Earthquake Research Council. They are also published in the reports of CCEP and ERC.

3.1.3 National Project for Prediction of Volcanic Eruptions

The National Project for Prediction of Volcanic Eruptions (NPPVE) has been carried out since 1974 as collaborative research among 9 universities, 3 institutions and 3 agencies, according to the recommendation of the Geodetic Council and the Ministry of Education, Science, Culture and Sports. NPPVE has been reapproved 5 years plan after checking and reviewing results. The annual budget for Sakurajima Volcano Research Center (SVRC) is around 5.5 million yen including

traveling expenses. SVRC has carried out the Comprehensive Joint Volcano Observation (CJVO) and the Joint Experiment on Subsurface Structure of Volcanoes (JESSV) at each target volcano in collaboration with other universities, institutions and agencies. In addition, SVRC joined in urgent collaborations of volcano crises at Iwatesan, Usuzan and Miyakejima. The target volcanoes are listed in Table 3.1.3.

SVRC organized the research plan and team for the CJVO of Suwanosejima in 1998 and that of Satsuma-iwojima and Kuchinoerabujima in 2000; reports were published and distributed to universities, institutions, national government and local authorities. The reports include seismic, geodetic, geochemical, geo-electric, geomagnetic, geothermal and geological research, and evaluation on current volcanic activity. Most of research results were published in international and domestic journals.

Table 3.1.3

year	CJVO	JESSV	Urgent observation
1997	Usuzan, Komagatake & Tarumaesan	Bandaisan	
1998	Suwanosejima	Asosan	Iwatesan
1999	Iwatesan	Izu-Oshima	
2000	Satsuma-Iwojima & Kuchinoerabujima	Iwatesan	Usuzan ,Miyakejima
2001	Unzendake	Usuzan	

3.1.4 Special project for earthquake disaster mitigation in urban areas

I. Regional characterization of the crust in metropolitan areas for prediction of strong ground motion

1. Deep Seismic Exploration

This project consists of three parts: 1) Deep seismic exploration, 2) Deep drilling and 3). Characterization of earthquake faults and crustal structure. DPRI in cooperation with the Earthquake Research Institute, University of Tokyo, is in charge of the first and the third parts of the project. The project started in 2002 as part of the plan for reconstruction of large cities and aims to improve the prediction of strong ground motion for large earthquakes, which may cause severe damage in urban areas. In the first two

years, seismic surveys were conducted in the capital areas of Tokyo to clarify the source faults of large earthquakes, in particular, their configuration and physical properties. This was done by conducting several seismic surveys along several measure lines. The results show the deep structures of the source faults, for example, the source fault of the Great 1923 Kanto earthquake was clearly defined just beneath Tokyo Bay.

In 2004, large-scale seismic surveys will be conducted in the Kansai area. There are many active faults in the region as well as the subduction of the Philippine Sea plate south of the city of Osaka, the second largest city in Japan. The objectives of these surveys are 1) to determine the deep structure of the fault geometry and 2) to determine the structures

which cause amplification of seismic waves in the Kansai area. The density of active faults in Japan is highest in the Kansai area, and the strikes have three dominant directions: north-south, west-east and northwest-southeast. Therefore, it is important to determine which are the primary faults that have deep roots and are dominant for large earthquake occurrences. For example, configuration of two parallel thrust faults, which are seen to have a spacing of about 10km at the surface, may be quite different at depth. They may intersect each other and one may be dominant at depth, or they may be parallel to the depth of the deep crust. These possibilities lead to differences of the deduced source geometry, which is necessary for calculating strong ground motions in urban areas. Moreover, the subduction of the Philippine Sea plate repeatedly causes great earthquakes along the Nankai trough and, with high probability, next one is predicted to occur in about 50 years. The subduction process is a major stress source for the movements of the active faults in the Kansai district. Therefore, the configuration of the plate boundary is also very important for determining the movements of the active faults described previously. Observations of earthquakes by a dense array stations will be also undertaken mainly along the profile lines to derive crustal structures by using the receiver function method and seismic tomography.

The project is conducted cooperatively with the Earthquake Research Institute (ERI), University of Tokyo and the National Research Institute for Earth Science and Disaster Prevention (NIED). Our institute and ERI are mainly in charge of the seismic surveys and NIED conducts deep drilling to obtain samples to compare with the results of the seismic exploration. The results will provide data for accurate prediction of strong ground motion in the urban areas of the Kansai district.

3. Characterization of Earthquake Faults and Crustal Structure

Under this research theme we have three research topics: 1) Construction of models of the deep structure of active faults and 3-dimensional crustal structure, 2) Study of a quasi-static model of inland faults and the strain accumulation process on active faults, and 3) Construction of source and subsurface structure models for "strong motion prediction". To advance these studies, we have formed cooperative research groups. The topics are described as follows:

1) The main objective of this research topic is to construct models of the deep structure of inland active faults and 3-dimensional structure models of the crust, based on the database of earthquakes, controlled-source experiments, and gravity measurements, in order to increase the accuracy of strong ground motion prediction. This research topic includes studies on the geometry of active faults, along-fault heterogeneity of seismicity and focal mechanism, and 3-D velocity and gravity structure of the crust.

2) The main objective of this research topic is to estimate static fault parameters, by utilizing geodetic data such as GPS and triangulations, and to develop a numerical model for the strain accumulation process on active faults, based on the crustal structure obtained in this project in order to give a basis of the strong ground motion prediction. This research topic includes studies on the quasi-static model of active faults and modeling of the strain accumulation process on active faults.

3) The aim of this research topic is to construct a prediction method of broad-band strong ground motions. For this purpose we characterize source models and subsurface structure models for hypothetical earthquakes, using various information, including the results of the deep seismic exploration and deep drilling, which characterize the active fault geometry and basin structures in urban areas, strong motion data, and seismological/geodetic information obtained by topics 1 and 2. This research topic includes studies on dynamic fault models, source scaling relations on high-frequency strong motion, and site effects due to surface geology.

3.1.5 The Special Coordination Fund for Promoting Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)

(1) Development of Integrated Countermeasures for Compound Urban Flood Disasters (Principal Investigator: Yoshiaki KAWATA)

Subjects: Downtown city areas and business districts with modern buildings such as Tokyo, Osaka and Nagoya are historically located in the flood-prone areas due to heavy rainfall, storm surges and tsunamis. And also several areas have underground parking lots, restaurants and shopping malls which are connected by subway systems. Therefore, flood damages

increase rapidly with complexity of urban space. In this project, the potential for urban flooding will be made clarified by hydraulic experiments and numerical simulation. On the basis of physical characteristics of hazards such as river flood, storm surges and tsunami, emergency management systems will be proposed to reduce the damage. Field surveys on flood disasters in urban areas were also conducted in some European countries and U.S.A. in last three years. Disaster reduction systems are also developed to modify Japanese government policy.

(2) Areal Prediction of Earthquake and Rain Induced Flow Phenomena (APERIF Project) (Principal Investigator: Kyoji SASSA)

Assesment of mechanisms of rapid long runout fluidized landslides that inflict many casualties and development of areal prediction techniques are urgent tasks to protect lives and properties of residents in the near cities. Due to factors, such as rapid local urbanization, frequent occurrence of localized heavy rainfall, and inland earthquakes, huge earthquakes may take place in the near future must be dealt with and limited resources.

The Special Coordination Fund for Promoting Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) "Areal Prediction of Earthquake and Rain Induced Flow Phenomena" (APERIF Project) was approved under the direction of Professor Kyoji Sassa of Geo-Disaster Division (currently Research Centre of Landslides since April 2003). This project involves DPRI as its core, and the Faculty of Technology, University of Tokyo; Institute of Industrial Sciences, Univ. of Tokyo, Geographical Survey Institute of Ministry of Land, Infrastructure and Transport; Independent Administrative Institution National Research Institute for Earth Science and Disaster Prevention (NIED); Independent Administrative Institution Forestry and Forest Products Research Institute; and the Japan Landslide Society.

APERIF Project consists of following four sub-projects. Sub-project 1: Research on the mechanism of rapid long-runout flow phenomena, Sub-project 2: Development of new terrain surveying and analyzing for slopes at landslide risk, Sub-project 3 : Research and development of landslide movement and Sub-project 4 : General study : Proposal of landslide hazardous area assessment methodology. APERIF was approved as one of International

Programme of Landslides projects (IPL-M101, APERTIF Project). IPL is managed by the International Consortium on Landslides (ICL) that which is supported by UNESCO, WMO (World Meteorological Organization), and UN/ISDR (United Nations International Strategy for Disaster Reduction), etc.

APERIF Sub-projects, for which RCL/DPRI is responsible, includes:

Sub-project 1-1 Development of visible-type seismic landslide geotechnical simulator

Sub-project 1-2 Research on reproduction of soil fluidization under seismic conditions and its mechanism by the visible-type seismic landslide geotechnical simulator tests

Sub-project 1-3 Development of fluidization potential measuring technique

Sub-project 4 General study : Proposal of landslide hazardous area assessment methodology.

(3) International Contribution to Monitoring, Prediction and Mitigation of Water-Related Disasters (Principal Investigator: Kaoru TAKARA)

A new research program "Promoting International Leadership and Coordination of Japan" was initiated in 2001 in the framework of the Special Coordination Funds for Promoting Science and Technology, the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

DPRI (Prof. Takara's group) obtained this competitive research fund to implement a three-year research project "International Contribution to Monitoring, Prediction and Mitigation of Water-Related Disasters" (2002-2004), which holds international meetings dealing with water-related issues and disasters and encourages international organizations led by Japanese to promote water-related activities. This project cooperated with the International Consortium on Landslides (ICL), the National Institute for Land and Infrastructure Management (NILIM) of the Ministry of Land, Infrastructure and Transport (MLIT), and the Public Works Research Institute (PWRI).

Activities already implemented during 2002-2003 are:

1. Participation in the International Conference on Urban Hydrology, Kuala Lumpur, Malaysia, 14-17 October 2002;
2. Participation in the Kick-off Workshop on IAHS

- Decade of Prediction in Ungaged Basins (PUB), Brasilia, Brazil, 20-22 November 2002;
3. Organizing the First International Conference on Hydrology and Water Resources in Asia Pacific Region, Kyoto, Japan, 13-15 March 2003;
 4. Organizing the IAHS Symposium on Distributed Hydrological Modeling and Application of Radar Information, Sapporo, Japan, 7-9 July 2003;
 5. Participation in the International Symposium on Remote Sensing and GIS in Hydrology, Water Resources and Environments, Three Gorges, China, 14-16 October 2003; and
 6. Organizing the International Conference on Managing Water Resources under Climatic Extremes and Natural Disasters, Sigatoka, Fiji, 27-28 October 2003.

(4) Prof. Hayashi (Missing)

3.1.6 Core Research for Evolutional Science and Technology (CREST)

In March 2001, the Second Science and Technology Basic Plan strategically formulated the national policies for science and technology of the new era, and the Japanese Council for Science and Technology Policy proposed four key research fields as the national policies for the strategic promotion of science and technology. Both will meet the social demands of this country in the future. In response to such proposed science and technology policies, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) designates generic goals of science and technology (called **Strategic Sectors**) and the Japan Science and Technology Corporation (JST, currently Japan Science and Technology Agency) accordingly establishes sets research disciplines to be centered in each Strategic Sector (called **Research Areas**).

The Core Research for Evolutional Science and Technology (CREST) is a Proposal-Oriented Type research framework under the coordination of the JST. A Research Area of CREST was newly begun in 2001: Research and Development of Hydrological Modeling and Water Resources System. This Research Area aims to build hydrology and water resources models by clarifying the mechanisms of water circulation processes in atmosphere-land-ocean environments at global and regional scales. It also deals with research on

effective water utilization in social systems. The area covers: change of water distribution due to climate variability; impacts of human activities on water cycle, maintenance and utilization of water resources, prediction of impacts of water circulation change on social systems, functions of water sustaining, conserving and recovering biological environments, and so forth.

DPRI (Prof. Takara's group) obtained this competitive research funds to conduct a five-year CREST research project "Modeling and Assessment of Interactions Between Social Transition and Water Cycle" (2001-2006), which constructs models for assessing interactions of social transition in Japan and Asian countries and hydrological cycle in river basins, as well as international water trade and balance considering movement of water resources from country to country. This research aims to properly model interactions between meteorological-hydrological dynamics and social dynamics, to quantitatively assess the availability and risk of fresh water resources in Asia, and to give perspectives of Japan's policies and international strategies on water, food and industries.

3.1.7 Research Project for Symbiosis among Earth/Nature/Human-being (Research Revolution 2002, RR2002)

Research Revolution 2002 is the national research-project plan for the promotion of 5 major academic fields. It has been assigned by the Ministry of Education, Culture, Sports, Science and Technology since 2002. The environmental research field entitled "Research Project for Symbiosis among Earth/Nature/Human being" has started. DPRI is leading one of seven missions in this project, "Advanced Numerical Model System and Countermeasure Technology for Regional- and Meso-scale Water Cycle". This mission is in collaboration with University of Tokyo, Tottori University, Sophia University, National Institute of Disaster Prevention Science and Technology, Frontier Research System for Global Change, Earth Simulator Center, and Mitsubishi Heavy Industry.

In order to establish the advanced prediction system and to develop the countermeasure technology for water cycle, the following 6 sub-themes are being conducted:

- (1) Development of integrated prediction system for

regional- and meso-scale water cycle, and elucidation of the hydrological cycle and prediction of its change in arid and semi-arid areas caused by global climate change.

- (2) Prediction of water disasters in East Asia.
- (3) Prevention of desertification in West Asia.
- (4) Development of technology for acquiring water resources.
- (5) Plantation/ reforestation in arid and semi-arid area and creation of oasis of closed water cycle type.
- (6) Impact assessment on the environment and human society by the improvements of desert environment.

3.1.8 Grants-in-Aid for Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology

and Other competitive funds

The Grants-in-Aid for Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) is one of our important research funds to maintain research activities at DPRI. The titles and principal investigator's names of the researches adopted in 2000 to 2001 are listed in Table 3.1.4. The average number of proposals for one researcher in the DPRI was about 0.8 and the success rate in all DPRI was about 25% from 2000 to 2001. The total number of proposals and adoption rates in 2000 and 2001 are smaller than those in 1998 and 1999. We need to make an effort to increase those numbers in the near future.

The titles and principal investigator's names of other competitive funds are also listed in Table 3.1.5.

Table 3.1.4 List of researches sponsored by the Grant-in-Aid for Scientific Research of Ministry of Education, Culture, Sports, Science and Technology

Researcher	Category	Theme	PI/I	Year	Fund
Norio Okada	B1	Development of Cost Allocation Methods for Multi-purpose Reservoir Development Including Environmental Conservation Water-Towards Integration of Conventional Allocation Methods and Game Theory	PI	2000	410
Norio Okada				2001	2,700
Norio Okada	Priority Areas (B1)	Criteria for Performance-based Design and Management of Infrastructure Systems	I	2000	5,500
				2001	8,500
				2002	9,250
				2003	8,350
				2004	8,200
Norio Okada	C2	Field Research on Vitalization of Rural Areas	I	2000	1,700
				2001	1,100
				2002	800
Norio Okada	C2	Development of Reliability Evaluation Methods for Infrastructure Development Benefits Based on Contingent Valuation Method	PI	2001	1,800
				2002	1,600
Norio Okada	Special grant for foreign researcher	Research on Development of Heavy Rainfall Disaster Risks and Emergency Management Support Systems Based on GIS	PI	2002	1,200
				2003	1,000
Norio Okada	C2	Study on Optimal Location of Residential Areas by use of Hazard Information Provision	I	2002	1,700
				2003	1,500
Hiroyuki Kameda	Priority Areas (B1)	US-Japan Cooperative Research on Urban Earthquake Disaster Mitigation	PI	2001	70,000
				2002	71,100
Hiroyuki Kameda	B2	Evaluation of the Seismic Performance for Transportation Systems	PI	2001	7,000
				2002	1,600
Hiroyuki Kameda	B2	A Research for Introduction of Spatial Temporal GIS based on RARMIS concept to Local Government and Community	PI	2002	5,800
				2003	4,600
Yoshiyuki Suzuki	B1	Evaluation of Seismic Ground-Motion and Estimation of Seismic Disaster by Using Array Earthquake Observation Network in Kyoto Valley	PI	1999	4,600
				2000	4,300
				2001	3,500
Yoshiyuki Suzuki	Priority Area (B)	Monitoring and damage detection system of structures	PI	2000	5,500
				2001	6,600
Yoshiyuki Suzuki	Specially Designated Research Promotion	Development of Theoretical High Precision Strong Motion Prediction Technique and Earthquake Disaster Prediction in Kyoto	I	2000	15,800
				2001	16,900
Yoshiyuki Suzuki	A1	Clarification of structural mechanics of wooden structures and evaluation method for their static and dynamic seismic performance	PI	2002	13,500
				2003	14,400
				2004	12,200
Yoshiyuki	B1	Evaluation and Expression of Seismic Risk of Buildings Based on Statistical	I	2002	2,800

Suzuki		Damage Data in Recent Earthquakes		2003	2,300
Hagihara Yoshinmi	B2	Economical Evaluation Method of Urban Water Pollution Risk	I	2002	
Hirokazu Tatano	B1	Development of Cost Allocation Methods for Multi-Purpose Reservoir Projects Including Environmental Water Use -For Harmonizing Conventional and Game Theoretic Allocation Methods-	I	2000	4,100
				2001	2,700
Hirokazu Tatano	C2	Reliability Analysis of Benefit Measurement of Infrastructure Development Based on Discrete Choice Models	I	2001	1,800
				2002	1,600
Hirokazu Tatano	C2	Effect of Information Provision about Vulnerability against Disaster Risk on Housing Location in Disaster Prone Areas	PI	2002	1,700
				2003	1,500
Yasuhiro Hayashi	B1	Evaluation of Seismic Ground Motions and Estimation of Seismic Disasters by using Array Earthquake Observation Systems in Kyoto Network	I	1999	4,600
				2000	4,300
				2001	3,500
Yasuhiro Hayashi	B1	Study on Dynamic Behavior of Soil and Structure around Epicenter Region in Chi-Chi Earthquake of Taiwan	I	2001	410
				2002	310
Yasuhiro Hayashi	B1	Evaluation and Expression of Seismic Risk of Buildings Based on Statistical Damage Data in Recent Earthquakes	PI	2002	2,800
					2,300
Yasuhiro Hayashi	A1	Clarification of structural mechanics of wooden structures and evaluation method for their static and dynamic seismic performance	I	2002	13,500
				2003	14,400
				2003	12,200
Yasuhiro Hayashi	Specially Designated Research Promotion	Development of Theoretical High Precision Strong Motion Prediction Technique and Earthquake Disaster Prediction in Kyoto	I	2001	16,900
				2002	14,400
Satoshi Tanaka		Evaluation of the Seismic Performance for Transportation Systems	I	2001	7,000
				2002	16,000
Satoshi Tanaka	B2	A Research for Introduction of Spatial Temporal GIS based on RARMIS concept to Local Government and Community	I	2002	5,800
Satoshi Tanaka	B1	MISSING	I	2002	5,000
Norio Okada	B1	Multi-participant Conflict-solving Planning System for infrastructure Development	PI	2003	1,500
				2004	1,500
				2005	1,500
Norio Okada	B2	Adaptive Management for integrated Disaster Risk Communication	PI	2004	2,900
				2005	2,700
				2006	1,800
Norio Okada	A1	Research on Development of GIS Infrastructure Systems	I		
Yoshimi Hagihara	C2	Disaster risk assessment and mitigation in urban aged society using spatial-temporal geographic information	I	2004	2,200
Michinori Hatayama	B	Introduction process of GIS to local government considering customers' cognitive structure about geographical information	I	2004	2,100
Kojiro IRIKURA		Study on Assessments of Seismic local-site effects at plural international test sites	PI	2001	16,900
				2002	9,000
Tadanobu Sato	B2	Causal Factor Analyses and International Comparison of Damage to the Infrastructure caused by the 1999 Chi-Chi earthquake in Taiwan	PI	2002	4,100
				2003	2,500
				2004	1,800
Tadanobu Sato	B2	Development of Automatic Structural Damage Detection System Using Strain Memory Sensors	PI	2001	4,000
				2002	2,600
				2003	2,600
Tadanobu Sato	B2	Modeling of Nonstationary Phase Characteristic of Earthquake Motions	PI	2002	3,500
				2003	2,500
				2004	2,300
Hitoshi Tanaka	C2	An Experimental Study of the Scale effects on the Stress-Stress Relationships of Confined Concrete with High Strength Materials	PI	2002	1,800
				2003	1,900
Masayoshi Nakashima	B2	Development of Experimental Systems for Simulation of Complete Failures of Steel Structures Subjected to Earthquake Loading	PI	2000	10,400
				2001	2,200
				2002	1,200
Masayoshi Nakashima	B2	Correlation Between Loading Rate, Temperature Rise, and Material Properties Changes in Plastic Rotation Capacity of Steel Welded Beam-to-Column Connections	PI	2001	6,200
				2002	2,600

Masayoshi Nakashima	Exploratory Research	Correlation between building production process and quality of welded connections	PI	2002	700
				2003	1,400
				2003	29,640
Masayoshi Nakashima	Specially Designated Research Promotion	Reliability-based seismic design with explicit consideration into uncertainties involved with seismic demand and capacity	PI	2004	39,130
				2005	17,290
				2006	13,100
				2007	5,850
Masayoshi Nakashima	Exploratory Research	Duplication and reevaluation of seismic capacity of high-rise steel building structures constructed during rapid economic growth	PI	2004	140
				2005	200
Suita, Keiichiro	B	Development of Steel Building Structure System with Joint Elements as Energy Dissipater	I	2001	7,400
				2002	5,200
Suita, Keiichiro	C2	Effect of Mechanical Performance of Base Metal and Weld Deposition on Ultimate Flexural Strength of Welded Beam-to-Column Connections	PI	2002	1,800
				2003	1,700
Suita, Keiichiro	A	Seismic Performance and Quality Assurance of Steel Building Structures Constructed by Mechanical Joint System	I	2002	12,300
				2003	12,200
				2004	13,900
				2005	2,700
Sawada, S.	B2	Survey of Geological Structure at Adapazari, the concentrated damage area during 1999 Turkey, earthquake	PI	2001	5,900
				2002	6,100
				2003	1,600
Sawada, S.	B2	A study on evaluation of seismic design input motion considering phase characteristics of scatted wave	PI	2002	1,100
				2003	900
				2004	1,100
Tomotaka IWATA	B2	Study on Prediction of Strong Ground Motions in Urban Regions	PI	2001	5,800
				2002	6,100
Tomotaka IWATA	C	Studies on prediction of strong ground motions for scenario earthquake using strong motion data	PI	2001	1,000
				2002	1,200
Tomotaka IWATA	B	Study on dynamic response of soils and buildings in the source area of the 1999 ChiChi, Taiwan, earthquake	I	2001-2002	7,200
Tomotaka IWATA	B	Study on estimation of input ground motions by high-reliable site effect evaluation	I	2001-2002	6,500
Tomotaka IWATA	University and Society Collaboration	Studies on development of strong motion prediction and earthquake disaster prediction in Kyoto basin	I	2001	16,900
Tomotaka IWATA	B	Study on Assessments of Seismic local-site effects at plural international test sites	I	2000-2003	9,000
Riki HONDA	Young Scientists (A)	Development of time integration scheme that implements frequency-dependent attenuation characteristics	P.I.	2001	1,200
				2002	1,200
Shigehiro Morooka	Young Scientists (A)	Analytical Study on the Instability of Spherical Shell Structures under Regular Vibration	P.I.	2000	1,700
				2001	600
Masashi Kamon	A1	Geotechnical Utilization of Waste Materials and Its Environmental Impact	PI	2001	2,800
Masashi Kamon	B2	Geotechnical Issues on Waste Disposal and Waste Landfill Design	PI	2001	10,300
				2002	2,200
Mamoru Mimura	B2	Research on Failure mechanism of Coastal Structures By Near field Earthquake	PI	2000	10,000
				2001	1,500
Toru Inui	A	Design of the Remedial Action for the Contaminated Site Based on the Risk Assessment Approaches	PI	2002	1,500
Toru Inui	A1	Geotechnical Utilization of Waste Materials and Its Environmental Impact	I	2001	2,800
Toru Inui	B2	Geotechnical Issues on Waste Disposal and Waste Landfill Design	I	2001	10,300
				2002	2,200
Hiroshi SUWA	B	Joint field studies on hydrology, potamology and coastal engineering for synthetic managements of water and sediment in the three watersheds in Java and Sumatora	I	2001	430
				2002	460
Toshitaka Kamai	C2	Landslide risk mapping of residential fill slope in urban region	PI	2000	2,200
				2001	800
				2002	700
Tamotsu Takahashi	B2	A study on mechanism of debris flows following slope failures and prediction of those discharges	PI	2000	1,300
Tamotsu	B2	Development of sediment control system over a whole river basin	PI	2000	3,400

Takahashi				2001	3,400
Tamotsu Takahashi	C2	Evaluation of functions of permeable sabo dams and its application to sediment management in a basin	I	2000	1,000
				2001	700
Kaoru Takara	A2	International hydrological research on sustainable water resources environment considering interaction between water, human, and earth system	I	1999	5,200
				2000	5,200
				2001	5,000
Masahiro Chigira	B2	Formative process of weathering profiles and the mechanism of landslide of granitic rocks	PI	2003	3,653
Masahiro Chigira	C1	Research on the current situation of education and professional certification of geoscience in Europe and America	PI	2003	1,900
Masahiro Chigira	Special purpose	Research on the rainstorm disaster of July 2003 in Kyushu	I	2003	4,600
Masahiro Chigira	B2	Mechanism of landslide closely connected to weathering profiles	PI	2001	500
Kaoru Takara	A1	Comprehensive research on scaling effects in water and energy cycle by synchronizing satellite, intensified, and continuous observations -The Lake Biwa Project 2nd stage	I	1999	18,200
				2000	8,900
				2001	4,800
Kaoru Takara	A1	Water resources crisis and countermeasures against it in Southeast Asia and the Pacific region	I	2000	9,400
				2001	9,400
Kaoru Takara	B2	Hydrological river and coastal field investigation for integrated water and sediment management in three basins in Indonesia	PI	2000	4,300
				2001	4,600
				2002	4,300
Kaoru Takara	B2	Development of a new flood protection planning methodology based on a distributed rainfall runoff simulation system	PI	2000	3,600
				2001	900
				2002	1,000
Kaoru Takara	B2	Study on the flood weakness of cities and the flood emergency management system	I	2000	5,300
				2001	2,600
Kaoru Takara	A1	Study on evaluation, management and measures of water resources environment in Asia Pacific Region	I	2001	10,800
				2002	8,300
				2003	8,300
Kaoru Takara	Spesial Purporse	Investigation on heavy storm and flood disaster caused by Typhoon Rusa in 2002	PI	2002	4,200
Kazuya Inoue	B2	Study on the flood weakness of cities and the flood emergency management system	PI	2000	5,300
				2001	2,600
Yasuto Tachikawa	B1	Development of hydrological data base and its sharing through computer network	I	1999	3,900
				2000	1,500
				2001	1,800
Yasuto Tachikawa	A	Flood prediction in large scale river basins in South East Asia	PI	2001	1,400
				2002	700
Yasuto Tachikawa	B2	Hydrological river and coastal field investigation for integrated water and sediment management in three basins in Indonesia	I	2000	4,300
				2001	4,600
				2002	4,300
Yasuto Tachikawa	B2	Development of a new flood protection planning methodology based on a distributed rainfall runoff simulation system	I	2001	3,600
				2002	900
				2003	1,000
Keiichi Toda	B2	Study on the flood weakness of cities and the flood emergency management system	I	2000	5,300
				2001	2,600
Hajime Mase	B2	Simulation of real sea states by multi-directional wave generator	I	2000	1,800
Hiroshi Yoshioka	A1	Investigation of Gas Transfer Mechanism through Air-Sea Boundary in Wave Breaking Condition with Turbulence due to Bubble Intrusion	I	2000	1,000
				2001	300
Hiroshi Yoshioka	University and Society Collaboration 2	Study of Water Exchange and Prediction of Red Tide in Tanabe Bay	I	2000	8,100
				2001	8,800
Masaharu Fujita	C2	A monitoring method for sediment movement in mountain rivers with an index of turbidity	PI	2001	2,300
				2002	1,100
Kazuya Inoue	B2	Study of Urban Flood and its Control Based on River Basin Management	PI	2002	4,400
				2003	3,200
Takao Iguchi	A1	Micrometeorological and ecological study on relation among fluxes of carbon, water and heat in several ecosystems of land area	I	2003	300
Hiromasa Ueda	A1	Research on the development of observing system for the whole atmospheric boundary layer and the coherent structure of atmospheric turbulence	PI	2001	8,300
				2002	2,200

				2003	1,000
Hiromasa Ueda	Priority Areas	Change of Aerosols and its Effects on Radiation in Asian Pacific Region	I	2000	35,300
				2001	34,300
Hiromasa Ueda	Grant-in-aid for Scientific Research (A2)	Research on the Climatological Influence of Biomass Burning in Indonesian Region	I	2000	8,400
Hiromasa Ueda	C1	Promotion of Aerosol Characterization Experiment (ACE-Asia) and International Correspondence	I	2000	3,200
Hirohiko Ishikawa	Priority Areas	Processes on circulation of atmospheric energy and water at Tibetan Plateau	PI	2000	12,900
				2001	10,700
				2002	7,800
Hirohiko Ishikawa	B2	Research on the development of observing system for the whole atmospheric boundary layer and the coherent structure of atmospheric turbulence	I	2001	8,300
				2002	2,200
				2003	1,000
Hirohiko Ishikawa	A2	Development of storm surge hazard map and the construction of environmental assessment system in Ariake/Yatsusiro coastal area.	I	2002	
				2003	
				2004	
Hirohiko Ishikawa	A2	Research on the Development of the Car-borne Doppler SODAR and its Meteorological Application	I	2001	20,500
				2002	5,000
				2003	6,000
Hirohiko Ishikawa	B2	Research on the Rain Characteristics as the Cause of Flood	I	2001	5,200
				2002	5,300
				2003	2,900
Mitsuaki Horiguchi	B2	Development of observing system for the whole atmospheric boundary layer and the coherent structure of atmospheric turbulence	I	2001	8,300
				2002	2,200
				2003	1,000
Mitsuaki Horiguchi	B2	Processes on circulation of atmospheric energy and water at Tibetan Plateau	I	2001	10,700
				2002	7,800
Mitsuaki Horiguchi	C2	The study for spatial structures and time development of turbulence in the atmospheric boundary layer	PI	2002	2,200
				2003	1,400
Hiromasa Kawai	B2	Study on flow pattern similarity around a reduced model of high rise building in the natural wind	I	2001	1,800
				2002	2,300
Hiromasa Kawai	C	Aeroelastic Instability of a Rectangular Cylinder with Side Ratio of 1/2 in Smooth Flow	PI	2001	2,700
				2002	600
Takashi Maruyama	B2	Study on flow pattern similarity around a reduced model of high rise building in the natural wind	PI	2001	1,800
				2002	2,300
Hiromasa Kawai	B2	Mechanism of wind induced damage of buildings and its reduction	PI		
Takashi Maruyama	B2	Study on unsteady air-force loading on low-rise buildings and predicting method of wind load for wind resistant construction	PI		
Hirohiko Ishikawa	B2	Study on the extratropical transition of typhoon and the related atmospheric disasters.	PI		
Hajime, NAKAGAWA	C2	Research on evaluation for a function of open-type sabo dams and integrated sediment management in a basin	PI	2000	1,000
				2001	700
Hajime, NAKAGAWA	B2	Research on occurrence mechanism of a debris flow and prediction of its hydrograph due to deep seated landslide	I	2000	1,300
Hajime, NAKAGAWA	B2	Joint field investigation on hydrology, river and coast for the comprehensive flood and sediment management in Java and Sumatra basins	I	2000	4,300
				2001	4,600
Hajime, NAKAGAWA	B1	Research on sediment disasters and their countermeasures in Venezuela	I	2001	3,500
				2002	3,200
				2003	4,100
Hajime, NAKAGAWA	B1	Research on integrated sediment distribution system in a basin	I		
Hajime, NAKAGAWA	B2	Research on evaluation of hydraulic structures and topographic variation for the integrated sediment management in a basin	PI	2002	4400
				2003	4800
				2004	3300
				2005	2800
Hajime, NAKAGAWA	JSPS Fellows	Research on changes of alluvial channels and their stabilization	PI	2002	800
				2003	1000

				2004	600
Hajime, NAKAGAWA	B2	Research on basin-wide flood defense	I	2002	4400
				2003	3200
				2004	2500
Hideo Sekiguchi	Exploratory Research	Analysis of progressive liquefaction as a moving-boundary problem	PI	2000	1900
Hideo Sekiguchi	B2	Wave-induced liquefaction, flow deformation and scouring in granular soils around coastal structures	I	2001	9,600
				2002	
				2003	
Toyoaki SAWADA	C2	Sediment outflow from Sabo dam and its effects on the river environment	I	2001	1,000
Toyoaki SAWADA	C2	Research on evaluation for a function of open-type sabo dams and integrated sediment management in a basin	I	2000	1,000
				2001	700
Toyoaki SAWADA	C1		I	2000	600
				2001	700
Taiichi HAYASHI	A2	Research on the Development of the Car-borne Doppler SODAR and its Meteorological Application	PI	2000	20,500
				2001	5,000
				2002	6,000
Taiichi HAYASHI	B2	Research on the Rain Characteristics as the Cause of Flood	I	2000	5,200
				2001	5,300
				2002	2,900
Takao YAMASHITA	University and Society Collaboration 2	Water exchange mechanics and red-tide prediction in the Tanabe Bay	PI	1999	15,500
				2000	8,100
				2001	8,800
Takao YAMASHITA		Wind-Wave-Current System in Wave Shoaling Region	PI	2002	7,200
Yasuyuki BABA	Young Scientists (A)	Evaluation method of sea surface stress in the shallow-water region	PI	2001	1,400
				2002	1,100
Shigeru KATO	Young Scientists (B)	Development of three dimensional model for wind, wave-induced coastal currents and its verification	PI	2000	1,100
Shigeru KATO	Young Scientists (B)	Simulation model for beach change prediction considered sediment transport in the coastal region	PI	2001	1,000
				2002	800
Shigeru KATO	University and Society Collaboration (2)	Water exchange mechanics and red-tide prediction in the Tanabe Bay	I	2000	8,100
				2001	8,800
Shigeru KATO	B2	Wind-Wave-Current System in Wave Shoaling Region	I	2002	7,200
Shigeatsu SERIZAWA	University and Society Collaboration (2)	Water exchange mechanics and red-tide prediction in the Tanabe Bay	I	2000	8,100
				2001	8,800
Yasuhiro UMEDA	Specially Promoted research	Reconnaissance report on the 2000 western Tottori earthquake and its disasters, Supported by the Japanese Ministry of the Education, Science, Sport and Culture, Grant No.12800013,Editor:Yasuhiro, Umeda	PI	2000	6,000
Manabu HASHIMOTO	C2	Study on the variety in seismicity generated by mechanical interaction between faults	PI	1999	900
				2000	600
				2001	500
				2002	1,000
Manabu HASHIMOTO	B1	Geodetic study on the deep structure and present motion of the Median Tectonic Line fault zone	I	1999	3,300
				2000	2,800
				2001	3,300
Manabu HASHIMOTO	Disaster	Integrated study on the earthquake disasters in urban areas due to the 2001 Geiyo earthquake	I	2002	4,800
MORI.James Jiro	B2	Investigating the Magma System of the Active Rabaul Caldera	PI	2001	8,800
				2002	2,600
MORI.James Jiro	B2	Investigating Earthquake Radiated Energies over a Large Size Range	PI	2001	1,700
				2002	600
MORI.James Jiro	B2	Estimating the Level of Absolute Stress prior to the 2000 Western Tottori Earthquake	PI	2002	4,190
MORI.James Jiro	Disaster	Integrated studies on the earthquake disasters in urban areas due to the 2001 Geiyo earthquake	I	2001	4,800

MORI,James Jiro	Disaster	A Comprehensive Survey of the 26 January 2001 Earthquake (Mw7.7) in the state of Gujarat, India.	I	2001	5,000
Naoto OSHIMAN	International Project	A study on the deep structure of the active fault in the north Anatolian fault zone, Turkey.	I	2000	5,310
Naoto OSHIMAN	International Project	A study on potential evaluation of earthquake occurrences in the western region of the north Anatolian fault zone, Turkey.	I	2001-2003	16,800
Naoto OSHIMAN	B	A study on electrical conductivity structure around the seismogenic zone in Chugoku-Shikoku region in Japan,	I	2001	4,820
Ichiro KAWASAKI	Priority Areas (2)	Applications to geophysical problems	I	2002	
				2003	
				2004	
				2005	
hiro KAWASAKI	C1	Urban planning in an area of high snowfall, confronting aging society	I	2002	
Kin'ya NISHIGAMI	A1	Repeated water injection experiments at the Nojima fault -Study on fault healing process and induced earthquakes-	I	2000	3,400
Yoshihisa IIO	A	Research on earthquake preparation process -Completion of the observation network in the semi-controlled seismogenic experiments in South African deep gold mines-	PI	2002	43,420
				2003	2,500
Yoshihisa IIO	B	Direct observation of earthquake source in deep level Gold n mines	I	2002	0
				2003	0
Takuo SHIBUTANI	Creative Basic Research	Ocean Hemisphere Network: New probes for scanning the Earth's interior	I	1996	320,000
				1997	300,000
				1998	290,000
				1999	300,000
				2000	280,000
				2001	244,000
Takuo SHIBUTANI	B2	Study of seismic discontinuities in the crust and the upper mantle beneath the Japan Islands due to array analyses of receiver functions	I	1999	6,500
				2000	3,800
				2001	4,100
Takuo SHIBUTANI	B2	Study of high resolution seismic discontinuities in the surface layer, the crust and the uppermost mantle beneath the Japan Islands	I	2002	5,700
				2003	3,100
				2004	3,500
Kajyuro NAKAMURA	B1	Study on effective method for combined analysis of microseisms and	I	1999	
				2000	2,200
				2001	1,300
Kajyuro NAKAMURA	B	Researches on conjugate fault and basement structure in and around the Lijiang basin in Yunnan province, China aiming at microzoning	PI	2002	
				2003	2,700
				2004	
Peiliang Xu	C	New Approaches to Precise Determination of Gravity Field from Precise Satellite Positionings	PI	2001	2,200
				2002	700
				2003	700
Ryokei YOSHIMURA	B2	Detection of the magnetic changes associated with volcanic activity by helicopter-borne magnetic surveys.	I	2003	
				2004	
				2005	
Kazuhiro Ishihara and Masato Iguchi	Special Purpose	Comprehensive study on 2000 eruption at Usu volcano and disaster prevention	I	2001	2,000
				2002	1,170
Kazuhiro Ishihara, Masato Iguchi and Wataru Kanda	A2	Preparation zone and generation process of the volcanic explosion	I	2003	5,100
Wataru Kanda	A	Quantitative study on the geomagnetic variation as a result of the change in thermal state inside the volcanic edifice	PI	2001	1,300
				2002	900
Wataru Kanda	B2	Development of a monitoring system using Array of Controlled Transient electromagnetics to Image inside the Volcanic Edifice (ACTIVE)	I	2001	
				2002	
				2003	
Wataru Kanda	Young Scientists (B)	Comparison study between Satsuma-Iwojima and Miyakejima volcanoes on the self-potential variation associated with the volcanic activity.	PI	2003	1400

Shuichi Ikebuchi	A	International hydrological research on sustainable water resources environment considering interaction between water, human, and earth system	PI	1999	5,200
				2000	5,200
Shuichi Ikebuchi	B	Development of flood control system based on short-time rainfall prediction	PI	2001	2,800
				2002	1,800
Shuichi Ikebuchi	A	Study on evaluation, management and measures of water resources environment in Asia Pacific Region	PI	2001	10,800
				2002	8,300
				2003	8,300
Shuichi Ikebuchi	A	Multi-scale-modeling of river ecosystem for its conservation and restoration	PI	2003	13,900
				2004	9,900
				2005	6,500
Kenji Tanaka	Young Scientists (A)	Estimation of water and energy budget over cropland in China Continent and land-atmosphere interaction	PI	2000	1,700
				2001	500
Kenji Tanaka	Young Scientists (A)	Study on soil moisture data assimilation by GMS data	PI	2002	1,300
				2003	500
Kenji Tanaka	Priority Areas (B)	Energy and water cycle process in subtropical and temperate zone	I	2000	35,100
				2001	28,100
				2002	19,000
Kenji Tanaka	A	Comprehensive research on scaling effects in water and energy cycle by synchronizing satellite, intensified, and continuous observations -The Lake Biwa Project 2nd stage	I	1999	18,200
				2000	8,900
				2001	4,800
Kenji Tanaka	A	Comprehensive research on water, energy, and material cycle by synchronizing satellite, intensified, and continuous observations -The Lake Biwa Project 3rd stage	I	2002	14,400
				2003	12,600
				2004	8,100
Kenji Tanaka	B	Re-analysis of high accuracy global soil moisture distribution and numerical experiments of its impact on rainfall prediction	I	2001	4,200
				2002	4,200
Taro Oka	B	Research on Design, Construction and Operation of the Underground Dam	PI	1999	6,100
				2000	4,100
				2001	2,200
Taro Oka	A	Hydrological Study on Flood Lake Behavior in Bangladesh	PI	2000	5,100
				2001	4,600
				2002	4,800
Yoshinobu Kido	C	Evaluation and Estimation of Environmental Pollutant Load and Environmental Resources Related to Citizens' Lifestyle in Complex of Urban and Rural Area toward Future Recycle-Oriented Society	PI	2001	1,600
				2002	1,000
				2003	1,000
Yoshinobu Kido	A	Hydrological Study on Flood Lake Behavior in Bangladesh	I	2001	4,600
				2002	4,800
Toshio Hamaguchi	Young Scientists (A)	Development of Practical Way to Manage Underground Dam Reservoirs	PI	201	1,500
				2002	700
Toshio Hamaguchi	A	Promotion of Intelligent way of Construction, Management and Reservoir Control in Service	I	2001	2,300
				2002	7,000
Toshiharu Kojiri	B	Decision support system for continuous reservoir operation with flood and drought through virtual reality technologies	PI	2001	1,100
Toshiharu Kojiri	A	International hydrological research on sustainable water resources environment considering interaction between water, human, and earth system	I	2001	5,000
Toshiharu Kojiri	B	Development of flood control system based on short-time rainfall prediction	I	2001	2,800
				2002	1,800
Toshiharu Kojiri	A	Study on evaluation, management and measures of water resources environment in Asia Pacific Region	I	2001	10,800
				2002	8,300
				2003	8,300
Shuichi Ikebuchi	A	Multi-scale-modeling of river ecosystem for its conservation and restoration	PI	2004	13,900
				2005	9,900
				2006	6,500
Taro Oka	B	The flood in Bangladesh and its Countermeasures	PI	2003	3,700
				2004	3,400
Yoshiaki Kawata	B	Study on widely applicable emergency management systems against gigantic plate boundary earthquake disasters	PI	2001	2,800
Yoshiaki Kawata	Priority Areas	Modeling of urban earthquake disaster process and integrated quantification on damage	PI	2001	5,800
				2002	6,100
Yoshiaki Kawata	Publication	Database on natural disasters	I	2001	4,900

Hayashi Haruo	International Project	Social Scientific Research on Catastrophic Urban Earthquake Disaster	PI	2001	3,200
Hayashi Haruo	JSPS Fellows	Application of Near-field earthquake prediction for disaster reduction	PI	2001	8,000
Hayashi Haruo	Priority Areas	Study of post- earthquake disaster response process through multi-media information processing	I	2001	600
				2002	600
Hayashi Haruo	Special Purpose	Integrated Study of Urban Earthquake Disasters due to the 2001 Keiyo Earthquake	I	2002	200
Takeyoshi Tanaka	B	Study on Prediction of Wind Blown Thermal Flow Induced by Urban Fires	PI	2001	3,000
				2002	1,700
Junpei Akamatsu	B	Study on effective methods of combined analysis of microseisms and gravity data to reveal bedrock structure	PI	2002	1,300
Tomoyuki Takahashi		Development of a scheme to evaluate historical tsunamis with tsunami deposits	PI	2001	1,600
				2002	500
Kyoji Sassa	A2	Risk evaluation and investigation of Inca World Heritage "Machu Picchu" citadel monument	PI	2003	5,000
				2004	6,400
				2005	4,200
				2006	3,500
Kyoji Sassa	B2	Landslide Hazard Assessment at Cultural Heritage Sites	PI	2000	3,500
				2001	3,200
Kyoji Sassa	C2	UNESCO/JAPAN : International Joint Research on Landslide Hazard Mitigation and Protection of Cultural / Natural Heritages	PI	2001	3,300
Kyoji Sassa	B2	Development of assessment method of flow phenomena based on undrained shear and grain crushing characteristics measurement	PI	2001	5,000
				2002	3,900
				2003	4,000
Hiroshi Fukuoka	A2	Risk evaluation and investigation of Inca World Heritage "Machu Picchu" citadel monument	I	2003	5,000
				2004	6,400
				2005	4,200
				2006	3,500
Hiroshi Fukuoka	C2	Development of regular check-up system of slope stability using RTK-GPS	PI	2000	1,100
				2001	1,300
Hiroshi Fukuoka	B2	Development of practical "regular check-up system of slope stability" using RTK-GPS	PI	2002	9,400
				2003	1,900
Hiroshi Fukuoka	B2	Landslide Hazard Assessment at Cultural Heritage Sites	I	2000	3,500
				2001	3,200
Hiroshi Fukuoka	C2	UNESCO/JAPAN : International Joint Research on Landslide Hazard Mitigation and Protection of Cultural / Natural Heritages	PI	2001	3,300
Hiroshi Fukuoka	B2	Development of assessment method of flow phenomena based on undrained shear and grain crushing characteristics measurement	I	2001	5,000
				2002	3,900
Hiroshi Fukuoka	Exploratory Research	MISSING	PI	2002	1,100
				2003	1,000

Table 3.1.5 Other Competitive fund

Researcher	Sponsor	Title	別	Year	Fund
Norio Okada	Central Research Institutes of Electric Power Industry	Measuring Economic Losses of Electric Power Shortage Triggered by an Earthquake Based on the Changes of Social Surplus	PI	2002	500
Norio Okada	National Research Institute for Earth Science and Disaster Prevention	Risk Analysis of Resistance Capacity of Social Systems against Disaster	PI	2002 - 2006	12,000
Norio Okada	EQTAP	Disaster Risk Assessment and Management	PI	2002	7,076
Norio Okada	Toyota Foundation	Field Study on Sustainable Community Capacity Development Systems in Rural Areas	PI	2000-2002	850
Norio Okada	Toyota Foundation	Field Study on Sustainable Community Capacity Development Systems in Rural Areas	PI	2000-2002	950

Norio Okada	Toyota Foundation	Field Study on Sustainable Community Capacity Development Systems in Rural Areas	PI	2000-2002	275
Norio Okada	Toyota Foundation	Field Study on Sustainable Community Capacity Development Systems in Rural Areas	PI	2000-2002	93
Norio Okada	Foundation of River & Watershed Environment Management (FRWEM)	Research on Cost Allocation Schemes for Multi-purpose Project with River Environment Conservation Considered	PI	2000	1,000
Norio Okada	Foundation of River & Watershed Environment Management (FRWEM)	Research on Cost Allocation Schemes for Multi-purpose Project with River Environment Conservation Considered	PI	2001	600
Norio Okada	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	PI	2001	2,000
Norio Okada	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	PI	2002	1,200
Yoshiyuki Suzuki	Kyoto Traditional Architecture Association	Preliminary Study on Seismic Performance of Traditional Wooden Buildings in Higashi Hongan-ji Temple	PI	2001	7,000
Yoshiyuki Suzuki	Property and Casualty Insurance Rating Organization	Study on Method of Evaluation for Seismic Performance of houses	PI	2002	9,000
Hirokazu Tatano	Central Research Institutes of Electric Power Industry	Measuring Economic Losses of Electric Power Shortage Triggered by an Earthquake Based on the Changes of Social Surplus	I	2002	500
Hirokazu Tatano	National Research Institute for Earth Science and Disaster Prevention	Risk Analysis of Resistance Capacity of Social Systems against Disaster	I	2002-2006	12,000,000 (year)
Hirokazu Tatano	EQTAP	Disaster Risk Assessment and Management	I	2002	7,076
Hirokazu Tatano	Riken Institute	Disaster Risk Assessment and Management	I	2001	9,100
Hirokazu Tatano	Foundation of River & Watershed Environment Management	Study on Cost Allocation Schemes in Joint Infrastructure Development Including Preservation of River Environment	I	2000	1,000
Hirokazu Tatano	Foundation of River & Watershed Environment Management	Study on Cost Allocation Schemes in Joint Infrastructure Development Including Preservation of River Environment	I	2001	600
Hirokazu Tatano	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	PI	2001	2,000
Hirokazu Tatano	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	PI	2002	1,200
Yasuhiro Hayashi	Kyoto Traditional Architecture Association	Preliminary Study on Seismic Performance of Traditional Wooden Buildings in Higashi Hongan-ji Temple	I	2001	7,000
Yasuhiro Hayashi	Property and Casualty Insurance Rating Organization	Study on Method of Evaluation for Seismic Performance of houses	I	2002	9,000
Yasuhiro Hayashi	Kansai Research Foundation for technology promotion	Various Expression of Building Damage and Disincentive Factors of Restoration	PI	2002	2,700

Yasuhiro Hayashi	The Obayashi Foundation	Support to Promote Restoration by Utilizing Structure and Culture of Local Wood House after Earthquakes	PI	2002	1,500
Kojiro IRIKURA	Grant-in-Aid for JSPS fellows	Study on Development of highly reliable strong motion prediction	PI	2000	1,000
				12	800
Kojiro IRIKURA	Grant-in-Aid for JSPS fellows	Study on Non-linear soil response to strong ground motions	PI	2001	1,000
Masayoshi Nakashima	Kajima Research Foundation	Prediction of maximum deformations of base-isolated building structures subjected to near-fault ground motion	PI	1999-2001	4,000
Kazuo Okunishi	General hazard prevention	Landslides of steep slope damage to energy transportation line	PI	2002	2,500
Kazuo Okunishi	Grant-in-Aid for Scientific Research of strategic field in Asia	Environmental observation in Jinzhaigou valley of Sichuan ,China	PI	2002	1,980
Yoshinobu Kido	Nissan Science Foundation	Development of Forecasting Model and Collaborative Investigation for Water and Materials Cycle in Natural-Human Systems	SI	2002	1,000
				2003	1,000
				2004	1,000
Toshiharu Kojiri	Foundation of River & Watershed Environment Management	River basin assessment and comprehensive river basin management considering the effects of global warming	PI	2001	
Kunio Tomosugi	Foundation of River & Watershed Environment Management	River basin assessment and comprehensive river basin management considering the effects of global warming	SI	2001	200
Yasuhiro Takemon	Core Research for Environmental Science and Technology	Stable radio isotope structure as indices for sound and sustainable basin ecosystems	SI	2004-	
Takashi Maruyama	MISSING	Study on prediction method of expectation value for mean annual wind	PI	2001	500
				2002	500
Takashi Maruyama	Grant of Nomura Makukouzou Gijutsu Shinko foundation	Study on turbulence characteristics of natural wind for wind load on membrane construction	PI	2002	2,000
Kiyoshi ITO	Earthquake Res.Inst, Univ. Tokyo	Crustal structure and seismic activity in Southwest Japan	PI	2002	800
Kiyoshi ITO	National Inst. Polar Res.	Study on the crustal structure in the Lutow Holm Complex area by seismic exploration	PI	2000-2002	1,200
Kin'ya Nishigami	The Mitsubishi Foundation	Mapping of small-scale heterogeneous structure over Japan to detect characteristic structures in the earthquake source region	PI	2002	4,000
Daisuke Miki	Foundation of Prof. Tojiro Ishihara	Paleomagnetic approach to eruptive history of volcanoes in southern Kyushu (2002)	PI	2002	500,000
Kyoji Sassa	funded research	Development of techniques for ground disaster prevention (1999 – 2003)	PI	11	3,428
Kyoji Sassa	Research and Development Organization	Mechanism of earthquake-induced ground failure disaster occurrence	PI	8	3,000
Takao YAMASHITA	Public Research Funds(Heiwa Nakajima Foundation)	Beach Restoration in Japan's Coasts : Feasibility Study on Soft Beach Formation by Sand-Fill	PI	2001	1,860
Takao YAMASHITA	Public Research Funds(Kyoto Prefecture Japan Sea Academic Forum)	Japan-Korea Research Project on Beach Preservation Studies in Japan Sea	PI	2001	600

3.2 Joint Research

Since 1996 DPRI has been assigned as an collaboration research center and become open to all domestic researchers in universities and institutes. In order to promote collaboration DPRI invites joint researches with researchers outside of the DPRI. These joint researches include ‘joint research projects’ and ‘research meetings’. These joint researches may be proposed by researchers both inside and outside of the DPRI, and proposals are approved by the Collaboration Committee.

Joint research projects are classified into the following 3 types and carried out cooperatively by researchers inside and outside of the DPRI.

3.2.1 Joint Research projects (Special Subject)

DPRI takes initiative in planning the research and invites participation from other university and institute staffs all over Japan. The research period is 2 or 3 years.

Table 3.5 List of Joint research Project (Special Subject)

ID	Project	PI	Years
11P-1	Economic Evaluation of Disaster Mitigation: Issues and perspectives	Hirokazu Tatano	2000-2001
11P-2	Development of Urban Flood Model Due to Heavy Rainfall and its Application to Flood Control Planning	Kazuya Inoue	2000-2001
11P-3	Survey of the data of strong local winds in Japan	Hirohiko Ishikawa	2000-2001
12P-1	Simulation and Observation of Flow-structure and Material Transport in Flooding River Mouth	Hirotake, Imamoto	2001-2002
12P-2	Applications of remote sensing for hazard monitoring and analysis	Kaoru Takara	2001-2002
12P-3	Dynamical model of gravity flow and its application to prediction of severe storm and volcanic flow	Hiromasa Ueda	2001-2002
13p-1	Development of Digital Museum for Disaster Reduction	Haruo Hayashi	2002-2003
13p-2	Study on Strain Partitioning between the Nankai Trough and the Median Tectonic Line	Takao Tabei	2001-2003
14P-1	Strategies to comply with globalization and unification of seismic design codes and specifications	Masayoshi Nakashima	2003-2004
14P-2	Research on the assessment of flood risk in urban area	Tomotsuka Takayama	2003-2004

3.2.2 Joint Research Projects (General Subject)

DPRI invites the research project proposals from outside and/or inside of the DPRI. The researches should be performed in collaboration with DPRI staff(s). The research period is 1 or 2 years.

Table 3.6 List of Joint Research Project (General Subject)

ID	Project	Principal Investigator	Year
12G-1	Research of pressure sources under the volcano by dense geodetic network	Fumiaki Kimata (Nagoya Univ.)	2001
12G-2	Enhanced corporative observation and model development of interactions between natural variation and anthropogenic activities in the Yodo River basin	Michiharu Shiiba (Graduate School of Engineering, Kyoto University)	2001
12G-3	Studies on the behaviour of background atmospheric minor constituents in the urban area and its surroundings	Kaoru Fukuyama Pro.(Mie Univ.)	2001
12G-4	Seasonal Variations of Micrometeorology and Evapotranspiration Estimated by Remote Sensing and Other Methods in a Deciduous Broadleaf Forest	Nobuhiro Ebisu (Faculty of Agriculture, Ehime Univ.)	2001
12G-5	Tectonic stress and large inland earthquakes in the Hida Mountain region	Ichiro Kawasaki(Toyama Univ.)	2001
12G-6	Interpretation of seismic history around the inland earthquake source fault	Ryohei Nishida(Tottori Univ.)	2001
12G-7	Wind Wave Effect on Air-Sea Circulation Model	Takashi Yasuda (Gifu Univ.)	2001
12G-8	Study on Initiation and Runout Mechanism of Fluidized Landslides	Kyoji Sassa (DPRI)	2001
12G-9	Environmental study of hazard on mass transportation from mountain to coast	Kazuo Okunishi (DPRI)	2001
12G-10	Approaches to Environmental Problems of Groundwater due to Human Activities	Satoru Sugio (Dept. of Engineering, Miyazaki Univ.)	2001
12G-11	Monitoring the bulk density of the Sakurajima volcano with absolute and relative gravity measurements	Shuhei Okubo (Univ. Tokyo)	2001
12G-12	Investigation on the Availability of Stormwater and/or Wastewater Reuse in Urban Area for Usual and Emergency Supply Water	Yoshinobu Kido (DPRI, Kyoto Univ.)	2001
12G-13	Preliminary study for magma reservoir prospecting of Kikai-Caldera	Noboru Matsushima (G.S.J)	2001
12G-14	Landslide movement and deformation of the mass on the occasion of landreform	Masahiro Kaibori (Hiroshima Univ.)	2001
12G-15	High Quality Evaluation for Heat and Water Budget Observation	Ichiro Tamagawa (Gifu Univ.)	2001
12G-16	Relation of local atmospheric circulation with fog generation in the Miyoshi basin	Masaaki Tanaka(Assoc.Prof.)	2001
12G-17	A study for the Structure of a Typhoon in landing on Japan	Genichi Naitoh (Defence Academy)	2001
12G-18	A observational study for Behaviors and Features of Sea Breeze using doppler sodar	Tohru Iwata (Okayama Univ.)	2001
13G-01	Basic study on treated wastewater recycled to the river considering the firefighting water on average and in an emergency	Kenjiro Yasuno(Nippon Jogesuido Sekkei CO., LTD, Research Institute for Urban Environment)	2002-2003
13G-02	The Verification of the seismic area around the 2000 Tottori Seibu Earthquake	Ryohei Nishida (Tottori Univ.)	2002
13G-03	The electrical resistivity structure beneath the seismic zone and the seismic gap around the focal region of the Western Tottori Prefecture Earthquake and its tectonic interpretation.	Ichiro Shiozaki (Tottori Univ.)	2002
13G-04	Enhancement of seismic safety by linking wood houses	Hideki Idota, Nagoya Institute of Technology	2002
13G-05	Development of Diagnosis Methods of Urban Structures through Disaster Risk Control	Kohei Furukawa, Faculty of Engineering, Yamaguchi University	2002-2003
13G-06	Evaluation of ocean tide effects on gravity measurements in volcanic island and re-analysis of the collected data	Shuhei Okubo (Univ. Tokyo)	2002-2003
13G-07	Study on Seismic Behavior of Soil Retaining Structures and Evaluation of Their Aseismic Integrity	Junichi Koseki (Tokyo Univ.)	2002-2003
13G-08	Intensive hydrological cycle observation and model	Yasuto Tachikawa (DPRI)	2002-2003

	development of water and material movement for the Yasu River basin		
13G-10	River basin assessment for environmental change due to human activities	Akihiro Tokai (National Institute of Advanced Industrial Science and Technology, Research Center for Chemical Risk Management)	2002-2003
13G-11	A study on the envelope of statistical Green's functions based on seismic wave scattering theory	Hoshiba, M. (Japan Meteorological Agency)	2002-2003
13G-12	Study on the structural characteristics of Pleistocene clays and the long-term settlement of reclaimed lands along Osaka Bay	Mamoru Mimura (DPRI)	2002
13G-13	Experimental Study of Seasonal Variation of Sea Surface Fluxes	Osamu Tsukamoto (Okayama Univ.)	2002
13G-14	Development of Decision Support System for Disaster Responders	Kishie Shigekawa (Fuji Tokoha University)	2002
13G-15	Study on mechanism of motion and areal prediction on landslides in crushable soils	Fawu Wang (Kanazawa Univ.)	2002
13G-16	Risk analysis of road slopes	Takashi Okimura(Kobe University)	2002
13G-17	Prospecting a northern end of the Philippine Sea plate	Satoru Yamaguchi (Kobe Univ.)	2002
13G-18	Study on the Internal Structure in Typhoon	Taiichi Hayashi (DPRI)	2002
14G-01	Studies on the mechanism and countermeasure of natural disaster caused by mud volcano and mud diapir	Kazuhiro Tanaka (Yamaguchi univ.)	2003
14G-02	Database of volcanic earthquakes and tremors observed in Japan, and comparative studies on their generation	Takeshi Nishimura (Tohoku Univ.)	2003
14G-03	Study on the surface flux measurement considering heterogeneity over homogeneous land surface	Atsushi Higuchi (Hydrospheric Atmospheric Research Center, Nagoya Univ.)	2003
14G-04	Observational study on the air-sea surface interaction in high wave condition	Hirohiko Ishikawa	2003
14G-05	Dynamic Loading Test on Damage-Free Building Structures with High Viscous Metallic Dampers	Dr. Isao Kohzu,(Osaka University)	2003
14G-06	MISSING	MISSING	2003
14G-07	Inspection of creep activity around the Atotsugawa fault	Yoichi Fukuda (Kyoto Univ.)	2003
14G-08	Seismic Interactions between Reinforced Concrete Walls and Foundation Piles, and Their Failure Mechanisms	Hitoshi Tanaka (DPRI)	2003
14G-09	Prediction of earthquake-induced landslide in urban residential fill slope	Katsumi Kimura(Geological Survey of Japan)	2003
14G-10	Detection of slope movement by satellite synthetic aperture radars and examination of their precision	Hiroshi Fukuoka (DPRI)	2003
14G-11	Construction of basic framework of disaster anthropology to contribute to developing countries 2002	Nobuyuki Hata(Kyoto Tachibana women's University)	2003
14G-12	Subsurface structure of Kyoto Basin and evaluation of the potential for geo-disasters	Keiji Takemura (Institute for Geothermal Sciences, Graduate School of Science)	2003
14H-3	Optimal Timing of Investment for Infrastructural Management	Tomoyoshi Takagi	2003

3.2.3 Joint Research Projects (Exploratory Subject)

In order to stimulate and develop new ideas on disaster prevention study, these projects are carried out by small number of researchers inside and/or outside of the DPRI. The research period is one year.

Table 3.7 List of Joint research project (Exploratory Subject)

ID	Project	Principal Investigator	Year
13H-1	Comparative study of debris flow deposits on the earth and Mars	Hideaki Miyamoto (Tokyo University)	2002
13H-2	Research on the numerical method applicable to the high temperature air flow over urban fire	Yuji Ohya (Kyusyu Univ.)	2002
13H-3	Prospecting for concealed earthquake faults	Satoru Yamaguchi (Kobe Univ.)	2001
13H-4	Preliminary study on the effects of methane hydrate to atmospheric environment	Kaoru Fukuyama (Mie Univ.)	2002
13H-5	Basic research on social education for disaster mitigation and prevention	Motoyuki Ushiyama (Tohoku University)	2002
14H-1	Diurnal cycle of convective activity at Sulupon, Indonesia	Daigaku Yamanaka (Kobe Univ.)	2003
14H-2	Study on effects of underground structure including sea in ground motion simulation	Ken Hatayama (DPRI)	2003
14H-3	Missing	Missing	2003
14H-4	Research on fault healing process derived from seismic observations	Keiichi Tadokoro (Nagoya Univ.)	2003

3.3 DPRI Research Meeting

DPRI invites proposals for research meetings on special topics related to the disaster prevention. In these meetings, the results and perspectives of research investigations are discussed. The following 2 types of research meetings are held.

3.3.1 Research Meetings (Special Subject)

DPRI initiates the planning of the research meetings and invites participation from all over Japan. The topics of meetings are set for one year. The adopted subjects from 2000 to 2002 are listed in Table 3.3.1.

3.3.2 Research Meetings (General Subject)

DPRI invites proposals for research meetings on topics related to disaster prevention. The topics of meetings are set for one year. Researchers outside of DPRI substantially lead the planning and execute these meetings. The adopted subjects from 2000 to 2002 are listed in Table 3.3.2.

Table 3.3.1 DPRI Research Meeting (Special Subject)

No.	Title of Research Meeting, Place, Date	P.I. (Organization)	Budget	No. of participants
12S-1	Risk evaluation and management of seismic disaster in urban space Disaster Prevention research Institute, Kyoto University, Dec.15-16 2000	Yoshiyuki Suziki (DPRI)	¥970,000	36
12S-2	Research forum on fluvial and maritime disaster prevention for the 21st century -Lessons from recent disaster-, Dec.6, 2000	Hajime NAKAGAWA (DPRI)	¥970,000	75
12S-3	111-years memorial conference of Totsugawa disaster -For the prediction of landslide disaster sites-, Oct.19-21, 2000	Masahiro Chigira (DPRI)	¥780,000	38
13S-1	Correlation and triggering between earthquakes and volcanic eruption	Manabu HASHIMOTO (DPRI)	¥360,000	68
13S-2	Studies of Water Circulation System for Disaster Prevention and Mitigation in Urban Area: Disaster Prevention Research Institute, Kyoto University, Dec.8, 2001	Yoshimi Hagihara (DPRI)	¥1,070,000	36
14S-1	DPRI Research Workshop, Information Sharing and Communication for Safe and Secured Town Management by Citizen Participati, Oct.15, 2002,10,15-Feb.20, 2003	Norio Okada (DPRI)	¥910,000	25
14S-2	Natural and Cultural Heritage and Landslide Hazard Mitigation, Mar.15, 2003, Takahashi city cultural hall, Okayama prefecture	Kyoji Sassa (DPRI)	¥920,000	100

Table 3.3.2 Research Meeting (General Subject)

No.	Title of Research Meeting, Place, Date	P.I. (Organization)	Secretary in DPRI	Budget	No. of participants
12K-1	Disaster and the Countermeasures for Space Structures: Architectural Institute of Japan	Ohiko Yamada (Tohoku Univ.)	Shigehiro Morooka	¥960,000	65
12K-2	The workshop on volcanic gases, 2000	Jun-ichi Hirabayashi (Tokyo Inst. Tech.)	Kazuhiro Ishihara	¥880,000	46
12K-3	Volcanic structure in the shallow part and volcanic fluid, 2000	Tsuneomi Kagiya (Univ. Tokyo)	Masato Iguchi	¥960,000	45
12K-4	Studies on Electromagnetic Phenomena associated with Crustal Activities in the Izu Peninsula	Toru MOGI(Hokkaido University)	Naoto Oshiman	¥880,000	58
12K-5	Geomorphic Analysis of Sediment Movements & Methods of Prediction for Sediment Movement Phenomena Based on Geomorphology	Yoshiharu Ishikawa (Kyoto Prefecture Univ.)	Toyoaki SAWADA	¥720,000	20
12K-6	State of the Arts on Nonlinear Structural Identification and Structural Health Monitoring : DPRI, Kyoto Univ.	Tadanobu Sato (DPRI, Kyoto Univ.)	Tadanobu Sato	¥824,000	29
12K-7	Cultural Heritage and Landslides	Hirimitsu Yamagishi (Niigata Univ.)	Kyoji Sassa	¥800,000	20
12K-8	Techniques of precise earth monitoring and the study of the long period dynamics.	Yuichi IMANISHI (Tokyo University)	Tamotsu FURUZAWA	¥510,000	38
12K-9	Comparative Research on the Hydrological Elementary Process and Water Resources in Asia: Kyodai Kaikan: Nov.2, 2000	Taro Oka (DPRI, Kyoto Univ.)	-----	¥736,000	65
12K-10	Symposium on the Lake Biwa Project in 2000 - toward the 3rd stage -: DPRI: Jan.13, 2001	Eiichi Nakakita (Faculty of Engineering, Kyoto Univ.)	Kenji Tanaka	¥480,000	24
12K-11	Stress loading process in the seismogenic zone	Yasuhiro Umeda (D.P.R.I)	-----	¥660,000	57
13K-1	Symposium on Disasters of the 2000 Tottoriken-Seibu Earthquake; Hino Town, Tottori Prefecture, May. 26, 2001.	Ryouhei Nishida (Tottori Univ.)	Koji Matsunami	¥930,000	350
13K-2	Magmatic activity and Volcanic earthquakes and tremors, Oct.4-5, 2001	Takeshi Nishimura (Tohoku Univ.)	Masato Iguchi	¥1,085,000	48
13K-3	Symposium on the Lake Biwa Project in 2001:DPRI, Feb.27, 2002	Kenji Tanaka (DPRI)	-----	¥595,000	19

13K-4	Recent Achievements for Physics and Observations during the Pre-process of Earthquake Occurrence	Minoru KASAHARA (Hokkaido University)	Yasuhiro UMEDA	¥1,070,000	70
13K-5	Comparative study on the latest wind tunnel test. Dec.21, 2001	Takasi Nomura (College of Science and Technology, Nihon Univ.)	Kawai Hiromasa	¥1,030,000	67
13K-6	International workshop for comprehensive documentation of historical mountain disasters	Hiroshi SUWA (DPRI)	-----	¥1,010,000	21
13K-7	Physics of Arc and Backarc Associated with the Subduction of the Philippine Sea Plate.	Ichiro NAKANISHI (Kyoto University)	Shiro OHMI	¥960,000	96
13K-8	Observation of the Basin Dynamics in the Hirudani Creek, 2001	Hiroshi IKEDA(Tukuba Univ.)	Toyoaki SAWADA	¥800,000	24
13K-9	Effects of Regional Development in Asia on Hydrological Cycle: Kyodai Kaikan: Nov. 2, 2001	Taro Oka (DPRI)	-----	¥720,000	44
14K-1	International water resources dynamics -International water conflict and water trade: Kyodai Kaikan: Nov.15, 2002	Shuichi Ikebuchi (DPRI)	-----	¥700,000	60
14K-2	Symposium on Reconstruction of Town and Life from Earthquake Disasters in the Mountainous Depopulated Area; Hino Town, Tottori Prefecture, Oct. 5, 2002.	Akio Kitahara (Tottori Environment Univ.)	Koji Matsunami	¥730,000	300
14K-3	Studies on Formation, Development and Decay for the Heavy Fog over a Basin	Kenji Miyata (Hiroshima Prefectural Women's Univ.)	Taiichi Hayashi	¥840,000	19
14K-4	Comparative study on spatio-temporal variation in the interplate coupling	Toru MATSUZAWA (Tohoku Univ.)	Yasuhiro UMEDA, Naoto OSHIMAN	¥850,000	29
14K-5	Beginnings and Endings of Earthquakes	Bun-ichiro SHIBAZAKI (Building Research Institute)	James Jiro Mori	¥660,000	21
14K-6	Symposium of water pressure fluctuation and underwater ground: Seminar Room of Collaboration: Building of the Institute of Chemistry, Dec.20, 2001	Hiroyuki Nagou (Okayama Univ.)	Tomotsuka Takayama	¥730,000	100
14K-7	Recent results for the observation and modeling of crustal movement and geodynamics, and their challenging assignments in future.	Tadahiro SATO (National Astronomical Observatory)	Tamotsu FURUZAWA	¥700,000	28

14K-8	Electrical conductivity structure in and around seismogenic layers	Satoru YAMAGUCHI (Kobe Univ.)	Naoto Oshiman	¥470,000	50
14K-9	State of Arts on Mathematical Science on Disaster Mitigation : Musashi Institute of Technolgy, Oct 10-11, 2002	Tadanobu Sato (DPRI)		¥720,000	23
14K-10	Current Topics in Earthquake Source Process Studies	Mamoru KATO (Kyoto University)	James Jiro Mori, Kojiro IRIKURA	¥690,000	88
14K-11	Observation of Basin Dynamics in the Ashiaraidani Creek -Towards the Integrated Approach in Both River Engineering and Geomorphology-, 2002	Shuji MAITA (Tsukuba Univ.)	Toyoaki Sawada, Hajime Nakagawa, Yoshifumi Satobuka	¥560,000	22
14K-12	Flood Control and Habitat -How to Create Desirable Rivers-, Dec.11, 2002	Shiro AYA(Osaka Institute of Tech.)	Hajime NAKAGAWA	¥460,000	22

3.4 Activity of COE

3.4.1 COE before 2001

Missing

Table 3.4.1 COE Research activity by part-time researchers

Div. or Center in DPRI	Name of Researcher	Period	Subject
IMDR	Michinori HATAYAMA	2000-2001	Development of spatial temporal GIS basic component and its application for disaster management
EDP	Iori Kanao	2000	Lateral Buckling and Post-Buckling Behavior of Standard and RBS Steel Beams Subjected to Cyclic Loading
EDP	Qiang XIE	2001	Analytic Expressions on Reduction of Responses for a Cluster of Building Structures Connected with Loose Linking Elements
EDP	Di Yuan	2000-2001	Analysis of liquefaction based on finite deformation theory
GD	Kenichi Nishiyama	2000-2001	
GD	GongHui WANG	2000	Initiation process and long runout mechanism of fluidized landslides
GD	GongHui WANG	2001	Initiation process of heavy rain-induced fluidized landslides and new prevention work design against earthquake-induced landslides
GD	Tewodros Ayelee Taddese	2001	Ring shear tests and model experiments on fluidization mechanism of landslides
FMD	Daichi Nakayama	2000	
FMD	Akiyo Ishida	2000	
RCEP	Takashi Kasaya	2001	A Study on electrical resistivity structure around the northern Hyogo Prefecture
DRS	Yuka Karatani	2000	

Table 3.4.2 COE Research activity by invited foreign Researchers

Div. or Center in DPRI	Name of Researcher	Research Period	Subject
EDP	Beltzer Abraham(Cuba)	July 20, 2001 – Oct.19, 2001	Damping of wave propagation in random media based on causality theory
GD	Jan VLCKO (Slovakia)	Oct.1,2000 - Feb.28, 2001	Cultural heritages and landslide hazard assessment
GD	Jan VLCKO (Slovakia)	Nov.1,2001 - Mar.31,2002	Cultural heritages and landslide hazard assessment
AD	Horia Hangan(Canada)	Jan.29,2000 – Feb.5, 2000	
WRRC	Slobodan P. Simonovic(Canada)	Jun.1, 2001 – Sep.24, 2001	

3.4.2 The 21 Century DPRI-COE

Program “Natural Disaster Science and Disaster Reduction”

Program Leader:

Professor Yoshiaki Kawata, Dr.Eng.

Steering Committee Chair:

Professor Syuichi Ikebuchi, Dr. Eng.

Three Activities of DPRI-COE Program

Making significant contribution for natural disaster reduction as the basis for the safe and secure society with sustainable economic development is the aim of Disaster Prevention Research Institute (DPRI, for short) as the World Center of Excellence. DPRI will carry out the following three kinds of activities in this program. First, we will promote of interdisciplinary research activities to properly include social needs. We have selected the following three research themes for the first three projects: 1) Research for Integrated Urban and Regional Diagnosis: Vulnerability Assessments, Technologies, and Strategies for Rehabilitating the Urban Environment, 2) New Technological development for disaster information and risk management, and 3) Hydro-meteorological Dynamic Systems including water, sediment and pollutant and multi-dimensional hazard map toward watershed management. Second, we will offer opportunities and training to young researchers of the next generation as COE researchers through cooperative research with DPRI faculty in the fields of natural science, engineering, as well as social and informatics sciences. We offered 25 post-doctoral fellowships, and 9 travel grants for short-term international exchange for promoting cooperative research work. Thirdly, we started DPRI lecture series both in Kyoto and Tokyo to provide a series of 1,000 lectures on natural disaster reduction for the public for the next five years. All lectures have been videotaped and archived for the future presentation on the internet,

Research Themes for Research Project

Research Project 1

“Research for Integrated Urban and Regional Diagnosis: Vulnerability Assessments, Technologies, and Strategies for Rehabilitating the Urban Environment”

Project Leader: Professor Norio OKADA, Integrated

Management for Disaster Risk

Successful disaster risk management in cities and regions requires scientific tools and models to diagnose the vulnerability of urban area. In particular, this requires examining urban and regional sustainability, particularly in terms of safety and security (environmental conditions, quality of life, resource allocation, etc) and performance criteria for critical social infrastructure (such as road networks, civil engineering facilities, and lifelines).

Our research objective is to propose and develop strategies for the effective implementation of these disaster performance criteria in an integrated, multidisciplinary context. Specifically, our interdisciplinary research involves the following contributions:

- 1) Development of fragility curves and risk curves for lifelines, roads, and other infrastructure as well as buildings and houses.
- 2) Implementation of technologies and strategies for the rehabilitation of social facilities in order to improve their maintenance and effectiveness.
- 3) Monitoring and diagnosis of facility performance from a social and engineering perspective.
- 4) Life-cycle assessment and management to improve the effectiveness and efficiency of social systems and critical infrastructure.
- 5) Development of social risk-finance schemes which enable citizens to partake in various disaster insurance arrangements.
- 6) Establishment of an “information technology society” in which useful information relating to security and safety is synthesized and released to the public in a timely way.

Research Project 2

“New Technological development for disaster information and risk management”

Project Leader: Professor Haruo HAYASHI, Research Center for Disaster Reduction Systems

This research project focuses on how to promote a good understanding about hazards, resulting damage, and their social consequences as the basis for effective mitigation and preparedness. In order to improve quality of disaster risk management, it is crucial to examine the contents of information to be processed as well as its system for collection, production, transmission, and communication. This multi-disciplinary research project intends to achieve the following four goals: 1) examine and identify

processes of disaster information generation and information transmission based on communication theory whose basic components are Source, Encoding, Media, Decoding, Target, Language System, and Schema. 2) use whether a particular information can reach to the intended target as a criteria for evaluating the success of communication. 3) locate individual research topics within this a holistic framework for as a step to provide further collaboration and 4) develop Cross-Media Database Management System (XMDB) as the research support information infra-structure for the future of DPRI.

Research Project 3

“Atmosphere-Hydrosphere Modeling for Water/Mass Movement in River Basins and Community-based Hazard Mapping.”

Project Leader: Professor Kaoru TAKARA, Fluvial and Marine Disasters

This inter-disciplinary research includes the following three objectives;

1) To integrate advanced atmospheric and hydrospheric modeling techniques for better disaster prevention use, DPRI has many advanced meteorological, hydrological and hydrodynamics models. All the models and coupling of them should aim at extreme storm events, high tidal waves, floods, debris flows, landslides and droughts in an integrated manner to cope with disasters effectively.

2) To improve the accuracy of forecasting/mapping water and mass movements, prediction accuracy depends on various conditions such as model accuracy itself, spatial-temporal resolution, initial and boundary conditions, spatial information available and the accuracy of measurements/observations. Inter-relationships among these various conditions and prediction accuracy would be clarified with intensive simulation case studies in related fields. Mapping accuracy and preferred map contents are discussed based on prediction accuracy.

3) To establish a framework for site-specific hazard mapping by the community-based approach through some case studies, DPRI has been conducting hazard map research with sophisticated numerical models using GIS and physical experiments such as in Ujigawa Open laboratories. Progress of hazard mapping technologies still needs further elaboration to make hazard maps more efficient/useful for the general public. Case studies are expected: community-based, stakeholder-oriented, site-specific research in conjunction with residents and municipalities, guided by proper scientific knowledge.

COE Researchers through cooperative research works with DPRI faculty

Management Leader: Professor Masayoshi

NAKASHIMA, Earthquake Disaster Prevention

Praween CHUSILP: Experimental Project of Full-Scale Earthquake Resistant Steel Frames

Daisuke FUKUSHIMA: Practical Study about the Education of Volcanology and Disaster at Sakurajima Volcano

Gen FURUYA: Detecting of Veins of Groundwater Related to Fluidized Slope Failure in Mountainous Crystalline Schist Area

Tamiyo KONDO: Towards Establishing Empowerment Approach for Developing Countries in Disaster Management and preparing Disaster Reduction Plan-A case study of EqTAP –

Masatoshi MIYAZAWA Seismic Monitoring of Activity around Subduction Boundaries and Active Faults

Takeshi NAGAE: A New CAT Bond for Improving Preventive Maintenance and Privatization of Road-Related Public Corporations

Go URAKAWA: Development of Cross-Media Database Management System

Hiroyuki YAMADA: Introduction of Research Proposal and Conventional Studies

Nobuyuki YAMADA: study on strong ground motion prediction for estimation of earthquake vulnerability in urban area

Hidemaru SHIMIZU: Improvement technology of seismic performance of conventional wooden houses

Yuki AKIZUKI: isibility of text information function as urban disaster prevention

Yuan DI: Numerical Method for large deformation analysis of saturated soils

Tatsuya NOGUCHI: Study of the preparation and distribution of effective earthquake information to contribute the disaster prevention program of the municipality

Takehiko MORI: Development of the compact devices that measure the volcanic gas flux and evaluation of the volcanic activity on the basins of the continuous observation of volcanic gas flux

Bandara NAWARATHNA: Application of weather Radar in flood prediction using physics based distributed hydrologic model

Masato NIKI: Coastal Environment system and its numerical simulation

Daizo TSUTSUMI: Model of lateral preferential flow in Hillslope soil-Application for slope stability-
Xingkyu XU: Deriving land surface parameters from satellite data and apply in the climate models
Kenji HARADA: Study on the effect of tsunami reduction by coastal forest
Hideo SHIOGAMA: Dependence of life cycle of the Arctic Oscillation (AO) on the El Nino /La Nina phase
Dawe LIU: Full-scale test on three-story steel moment frame for assessment of seismic performance in very large deformation range
Tomohiro KUGAI: Development of cross media database for disaster research
Jens HARTMANN: Assessing the composited risk of river contamination perspectives, problems, methodology
Paul YOSHITOMI: Cross Media Database (XMDB) for a Disaster Research Information Infrastructure

**DPRI Lecture Series in Kyoto and Tokyo
(Satellite in Kyoto and Tokyo)**

Management Leader: Professor Manabu

HASHIMOTO, Research Center for Earthquake Prediction

In order to improve accountability of research works and to enlarge educational opportunities, we opened satellite offices near the Kyoto and Tokyo stations and started a lecture series on almost all disciplines in the field of science and technology related to disaster mitigation. One and half hour-long classes are held in the evening on four days in a week in Kyoto, and once per two weeks in Tokyo. All the classes are recorded with VTR's and will be put on our website in the future. Programs and lecturers are announced on our website (<http://www.21coe.dpri.kyoto-u.ac.jp>). Applicants must apply for their desired classes on this website. Therefore applicants should be familiar with the Internet.

By the end of November, 151 classes were held in Kyoto and an average of 10 participants attended. We held 16 classes in Tokyo as of October, 2003. There were more than 35 attendants in each class. Participants included high school teachers, undergraduate and graduate students, journalists, national and local government officials, employees from utility companies, etc.

3.5 International Cooperative Researches and Programs

3.5.1 A Summary of International Collaboration Research Programs

We were conducting international collaborative research supported by the Grants-in-Aid for Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology. Our proposal of the research project on "International Cooperative Study on Forecast and Mitigation of Natural Disasters in China and Indonesia" was adopted as a specially promoted five-year program of the Ministry of Education, Culture, Sports, Science and Technology in 1994. Through this research program, we conducted following individual research projects for forecast of hazards and mitigation plan against natural hazards.

- (I-1) Volcanoes and Tectonics in Indonesia
- (I-2) Floods and Hazards along seacoast in Indonesia
- (C-1) Earthquake Disasters in China
- (C-2) Landslide Disasters in China
- (C-3) Disaster of Debris flow in China

We also been involved international collaborative research programs,

- a) Japan-US Cooperative Research for Urban Earthquake Disaster Mitigation (UEMD),
- b) GEWEX Asian Monsoon Experiment (GAME)
- c) International Hydrological Programme (IHP)
- d) UNSECO-IUGS (International Union of Geological Sciences) International Geological Correlation Programme "Cultural Heritage and Landslide Hazard Assessment" (IGCP-425).

Details on the programs, UEMD, GAME, IHP and IGCP-425, are described in the following subsections.

Other research activities as international collaboration studies are summarized in this subsection. All titles of the research projects are listed in Table 3.5.1.

3.5.2 UEDM

(Japan-US Cooperative Research for Urban Earthquake Disaster Mitigation)

Program PI : Hiroyuki Kameda, Kyoto University
Coordination Committee Chair: Shunsuke Otani, University of Tokyo
Secretary General: Tadanobu Sato, Kyoto University

The five-year bilateral research program with the above title began in 1998. This program provided the Japanese academic community with an opportunity focusing on comprehensive urban earthquake disaster under a framework of Japan-US collaboration. The Japan side funding is provided by Grant in Aid for Scientific Research sponsored by Monbu-Kagaku Sho (Japanese Ministry of Education, Science and Technology, MEXT), and the US side funding by the National Science Foundation (NSF). The Japan side program was planned to have a one-year preparatory phase in 1998 fiscal year followed by a five-year full budget phase for 1999-2003: three-year Phase I plus two-year Phase II provided extension was judged feasible by a peer review committee organized by the Monbu-Kagaku Sho. The Japan side of the program is operated under ten designated projects that are categorized in five multi-disciplinary sections encompassing a holistic framework of urban earthquake disaster mitigation. In contrast, the US side of the program operated under NSF is a more dynamic process based on proposal-reviews and awards. The Japan side of the program encompasses structural and geotechnical engineering, systems and lifeline engineering, and social sciences. It includes issues of disasters as physical events as well as social events. In order to facilitate activities of individual projects as well as promote development of integrated output from the entire program, an Executive Committee plays an important role for project management with US counterparts. Principal investigators of each project are: Project-1: Tomotaka Iwata (Kyoto Univ.), Project-2: Masanori Hamada (Waseda Univ.), Project -3: Toshimi Kabeyazawa (Univ. of Tokyo), Project-4: Kazuo Inoue (Kyoto Univ.), Project-5: Kazuhiko Kawashima (Tokyo Inst. Of Technology), Project-6: Yoshiyuki Suzuki (Kyoto Univ.), Project-7: Norio Okada (Kyoto Univ.), Project-8: Takashi Okimura (Kobe Univ.), Project-9: Yoshiyuki Kawata (Kyoto Univ.) Project-10 Kimiro Megro (Univ. of Tokyo).

3.5.3 GAME

(GEWEX Asian Monsoon Experiment)

Program PI :

Shuichi IKEBUCHI (WRRC, DPRI)

Hirohiko ISHIKAWA (AD, DPRI)

(a) Objective of GAME

More than 60% of the earth's population live under the influence of Asian monsoon climate. Seasonal forecasting of monsoon rainfall and the control of water resources have been a matter of great concern for the people and governments in this region. As a part of the Global Energy and Water cycle Experiment (GEWEX), the GEWEX Asian Monsoon Experiment (GAME) is being implemented to understand the role of the Asian monsoon in the global energy and water cycle and to improve the simulation and seasonal prediction of Asian monsoon patterns and regional water resources.

(b) GAME-HUBEX

The energy and water cycle in the subtropical and temperate monsoon regions of East Asia is characterized largely by the Baiu front in summer. Various scales of cloud/precipitation systems associated with the complex processes between air and land-surface are formed in this frontal zone and play a major role in this region. Land-Atmosphere interaction and its role in the formation of meso-scale precipitation systems are one of the most important research targets of GAME-HUBEX Projects. This kind of research becomes possible due to the existence of high accuracy datasets for the meteorological and hydrological elements in the Huaihe river basin and its surrounding area.

A dataset that is homogeneous in time and space was created by using meteorological, hydrological, and satellite data obtained during HUBEX-IFO (1998/5/1-8/31). This dataset was produced to be used as forcing data for Land Data Assimilation (LDAS) by land surface scheme (SiBUC) and to be utilized to validate regional 4DDA by JSM-SiBUC.

Through the detailed analysis of the time series of NDVI data of NOAA-AVHRR, the cropland in the Huaihe River Basin was separated into paddy field and farmland. Furthermore, based on the agricultural report, all cropped fields are categorized into four major classes (annual paddy, semiannual paddy, wheat + soybean, wheat + maize). The paddy field scheme, which has been developed in the Lake Biwa Project Japan, is applied to the Huaihe River Basin to enable the irrigation/drainage.

According to the water requirement data in the literature, appropriate water levels and soil moisture conditions are defined depending on growing stage.

As a result of this off-line simulation, the distribution of the number of occurrences of irrigation in the land surface scheme agrees well with those described in the literature. As for the water budget in the upstream of Bengbu (121330km²), simulated total runoff (surface runoff + baseflow) is almost the same as observed discharge.

On the other hand, in order to improve the description of the land surface hydrological processes, SiBUC is coupled into JSM (Japan Spectral Model) developed in JMA (Japan Meteorological Agency). Many numerical experiments for several precipitation events during HUBEX-IOP have been conducted. The model is initialized and externally forced by GAME-Reanalysis data or GANAL data. The simulation results are evaluated with surface data and satellite data, and some problems in the simulated field are discussed. Also, JSM-SiBUC is utilized for various research such as the impact of evapotranspiration from paddy fields and land cover changes due to the activity of Baiu Front.

(c) GAME-Tibet

Tibetan Plateau plays an important role in the Asian Monsoon circulation and the resultant energy water cycle in Asia. The division of atmospheric disaster took part in the field observation of land surface- air interaction over the Tibetan Plateau. Several automatic weather stations were set up in the plateau, and the continuous monitoring of radiation, soil heat flux, sensible heat flux, latent heat flux and other meteorological and hydrological parameters were conducted. It was the first experiment over the Tibetan plateau where the fluxes are measured using the direct eddy correlation technique. All data were recorded and opened in the GAME database.

Observations were continued with a post GAME project, Camp-Tibet, and the data are compiled from 1998 to 2003. Using these data, the features of interaction between land surface and atmosphere such as daily, seasonal, inter-seasonal and inter-annual variations are analyzed.

The regional features of land surface characteristics are also analyzed using GMS-5 satellite observations with the aid of field observations. The long-term trends of land surface temperatures and cloud activities are being studied with these satellite and field data.

3.5.4 IHP

The Programme started as the International Hydrological Decade (IHD, 1965-1974) and was followed by the International Hydrological Programme (IHP) in 1975. Since its inception, much progress has been achieved regarding methodologies for hydrological studies and training and education in the water sciences. Although the general objectives remain valid, greater emphasis is being put on the role of water resources management for sustainable development and the adaptation of the hydrological sciences to cope with the expected changing climate and environmental conditions. Another important objective is to integrate the developing countries into the worldwide ventures of research and training.

The principal modes of execution of IHP, which is a long-term programme executed in phases of a 6-year duration, have been working groups, symposia, workshops, publications and extra-budgetary projects, the latter especially through the UNESCO Regional Offices where regional hydrologists are located.

The Disaster Prevention Research Institute (DPRI) contributed to the Programme since the IHD period, setting up experimental basins such as the Daido River and the Arakawa River basins in Shiga Prefecture. Currently, Prof. Shuichi Ikebuchi (Water Resources Research Center) and Prof. Kaoru Takara (Division of Fluvial and Marine Disasters) are members of National Committee for UNESCO-IHP. Prof. Toshiharu Kojiri (Water Resources Research Center) and Associate Prof. Yasuto Tachikawa (Division of Fluvial and Marine Disasters) are also participating in the IHP activities. They contributed to editing of the Catalogue of Rivers in Southeast Asia and the Pacific and hydrological database and modeling studies in the framework of the FRIEND (Flow Regimes from International Experimental and Network Data) project; results are summarized in the Asian Pacific FRIEND Report for Phase 1 (1997-2001), IHP Technical Document No. 9, 2002, UNESCO Jakarta Office, under the framework of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific. Since 1999, Prof. Takara is actively working as the Secretary of the RSC.

The current phase of IHP, IHP-VI, covering the period 2002-2007, is devoted to "Water Interactions: Systems at Risk and Social Challenges". Asian Pacific FRIEND and HELP (Hydrology for Environment, Life and Policy) are main themes as well as other RSC activities.

3.5.5 IGCP-425

UNESCO-IUGS (International Union of Geological Sciences) International Geological Correlation Programme "Cultural Heritage and Landslide Hazard Assessment"

Leader : Kyoji Sassa (Director/Professor of Research Centre on Landslides)

(a) History of this joint research

IGCP (International Geological Correlation Programme) is one of UNESCO and IUGS (International Union of Geological Sciences) joint projects. DPRI is engaged in "Assessment of landslide hazard in Yang-Gui-Fe's Hua-Qin Palace, Xian city China since 1991 as a part of IDNDR Special Project of Ministry of Education, Science, Sports, and Culture (Now it is reorganized into MEXT). Together with this project, the International Symposium on Landslide Hazard Assessment was organized in Xian city in 1997. This project demonstrated that practical assessment and disaster mitigation measures are possible in order to protect cultural heritages at landslide risk. Participants agreed to promote this achievement all over the world and released the "1997 Xian Appeal for Protection of the Cultural Heritage (Huaqing Palace) in Xian and Promotion of Worldwide Landslide Hazard Assessment and Risk Mitigation." Based on these activities, application of new project of IGCP was approved as IGCP-425 for 1998 - 2002 (5 years) in the 1998 Scientific Committee. The formal and full title of IGCP-425 is "Landslide Hazard Assessment and Mitigation for Cultural Heritage Sites and Other Locations of High Societal Value."

(b) Research Purpose

(1) The 20th century marked the century of economic expansion and development, and little attention was paid for protection natural environments and cultural heritages of non-economic values. Nowadays, world-leading developed countries are confronting the problem of protecting cultural heritages for future generations which have been handed down over many generations. These cultural heritages are irreplaceable and once destroyed, absolutely impossible to reconstruct at any cost. The damage means not only a loss for nations and local people, but also a loss of spiritual property for all mankind.

Many cultural heritages are at risk of catastrophic destruction not only by weathering, erosion, man-made-damage, but also by landslides, including shallow slope failures, debris flows, rock slope failure,

ground liquefaction, lateral spread. Japan 2nd plan of economies of the world with more than 100 million people living on steep slopes suffering from frequent intense rainstorms and earthquakes. Japanese landslide researchers have promoted the most advanced studies in the world and their international contribution is highly desirable.

(3) IGCP-425 project is based on the achievements of the "C-2 : Landslide hazard assessment of the Huaqin Palace" of the "IDNDR Special Project : Study on the assessment of natural disasters and their mitigation" which was organized by DPRI with cooperation from other universities, national research institutes, consulting companies, and was conducted from 1994 to 1998. Based on the experiences obtained in this international joint research and its international network established by its overseas evaluation, Sassa proposed the IGCP-425 project. "Research on landslide assessment and their mitigation in cultural heritage sites" is the initiative project in disaster prevention research in the 21st century, and is very important for the international contribution of Japanese government, especially of MEXT and universities. This entire research project is managed as a unit. Four major research topics include.

(i) Study on extracting slope at landslide risk and interpretation method of precursor events

(ii) Development of high-precision and high-durability slope monitoring system to decide the magnitude and risk of landslides.

(iii) Study on reliable landslide occurrence and movement assessment and risk evaluation methodology based on experiments and measurement.

(iv) Development of economic and practical slope conservation technique and disaster prevention measures.

(c) Approach

Each sub-project group of IGCP-425 conducts its own research by their own budgets, and leaders of sub-projects meet every year. Past IGCP-425 meetings were organized in; Vancouver, Canada from 22 - 24 September 1998, Tokyo, Japan from 30 November - 1 December 1998, UNESCO Headquarters, from 20 - 24 September 1999, Rio de Janeiro from 8 - 9 August 2000, and "International Symposium on Tokyo from 15 - 19 January 2001, Kyoto from 21 - 24 January 2002, and the final symposium will be held from 21 - 22 January 2004 jointly with International Consortium on Landslides (ICL) International Programme on Landslides (IPL) C-101 and M101 groups and RCL/DPRI. The number of IGCP-425

sub-groups increased year-by-year and finally it consists of following 31 sub-groups.

List of IGCP-425 Sub-projects:

1)Research on the Slope Stability of the Block II of the Lishan Landslide, Lintong County, Xian, China

QingJin YANG and Baoer SONG

(Lishan Landslide Prevention and Management Office, China)

2)The Archaeological Site of Delphi, Greece

-A Site Vulnerable to Earthquakes and Landslides-
Paul MARINOS

(National University of Athens, Greece)

3)Slope Stability Conditions of the Rockmass at the Foundation Areas of the Monasteries of Mount Athos, in N. Greece

Basile CHRISTARAS

(Aristotle University of Thessaloniki, Greece)

4)Conservation from Rockfall of the Engraved Wall in the Fugoppe Cave, Hokkaido, Japan

Hiromitsu YAMAGISHI

(Geological Survey of Hokkaido, Japan)

Tadashi YASUDA

(Public Consultant Co., Ltd., Japan)

Hideji KOBAYASHI

(Shin Engineering Co., Ltd.,Japan)

5)Slope Deformation and Other Geohazards Endangering the Stability of Historic Sites in the Western Carpathians

Jan VLCKO

(Comenius University, Slovakia)

6)Landslide Hazard and Risk Assessment in Archaeological Sites

Paolo CANUTI

(University of Firenze, Italy)

7)The evaluation of the risk of deep-seated mass movements to the cultural heritage sites of Hallstatt-Dachstein/Upper Austria

Michael MOSER(University of Erlangen)

Kurt A. CZURDA

(Karlsruhe University,Germany)

8)Geotechnical Landslide Risk Analysis around and inside some Egyptian Historical Monuments

M. Yasser EL-SHAYEB & M. Thierry VERDEL

(Laboratoire Environnement, Geomechanique, et

Ouvrages (LAEGO), France)

9)Landslide Hazard Assessment for the Places of Historical Heritage in the north-eastern Azov Sea coastal region (Taganrog city and the area of ancient Greek town of Tanais, Rostov district, Russia)

Eugene A. VOZNESENSKY

- (Moscow State University, Russia)
Oleg V. ZERKAL
(Federal Center for Geocological Systems, Russia)
- 10) Assessment and Mitigation of the Landslide Hazard to Cultural and Historical Monuments in the Central Russia (the Golden Ring of Russia)**
Victor I. OSIPOV
(Institute of Environmental Geoscience, Russia)
- 11) The Present and Past Geomorphologic Hazards in The Archeological Sites of Sicily and Calabria (South Italy)**
G. Marino (SORRISO-VALVO, IRPI, Italy)
- 12) Development of Quantitative Prediction Models for Landslide Hazard**
Chang-Jo F. CHUNG
(Geological Survey of Canada, Canada)
- 13) Rice-Paddy Terrace and Landslides**
Toshitaka KAMAI (Kyoto University, Japan)
Haruo SHUZUI (Nippon Koei Co. Ltd., Japan)
- 14) Quantitative Analysis of Natural Landslide Hazards Affecting the Rocky Mountain Parks of Canada**
Oldrich HUNGR
(University of British Columbia, Canada)
Stephen G. EVANS
(Geological Survey of Canada, Canada)
- 15) Protection of Inca Cultural Heritage on Landslide Zones at Cusco, Peru**
Raul CARRENO (PROEPTI-EPFL, Peru)
- 16) Landslide Risk Evaluation for the Protection of Cultural Heritage: Case of Old Quebec, Canada**
Jacques LOCAT
(Laval University, Canada)
- 17) Prediction of Rapid Landslide Motion for Lishan, China, Unzen, Japan**
Kyoji SASSA
(Kyoto University, Kyoto, Japan)
- 18) Seismogenic Landslides and Rockfalls in the Vicinity of the Horesman of Madara (NE Bulgaria)**
Margarita MATOVA & Gueorgui FRANGOV
(Geological Institute, Sofia, Bulgaria)
- 19) Monitoring of a Large-Scale Landslide Threatening the Zentoku Historical Settlement in the Iya-Valley, Tokushima, Japan.**
Hiroshi FUKUOKA, Kyoji SASSA
(Kyoto University, Kyoto, Japan)
- 20) Development of a Spatial Database System for Landslide Information Management and Analysis**
Venkatesh RAGHAVAN, Shinji MASUMOTO
Kiyoji SHINO (Osaka City University, Japan)
Takashi FUJITA
(Osaka Institute of Technology, Japan)
- 21) Landslide Hazard and Mitigation Measures in the Area of Medieval Citadel of Sighisoara.**
Christian MARUNTEANU,
(University of Bucharest, Romania)
Mihail COMAN, (ISPIF, Romania)
- 22) Disaster of Rock Avalanches and Landslides in Tianchi Lake Tourist Area of Changbai Mountain (Volcano), Northeast China.**
Binglan CAO (Jiling University, China)
- 23) Guidelines for the Safeguard of Cultural Heritage against Natural Risk**
Claudio MARGOTTINI
(ENEA (Italian Agency for New Technology, Energy and Environment), Italy)
- 24) Rock Slope Monitoring for Environment-Friendly Management of Rock Fall Danger.**
Jiri ZVELEBIL
(Institute of Rock Structure and Mechanics, Academy of Sciences, Czech Republic)
H. D. PARK
(Seoul National University, Korea)
- 25) Slope Stability in a Context of Progressive Environmental Change**
Edward DERBYSHIRE (University of London (UK))
Tom DIJKSTRA and Rens van BEEK
(Coventry University (UK))
- 26) An Integrated Approach to Sustainable Management of Landslides Along the Black Sea Coast**
Mihail POPESCU
(Illinois Institute of Technology, USA/
Univ. of Civil Eng., Romania)
- 27) Protection of Cultural Heritage Sites from Landslide in the Hindu Kushi- Himalayan Region**
Li TIANCHI
(International Centre for Integrated Mountain Development, Nepal)
- 28) Assessment of Mass Movement Hazard to the Natural Heritage Sites of Akha Area, Northern Tehran, Iran**
Zieaoddin SHOAEI
(Soil and Water Conservation Center, IRAN)
- 29) Monitoring Unstable Cultural Heritage Sites with Radar Interferometry**
Paolo CANUTI and Carlo ATZENI
(University of Firenze, Italy)
Dario TARCHI, (Institute for Systems, Informatics and Safety, Italy)
- 30) Landslide Hazard and Mitigation Measures in the South Gippsland Highlands, Victoria, Australia**
John BRUMLEY

(RMIT University, Australia)

31) Landslide Hazard Mapping along the Prithvi Highway to Protect Seven World Heritage Sites in Kathmandu Valley, Nepal

Tiwari BINOD

(Disaster Prevention Technical Centre, Nepal)

Hideaki MARUI (Niigata University, Japan)

Note: Sub-Projects No.1-16 were approved in Tokyo Symposium in December 1998. Sub-Projects No.17-24 were approved in UNESCO meeting in September 1999. Sub-Projects No.25-31 were approved in Tokyo Symposium in January 2001.

(31 sub-projects, participants from 21 countries)

(d) Achievements

One of major achievements of the international joint research is the Memorandum of Understanding concerning cooperation in research for landslide risk mitigation and protection of the cultural and natural heritage as a key contribution to environmental protection and sustainable development in the first quarter of the twenty-first century between UNESCO and the DPRI which was exchanged in December 1999 (UNESCO/DPRI MoU). Along with this MoU, the UNESCO/IGCP Symposium on Landslide Risk Mitigation and Protection of Cultural and Natural Heritage was organized in the Science Council of Japan on 15-19 January 2001, Tokyo, Japan. During this symposium, Director of Earth Science of UNESCO, Chief for Asia/Pacific & Europe Division of Cultural Heritage Division of UNESCO, President of IUGS, President of IAEG, President of ISSMGE, Minister of Cultural Agency (INC) of Peruvian Government, et al. joined and agreed to create 2001 Tokyo Appeal for establishing a new framework "International Consortium on Landslides" (ICL) for further development of the IGCP-425 achievement. Core bodies of ICL were planned to be based on UNESCO, IUGS and other landslide related organizations, and major administration work of ICL was to be managed in RCL/DPRI. Landslides have been studied in specific academic fields, such as geomorphology, geology, geophysics, civil engineering, mining engineering, soil mechanics, agriculture, forestry, however, there was no such organization treating landslides generally in the past. This ICL intends to promote international joint research on landslide assessment and mitigation. It recognizes that disasters will occur world-wide and be more serious as a progress of urbanization and mountain area development. These

aims match the purpose of DPRI's mission.

(2) It has been gradually and widely recognized that assessment of large-scale landslides affecting cultural heritages based on precise ground monitoring and soil tests by landslide geotechnical simulators is now possible. Especially, the landslide risk assessment project of the World Heritage Inca's "Machu Picchu" was approved as the first important study project.

(3) Major achievements of the FY 2000 and 2001 are summarized in the following two symposia organized by the IGCP-425 group.

Sassa, K. (ed.): Proceedings of the International Symposium "Landslide Risk Mitigation and Protection of Cultural and Natural Heritage," Tokyo, ISBN 4-9900618-3-7 C3051, 268 pages. 2001.

Sassa, K. (ed.): Proceedings of the International Symposium "Landslide Risk Mitigation and Protection of Cultural and Natural Heritage," Kyoto, ISBN 4-9900618-3-7 C3051, 750 pages. 2002.

3.5.6 UNESCO-Kyoto University-ICL UNITWIN Cooperation Programme

(a) Background

Landslides often cause catastrophic disasters destroying houses in urban and urbanizing areas. They bring economic losses by destroying not only infrastructure such as roads, railways, bridges, dams, and ports, but also cultural and natural heritages and other properties which are precious for mankind. Since landslide risk mitigation and protection of cultural and natural heritages are very important now at the beginning of 21st century, the International Consortium on Landslides "ICL" was established as a common international platform. ICL was established during the International Symposium "Landslide Risk Mitigation and Protection of Cultural and Natural Heritage" in Kyoto, jointly organized by UNESCO and Kyoto University. On this occasion, the significance of establishing a new Research Centre on Landslides as a core of landslide research was discussed. This idea was introduced in order to promote an international network under the initiative of the center. The 1st Board of Representative Meeting of ICL (1st BOR/ICL) was held in the UNESCO Headquarters in Paris in November 2002. Up to December 2003, 46 research organizations from 15 countries registered as ICL

members, and UNESCO, the World Meteorological Organization (WMO), the Food and Agriculture Organization of the United Nations (FAO), International Strategy for Disaster Reduction (UN/ISDR) Secretariat, the Japan Ministry of Education, Culture, Sports, Science and Technology (MEXT), U.S. Geological Survey, etc. have become the Supporting Organizations. Since ICL joined the International Union of Geological Sciences (IUGS) as an Affiliated Organization in February 2003, IUGS joined ICL as a Supporting Organization from NGO. UNESCO, Kyoto University, and ICL discussed about the application for an UNITWIN (university twinning and networking) joint programme.

(b) UNITWIN Programme with UNESCO and ICL

UNESCO represented by its Director-General, Mr Koichiro Matsuura, Kyoto University represented by its President, Makoto Nagao, and the International Consortium on Landslides represented by its President Kyoji Sassa, exchanged the agreement concerning the establishment of a UNITWIN Cooperation Programme on Landslide Risk Mitigation for Society and the Environment in the framework of the UNITWIN/UNESCO Chairs Programme, at Kyoto University President Room on 18 March 2003. In this signing ceremony, two members from UNESCO, two from Ministry of Education, Culture, Sports, Science and Technology, three vice presidents of ICL joined and exchanged opinions. Details of this programme are accessible at <http://landslide.dpri.kyoto-u.ac.jp/unitwin.htm>. The principal objectives of the Cooperation Programme are to ;

- (1) promote an integrated system of research, training, information and documentation activities in the field of Landslides for the benefit of society and the environment and as a key contribution to sustainable development and the protection of the environment on a global scale;
- (2) provide advice and expertise to all countries, particularly the least developed, with a view to:

- (i) establishing landslide research and education for landslide risk mitigation;
- (ii) facilitating exchange of scientists and engineers;
- (iii) helping members of the Consortium in developing methods of global landslide monitoring;
- (iv) enhancing landslide experiments;
- (v) permitting development of a landslide database and digital library as well as of a world digital inventory.

(c) The following is a list of UNITWIN Network participating ICL member organizations with their representatives and alternative representatives.

1. Geological Survey of Canada, Canada, Peter BOBROWSKY/Baolin WANG
2. Institute of Geology and Mineral Exploration (IGME), Greece, Nikos NIKOLAOU/ Eleftheria POYIADJI
3. ENEA (Italian Agency for New Technologies Energy and Environment), Italy, Guiseppe DELMONACO/Claudio PUGLISI
4. Consiglio Nazionale dei Geologi, Italy, Pietro Antonio De PAOLA/Gerardo NOLLEDI
5. University of Firenze, Earth Sciences Department, Italy, Paolo CANUTI/Nicola CASAGLI
6. CIVITA Consortium, Italy, Claudio MARGOTTINI
7. European Commission's Joint Research Centre, IPSC / HSU, Italy, Alois SIEBER/Dario TARCHI
8. International Association of Geomorphologists (IAG), Italy, Mario Panizza
9. Ehime University, Faculty of Engineering, Japan, Ryuichi YATABE/Netra P. BHANDARY
10. Forestry and Forest Product Research Institute, Japan, Kiyoshi TANAKA/Hirota OCHIAI
11. Geographical Survey Institute, Japan, Masanori SUGIYAMA/Tatsuo SEKIGUCHI
12. Japan Landslide Society, Japan, Hiromitsu YAMAGISHI/Hiroshi FUKUOKA
13. Kanazawa University, Faculty of Engineering, Geotechnical Engineering Group, Japan, Tatsunori MATSUMOTO/Fawu WANG
14. Kyoto University, Disaster Prevention Research Institute, Research Centre on Landslides, Japan, Kyoji SASSA/Hiroshi FUKUOKA
15. Kyoto University, Disaster Prevention Research Institute, Flood Section, Japan, Kaoru TAKARA/Roy SIDLE
16. Niigata University, Research Institute for Hazards in Snowy Areas, Japan, Hideaki MARUI/Naoki WATANABE
17. University of Tokyo, Department of Civil Engineering, Geotechnical Engineering Group, Japan, Ikuo TOWHATA
18. University of Tokyo, Institute of Industrial Science, Japan, Kazuo KONAGAI
19. International Centre for Geohazards (ICG) in Oslo, Norway, Oddvar KJEKSTAD/Farrokh NADIM
20. Swiss Federal Institute for Snow and Avalanche Research SLF, Switzerland, Walter

- AMMANN/Oliver KORUP
21. U. S. Geological Survey, U.S.A., Peter T. LYTTLE /Randall G UPDIKE
 22. Charles University, Research Center of Earth Dynamic, Czech Republic, Vit VILIMEK/Jiri ZVELEBIL
 23. Comenius University in Bratislava, Faculty of Natural Sciences, Department of Engineering Geology, Slovakia, Rudolf HOLZER/Ján VLČKO
 24. Chengdu Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, China, LI Tianchi/CUI Peng
 25. Chongqing Seismological Bureau, China, Renjie DING
 26. Jilin University, Environmental Geological Disaster Research Institute, China, Binglan CAO
 27. Northeast Forestry University, China, Wei SHAN/
 28. Shanghai Jiaotong University, School of Civil Engineering and Mechanics, China, Xingchun HUANG/Dexuan ZHANG
 29. Xian Municipal Government, Lishan Landslide Prevention and Control Office, China, Qingjin YANG
 30. Cairo University, Faculty of Engineering, Rock Engineering Laboratory, Egypt, Yasser ELSHAYEB /Hany HELAL
 31. Mekelle University, Ethiopia, Kurkura KABETO/Trufat HAILEMARIAM
 32. Indian Institute of Technology, India, A. K. PACHAURI
 33. Building & Housing Research Center, Iran, S. H. TABATABAEI/M. H. Tofigh RAYHANI
 34. International Institute of Earthquake Engineering and Seismology (IIEES), Iran, Mohammadreza MAHDAVIFAR/Ebrahim HAGHSHENAS
 35. Soil Conservation and Watershed Management Research Institute, Iran, Z. SHOAEI
 36. University of the West Indies, Jamaica, Rafi AHMAD
 37. International Centre for Integrated Mountain Development (ICIMOD), Nepal, Binayak BHADRA
 38. Instituto Geologico Minero y Metalurgico, Peru, Romulo MUCHO/Antonio GUZMAN
 39. Grudec Ayar, Peru, Raul CARRENO
 40. Technical University, Civil Engineering Faculty, Romania, Nicolae BOTU/Dan CARASTOIAN
 41. Federal State Unitary Geological Enterprise Scientific Centre "HydGeo", Russia, Oleg ZERKAL/Julia V. FROLAVA
 42. Institute of Environmental Geoscience (IEG RAS), Russian Academy of Sciences, Russia, Victor OSIPOV/Svalova VALENTINA
 43. Institute of the Geospheres Dynamics, Russian Academy of Sciences, Russia, Alexander STROM/Nikolai SYRNIKOV
 44. Share-holding Company "Hydroproject Institute", Russia, Alexander PIOTROVSKIY
 45. West-Siberian Regional Center (RC"TomskGeoMonitoring), SC HydGeo, Russia, Viktor A. LGOTIN
 46. Ministry of Agriculture and Cooperatives, Land Development Department, Thailand, Aniruth POTICHAN

Table 3.5.1 Other international joint researches

Principal Investigator	Title	Country	Period
Kaoru Takara	Hydrological river and coastal field investigation for integrated water and sediment management in three basins in Indonesia	Indonesia	2000-2002
Kyoji Sassa	Canada-Japan Research on the Occurrence, Mechanisms and Behaviour of Catastrophic Landslides	Canada	1998 - 2008
Kyoji Sassa	Landslide hazard assessment in cultural heritage sites	UNESCO	Apr.1999 - Dec.2002
Kyoji Sassa	International joint research in the field of landslide hazard assessment and mitigation in Lishan, Xian, China	China	Jun.1999 - Mar.2004
Kyoji Sassa	Landslide Risk Evaluation of Inca's Machu Picchu monument	Peru	Mar.2000 -
Kyoji Sassa	International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) Asian Technical Committee ATC-9 : Protection of Cultural Heritage from Landslides	Asian Counties	April 1999 -
Atsuo Takeuchi	Joint research on landslide groundwater investigation	Iran	1999 -
Hajime NAKAGAWA	Cooperative Research on Rainfall and Sediment runoff Characteristics in the Lesti River Basin, Brantas River, Indonesia	Indonesia	2001-2005

3.6 Activities in International Exchange and Relationships

The number of natural disasters is globally increasing due to environmental changes caused by humans. In Japan, frontier science, engineering and advanced technologies have been developed to mitigate natural disasters due to earthquakes, volcanic eruptions, floods, typhoons, etc. However, in 1995, the Kobe Earthquake (Hyogo-ken Nanbu Earthquake) induced the so-called Hanshin-Awaji Devastating Disaster. This event made us recognize that our disaster mitigation systems had not functioned well and, thus, there was a need for prompt improvement.

The organization of DPRI was reconstructed in 1996, not only to reflect such domestic experience but also to support disaster prone countries more effectively by providing useful information/technologies and research funds. As a result, DPRI now consists of 5 research divisions and 5 research centers where innovation of the total system to mitigate natural disaster has been developed by conducting studies on human/social problems and risk management in addition to the fundamental studies on earthquake prediction, disaster mitigation science and engineering. It is noted that another important purpose of the reconstruction of DPRI was to promote international exchange of researchers and to achieve more active international cooperation in research work.

3.6.1 Activities based on the Agreements between DPRI and Foreign Organizations

(1) International Collaboration Related to the International Decade for Natural Disaster Reduction (IDNDR)

The concept of IDNDR proposed by Dr. F. Press (U.S. National Academy of Sciences) was to make the last ten years of the 20th century "the Decade of International Disasters Reduction" and promote cooperation with one another to mitigate natural disasters in the world. DPRI agreed to join the international collaborations in IDNDR under the support of the Ministry of Education, Science, Sports and Culture, as a special international project in 1991. Thus the project, "Study of Prediction and Mitigation of Natural Disasters in Eastern Asia (Indonesia and China)" started as a three year program. A 5-year joint research program began in 1994 with the overall title

"Prediction and Mitigation of Natural Disasters in Indonesia and China". These projects were finished in 1999 but further cooperative research continued under the Grant-in-Aid for Scientific Research provided by JSPS (Japan Society for the Promotion of Science). The subjects with Indonesia were (1) Igneous Process and Tectonics, and (2) Disasters Caused by Floods and Geomorphological Change and Their Mitigation. The subjects with China were (1) Prediction of Landslide and Related Disaster at Hua-ching Pond in Xi'an, and (2) Cooperative study for mitigation of Earthquake Disasters in China and Japan. These projects cover aspects mostly in geoscience and civil engineering. For Indonesia, China and Japan, these activities are very strategic for the purpose of mitigation of natural hazards.

(2) Establishment of Data Base of Observed Strong Seismic Motions

This research collaboration, which includes exchange of researchers, has been conducted by DPRI with the research institute of seismology of China using the Special Coordination Funds for Promoting Science and Technology provided by the Ministry of Education, Science, Sports and Culture of Japan.

(3) Research Project with UNESCO

Since 1999, DPRI has been taking part in a cooperative project between UNESCO and IUGS entitled "International Geological Correlation Program (IGCP) No.425" conducted to protect the global environment and as the key of possible land development in the first quarter of 21st century. DPRI has been contributing to the project entitled "Landslide Hazard Assessment and Mitigation for Cultural Heritage Sites and Other Locations of High Societal Value".

3.6.2 Contribution to International Conferences and Symposiums

The international conferences and symposiums which were organized or coordinated by the academic staff members of DPRI from the year of 2000 are listed in Table 3.6.1.

Table 3.6.1 Hosting International Conference

Conference Name	Year	Date	Place	No. of participants (ditto from abroad)
Hazard 2000 Tokushima	2000	May 21-25	Asty Tokushima, Tokushima city	144 (31)
	2001	Aug.28	Chuou University	70 (30)
International Workshop on Documentation Records of Historical Hazards in Mountainous region	2001	Aug.29-Sep.2	O-taki village, Hakuba Village, Nagano	40 (15)
5th International Symposium on Hydrological Applications of Weather Radar - Radar Hydrology -	2001	Nov.19-21	Heian-Kaikan, Kyoto city	130 (56)
UNESUCO-Kyoto University International Symposium "Landslide Risk Mitigation and Protection of Cultural and Natural Heritage"	2002	Jan.21-25	Pa-Lu-Lu Plaza Kyoto and Kyoto Campus Plaza	82 (51)
International Workshop on compound urban flood disasters 2001 Kobe	2002	Feb.14	Kobe city	40 (8)
International Workshop on tsunami disasters and their reduction 2001 Bandang, Indonesia	2002	Mar.18-19	Technical University in Bandang city	100 (85)
1st International Conference on Hydrology and Water Resources in Asia Pacific Region	2003	Mar. 13-15	Pa-lu-lu Plaza, Kyoto city	278 (155)
The First Japan-South Korea Joint Seminar on Ecology and Civil Engineering "Possibility and Limitation of Nature Restoration in Artificially Altered River Ecosystems"	2003	Aug.1-2	Tokushima University, Tokushima city	100 (13)
US-Japan joint workshop and Fourth grantees meeting / Cooperative research on Urban earthquake disaster mitigation	2002	2002,10,21-22	DPRI	95 (43)
DPRI-IIASA, the 3rd International Symposium on INTEGRATED DISASTER RISK MANAGEMENT: Coping with Regional Vulnerability (IDRM-2003)	2003	July 3-5	Kyoto International Conference Hall, Kyoto city	147 (48)
Division 8 Meeting, IUFRO (International Union of Forestry Research Organizations) World Congress	2000	Aug. 7-12	Putra World Trade Center Kuala Lumpur, Malaysia	198 (166)

ISSMGE ATC-9 Field Workshop on Landslides and Natural/Cultural Heritages in Turkey	2000	Aug.23-24	Karadeniz Technical University Trabzon, Turkey	30 (27)
ISSMGE TC-11 (Landslides) Conference on Transition from Slide to Flow - Mechanisms and Remedial Measures -	2000	Aug.25-26	Karadeniz Technical University Trabzon, Turkey	30 (27)
International Symposium on Landslide Risk Mitigation and Protection of Cultural and Natural Heritage	2001	Jan. 15 - 19	Science Council of Japan, Tokyo	57 (36)
Interim Steering Committee Meeting of International Consortium on Landslides	2002	Jun. 24 - 26	Czech Technical Univ. Prague, Czech	40 (35)
First Session of Board of Representatives of International Consortium on Landslides	2002	Nov. 19 - 21	UNESCO Headquarters Paris, France	50 (45)
Second Steering Committee Meeting of International Consortium on Landslides	2003	May. 19 - 21	FAO Headquarters Rome, Italy	34 (26)

3.7 Disaster Field Investigations

2001 Gujarat, Western India Earthquake

Date of Event: January 26, 2001

Investigation Period: Feb 26 – Mar.13, 2001

Members:

James J. Mori (RCEP) Aftershock Observation Team
Yasuhiro Hayashi (IMDR) Damage Investigative Team
Sumio Sawada (EDP) Damage Investigative Team

Type of Investigation:

Ministry of Education, Culture, Sports, Science and
Technology (MEXT) Disaster Response Program

At the time of the earthquake, there were few seismological observations in the area of the mainshock and immediate aftershock. So, the Aftershock Team installed 8 temporary seismographs and recorded over 1400 aftershocks that determined the size and orientation of the fault of the mainshock. The Damage Investigative team noted that there were large differences in the building damage in the city of Gandhidam. Studies were carried out of the local site conditions but could not find any clear relation to the damage. Differences in building damage was likely due to construction. Newer buildings performed worse than slightly older buildings which were constructed soon after the damaging Anjar earthquake in this region. This indicates that the 'memory' of earthquake engineering practices is relatively short for this region.

Related Reports:

Sato et al., A comprehensive survey of the 26 January 2001 earthquake (Mw 7.7) in the State of Gujarat, India, 2001.

2003 Tokachi-oki Earthquake

Date of Event: Sep.26, 2003

Investigation Period: Oct. 3-6, 2003

Members:

Riki HONDA (EDP)
Yusuke ONO (Graduate School of Eng. Kyoto Univ.
Hisakazu SAKAI (The National Research Institute
for Earth Science and Disaster Prevention
(NIED))

Niijima and Kozushima Earthquake

Date of Event: July 1 to 7, 2000

Investigation Period: December 23 to 26, 2000

Members:

Masahiro Chigira(GD)

Ken-ichi Nishiyama (GD)

We investigated the geological and geomorphological causes of the landslides triggered by an earthquake of July 1 and the subsequent rainfall and earthquakes. The research was followed by Yuko Miyazaki as her Master course research. We clarified that 618 landslides occurred by the earthquake on July 1, but subsequent heavy rainfall as much as 291 mm in 24 hours generated rather fewer 123 landslides on slopes of rhyolitic lava and pyroclastics that dominates the island.

Disaster name: Landslides generated by the Chi-Chi Earthquake in Taiwan

Date of Event: September 21, 2001

Investigation Period: November 11 to 24, 2001

Members: Masahiro Chigira (GD) in cooperation with Industrial Technology Research Institute, Taiwan

We investigated two bit landslides (Chiu-Feng-Woo Shan and Tsaoling landslides) triggered by the earthquake, and found that slow movement before the event preceded these landslides. This precursory movements were expressed on landforms, which could be used to predict the landslide locations.

Related Reports: The results are reported in the following papers:

Wang Wen-Neng, Furuya T., and Geological and Chigira, M. (in press) Geomorphological Precursors of the Chiu-fen-erh-shan Land- slide Triggered by the Chi-chi Earthquake in Central Taiwan. Engineering Geology.

Chigira, M., Wang Wen-Neng, Furuya T., and Kamai, T. (in press). Geological causes and geomorphological precursors of the Tsaoling landslide triggered by the 1999 Chi-Chi Earthquake, Taiwan. Engineering Geology.

Landslides triggered by 24 March 2001 Geiyo Earthquake

Date of Event: March 24, 2001

Investigation Period: April, 2001

Members:

Kyoji Sassa (Head, GD/RCL)
 Hiroshi Fukuoka (GD/RCL)
 Wang Gonghui (GD/RCL)
 Ryuji Kitagawa (Hiroshima Univ.)
 Hiroki Ochiai (Forestry and Forest Products
 Research Institute)
 Takashi Inokuchi (The National Research Institute
 for Earth Science and Disaster Prevention
 (NIED))

Type of Investigation:

DPRI Investigation Team
 Investigation team of the Japan Landslide Society

The 24 March 2001 Geiyo Earthquake had ground shaking intensity of IV - V class. Fortunately, it was dry season, and no large disaster by landslides and slope failures occurred. However, numerous cracks and deformation were observed widely. This provides valuable data to assess the risk of landslides and slope failures in case the earthquake would have occurred in rainy season, as well as contribute to assessment of landslide risk in further earthquakes and intense rainstorms. Sassa organized an urgent investigation team jointly with the Japan Landslide Society and visited Kure city, Higashi-Hiroshima city and Kawachi-cho of Kamo-gun and investigated following items;

1. Finding the ground deformation spots created by the earthquake and their condition (most fundamental investigation for assessment of earthquake-induced landslide sites).
2. Fundamental investigation for prevention measures planning against earthquake-triggered landslides.
3. Investigation of difference of location and the style of landslides triggered by earthquake and intense rainstorm.
4. Fundamental investigation on difference of location and form between landslides triggered by earthquakes and intense rainstorms, by comparing the June 1999 Hiroshima intense rainstorm disaster and Geiyo earthquake disaster.

Related Reports: Sassa et al., Japan Landslide Soc. Vol. 38 (1), pp. 78-84, 2001 (in Japanese)

Las Colinas Landslide triggered by the 13 January 2001 Offshore El Salvador Earthquake

Date of Event: January 13, 2001

Investigation Period: November, 2001

Members:

Kyoji Sassa (GD/RCL)
 Hiroshi Fukuoka (GD/RCL)
 Haruo Shuzui (Nippon Koei, Co., Ltd., and Adjunct
 lecturer, RCL*)
 Minoru Hoshino (Geographical Survey Institute,
 Ministry of Lifeline, Infrastructure and
 Transportation)

Type of Investigation:

DPRI Investigation team, and the Sub-project No. 4 for "General study" team of the Special Coordination Fund for Promoting Science and Technology of MEXT "Areal Prediction of the Earthquake and Rain Induced Fluidized Phenomena" (APERIF)

The 13 January 2001 Offshore El Salvador Earthquake of Ms 7.8 caused many landslides in the country, especially in the Las Colinas district of Nueva San Salvador in the suburb of nation's capital, middle-sized rapid fluidized landslide occurred, and destroyed significant extension of residential area at the foot of the hill. Death toll was reported to rise 747 and because rather large-scale disaster. Field investigation was conducted in November 2001 and found that the brown silty volcanic deposits had still higher water contents even 10 month had passed since its occurrence. This soil layer was the key to high-speed motion due to excess pore water pressure generation during shearing. About 100 kg of the brown silty volcanic deposits and not large amount of dry white pumice were transported to Japan and conducted seismic landslide geotechnical simulation test.

Related Reports:

Konagai, K., K. Sassa, H. Fukuoka, et al.(2001): Las Colinas Landslide Caused by the January 13, 2001 Off The Coast of El Salvador Earthquake. Journal of Japan Association for Earthquake Engineering, Vol. 2, No.1, pp.1-15.

Sassa et al., in collected papers of the Japan Landslide Society Symposium, pp. 61-79, 2002 (in Japanese).

Fukuoka et al., in collected lectures of the Japan Landslide Society, pp. 71-74., 2002. (in Japanese)

Fukuoka et al., collected papers of a public APERIF symposium, pp.301-312, 2002. (in Japanese)

Sassa et al., collected papers of a public APERIF symposium, pp.301-312, 2002. (in Japanese)

Flood Disasters in the Mekong River**Dates of Events:** August to October, 2000**Investigation Period:** November 2000**Members:**

Kazuya Inoue (FMD)

Hajime Nakagawa (RCDE)

Yasunori Muto (RCDE)

(4 other members from other universities)

Type of Investigation: Japan Civil Engineering Society Investigation

Investigations were carried out of the flooding and data were collected on the water flow and fluid mechanics for the 2000 floods. The processes of inundations and resultant damage were investigated.

Related Reports: Report of the Fluid Mechanics Committee of the Japan Civil Engineering Society (in Japanese)**Tokai heavy rainfall disaster****Dates of Events:** September 11-12, 2000**Investigation Period:** 2000 to 2001**Members:**

Kaoru Takara (FMD)

Yasuto Tachikawa (FMD)

Type of Investigation: Tokai Heavy Rainfall Investigation Committee of the Japan Society of Hydrology and Water Resources (in Japanese)

The Tokai Heavy Rains Investigation Committee was established to study and discuss the damage due to this event. Statistical analyses of 110 years of meteorological data indicated the one-day rainfall was exceptional. Rainfalls of 350 mm per day are not unusual and there are several cases of 400mm. There is only one record in September 1965 of higher one day rainfalls. The highest one hour rainfall was recorded in Nagoya. Compared to the September 1965 and July 1972 storms, the 1 to 5 hour rainfalls were especially heavy.

Related Reports: Report in the Journal of Japan Society of Hydrology and Water Resources Society, vol., 14, pp. 411-432, 2001 (in Japanese)**Heavy Storm and flood disaster caused by Typhoon Rusa, 2002 in Korean Peninsula****Dates of Events:** Aug.31-Sep.1,2002**Investigation Period:** 2002**P.I.:** Kaoru Takara (DPRI, Kyoto University)**Flood disaster in Europe in summer 2002 (focused on the Elbe river basin)****Dates of Events:** August, 2002**Investigation Period:** 7-17 November 2002**P.I.:** Kengo Sunada (Yamanashi University)**Wind Damage that Occurred from June to July 2001****Dates of Events:** June to July, 2001**Investigation Period:** June to July 2001**Members:** Wind Resistant Structures Group in the Division of Atmospheric Disaster**Type of Investigation:** Independent Investigation

Field investigations were carried out of three occurrences of strong wind damage in Hokkaido, Aichi and Shiga prefectures. Also data was collected from local governments and fire department data to study the relation of the building damage and meteorological conditions.

The size of the three affected areas have lengths of 7 to 12 km and widths of 20 to 600 m, equivalent to P2 on the Peason Scale. From the building damage, it was estimated to be F2 on the Fujita scale.

Compared to the other two areas, in Hokuryu Town, Hokkaido the damage was mainly to warehouses, storage buildings, and plastic greenhouses, since there are few people living in the area. A video showed that a tornado occurred in the Hokuryu area and the building damage was due to this tornado.

It was difficult to distinguish if the damage in Ichinomiya City, Aichi prefecture and Aichigawa Town, Shiga prefecture was due to tornadoes or down bursts.

Related Reports: Submitted to the reports of the Japan Wind Engineering Society.**Sediment Disasters Caused by the Typhoon "TORAJI", 2001 in Taiwan****Investigation Period:** Aug.13-17, 2001**Members:**

Hajime, NAKAGAWA

Keiichi, TODA

Motoyuki, USHIYAMA

Type of Investigation: DPRI Investigation Team

Field investigations were carried out to obtain precise data on the disaster through the field survey. The Typhoon 0108 (Typhoon Toraji) attacked the eastern and central Taiwan on 30 July, 2001. This typhoon brought about a heavy rainfall. In the central area of Hualien-ken and the southern area of Nantou-ken, the hourly rainfall more than 100 mm lasted three hours, and the total rainfall amounted to more than 400 mm, resulting in the occurrence of disastrous debris flow in many places in both Hualien-ken and Nantou-ken. The severe inundation flows also occurred due to both overtopping flows and bank breaches in Chosui River basin in Nantou-ken. By these river floods and sediment disasters, 214 persons were killed or missing and huge damages spread out all over the country.

Mt. Usu volcanic eruption disasters

Date of Event: March 30, 2000

Investigation Period: April to October, 2000

Members: Yoshiaki Kawata (DRS)

Type of Investigation: Independent Investigation

The evacuation of Date City, the relation between national and local government, and restoration and reconstruction plans were investigated. The results of this study are summarized as follows.

1. The amount of damage that occurred is directly (inversely) related to the disaster prevention efforts carried out before the eruption.
2. The prepared hazard map was useful, even though the type of volcanic eruption was not exactly specified in the map.
3. A model was proposed for a society living close to an active volcano..

Related Reports: Results presented in the government crisis management manual (in Japanese).

Mt. Oyama Eruption Disaster in Miyake Island

Dates of Events: August 8, 2000 to present

Investigation Period: April 8-17, 2002

Members: Haruo Hayashi (DRS)

Type of Investigation: Independent Investigation

Field observation of Miyake Island from ground and air. Interviews to Vice Governor of Tokyo

Metropolitan Government, and key members of Miyake Mura Government.

Related Reports: Restoration Plan for Miyake Town (in Japanese).

Tokai heavy rainfall disasters

Date of Event: September 11, 2000

Investigation Period: September 16, 2000 to March 7, 2001

Members: Yoshiaki Kawata (DRS)

Type of Investigation:

Nagoya University Disaster Response

Discussions were carried out and survey conducted of public citizen about how they responded to the flooding. The results of this investigation are summarized as follows.

1. At the start of the rains, serious flooding was not considered possible so the response was slow
2. Government agencies were mainly concerned with the response to earthquakes and there was little consideration about response to flooding.
3. There were problems in the organization of volunteer teams. There were no plans for response to floods.
4. Equations were derived to estimate the amount of refuse produced in the city
5. Response plans of the local government were improved

WTC terrorism disasters

Date of Event: September 11, 2001

Investigation Period: February 24 to March 3, 2002

Members:

Yoshiaki Kawata (DRS)

Haruo Hayashi (DRS)

Satoshi Tanaka (IMDR)

Type of Investigation:

MEXT Emergency Investigation

1. Investigations were carried out of the damage to the city conditions in the area of the World Trade Center building and restoration plans were studied
2. Analyses were done of the response in the immediate area of the disaster
3. Analyses were done of the damage and

restoration plans in the surrounding widely affected area

4. Investigations were carried out of the ethnography of Japanese-Americans and Japanese company employees in New York.

Related Reports: MEXT and investigation committee reports (in Japanese)

The 2000 Western Tottori Prefecture Earthquake

Date of Event: October 6, 2000

Investigation Period: Oct.13 to Nov.13, 2000

Members: Junpei Akamatsu (DRS)

Type of Investigation: Joint Research of Universities

Contents: Observation of aftershocks to reveal bedrock structure under seriously damaged area in Yumigahama Peninsula.

Related Reports: Yoshikawa, H., H. Morikawa, J. Akamatsu, T. Noguchi and R. Nishida: Estimation of the Bedrock Structure at Yumigahama Peninsula, Tottori, by Using Observation of Aftershocks, Microtremors, and Gravity, *Zisin II*, 55, 61-73, 2002.

3.8 Joint Researches with Other Organizations

3.8 Cooperative Research with Private Companies

There are three categories for the funding that is received from private companies for cooperative research efforts. These are,

Cooperative Research with Private Companies

Directed Research

Donations of Research Grants

The number of projects and the total amount of funding in the three categories is shown by year in the table below.

In the modern industrial society dominated by high technology, there is an intense competition for survival. Although the missions of universities and private industry are largely different, partnerships can be formed to benefit both parties. This is an important part of the DPRI vision to create such relationships in order to further its research goals.

3.8.1 Cooperative Research with Private Companies (1997-2001)

1997		1998		1999		2000		2001	
No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount
2	8,300,000	3	6,050,000	2	2,564,000	2	7,500,000	4	13,000,000

3.8.2 Directed Research (1997-2001)

1997		1998		1999		2000		2001	
No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount
6	41,530,000	10	35,990,000	17	70,442,000	20	107,716,000	10	32,156,000

3.8.3 Donation of Research Grants (1997-2001)

1997		1998		1999		2000		2001	
No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount	No.of Projects	Total Amount
60	78,730,000	55	71,129,461	62	65,719,824	70	89,136,057	73	83,829,600

Money units are in Japanese Yen

Table 3.8.4 Research Project with National and Local Government

Name	Organization	Title of research	Status	Year
Norio Okada	Chizu town	Prototype Development of the Administrative Information System in Chizu Town	P.I.	1999-2000
Norio Okada	RIKEN(EQTAP)	Prototype Development of an Information Support System for Urban Disaster Diagnosis Based on GIS	P.I.	2000
Hiroyuki Kameda		China-Japan joint research on the spatio-temporal information system framework for the environmental conservation and the disaster countermeasure.	P.I.	2000-2001
Kazuo Okunishi	Matsumoto Sabo Construction Office, Ministry of Construction	Observation and analytical study of debris flow at Mount Yakedake in Shinano River Watershed	P.I.	1999-2001
Hiroshi Suwa	Matsumoto Sabo Construction Office, Ministry of Construction	Observation and analytical study of debris flow at Mount Yakedake in Shinano River Watershed	Member	1999-2001
Hiroshi Suwa	Matsumoto Sabo Construction Office, Ministry of Construction	Observation and analytical study of debris flow at Mount Yakedake in Shinano River Watershed	P.I.	2002-2003
Roy C. Sidle	Grant from British Columbia Advanced Systems Institute	Predicting the effects of innovative forestry practices on hydrologic response of watersheds in southeastern British Columbia		1999-2001
Roy C. Sidle	JSPS Fellowship	hydrogeomorphology research at Niigata University		2000
Roy C. Sidle	competitive research grant from National University of Singapore	Sustainable sources of high quality water in Southeast Asia: influences of land management in headwaters		2001-2004
Tamotsu Takahashi	Jinzu Sabo Work Office, Ministry of Construction	Observation and analysis on debris flows in the Yake-dake mountain watershed	P.I.	2000-2002
Hiromasa ueda	Research fund for the global environment research	¥Source-receptor relationship of air pollutants and international collaborative observation in east Asia	P.I.	1999
Hiromasa ueda	Research fund for the global environment research	¥ Source-receptor relationship of air pollutants and international collaborative observation in east Asia	P.I.	2000
Hiromasa ueda	Research fund for the global environment research	¥Source-receptor relationship of air pollutants and international collaborative observation in east Asia	P.I.	2001
Hiromasa ueda	Research fund for the global environment research	¥Source-receptor relationship of air pollutants and international collaborative observation in east Asia	P.I.	2002
Toyaki SAWADA	Jinzu Sabo Work Office, Ministry of Construction	Observation and Analysis of Debris Flows Occurring at Mt. Yakedake in the Jinzu River Basin	Member	2000 2001 2002
Haruo Hayashi	Hyogo prefecture	Socio-economic Recovery from the 1995 Hanshin-Awaji Earthquake Disaster -Report of Panel Survey 2001-	P.I.	2000-2001

Table 3.8.5 Joint research with private organizations

Name of Researcher	Type of fund	Organization	Title of Research	Status	Year
Norio OKADA	Joint research	Central Research Institutes of Electric Power Industry	Measuring Economic Losses of Electric Power Shortage Triggered by an Earthquake Based on the Changes of Social Surplus	P.I.	2001
Norio OKADA	Joint research	Central Research Institutes of Electric Power Industry	Measuring Economic Losses of Electric Power Shortage Triggered by an Earthquake Based on the Changes of Social Surplus	P.I.	2001-2005
Norio OKADA	Joint research	EQTAP research grant	Disaster Risk Assessment and Management	P.I.	2001
Norio OKADA	Competitive funding	Toyota Foundation	Field Study on Sustainable Community Capacity Development Systems in Rural Areas	P.I.	1999-2001
Norio OKADA	Competitive funding	Foundation of River & Watershed Environment Management	Study on Cost Allocation Schemes in Joint Infrastructure Development Including Preservation of River Environment	P.I.	1999-2000
Norio OKADA	Competitive funding	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	P.I.	2000-2001
Hiroyuki KAMEDA	Donations for research	West Japan Railway Company	Research aid for disaster prevention and mitigation	P.I.	2000
Yoshiyuki SUZUKI	Joint research	Kyoto Traditional Architecture Association	Preliminary Study on Seismic Performance of Traditional Wooden Buildings in Higashi Hongan-ji Temple	P.I.	2000
Yoshiyuki SUZUKI	Joint research	Property and Casualty Insurance Rating Organization	Study on Method of Evaluation for Seismic Performance of houses	P.I.	2001
Yoshiyuki SUZUKI	Donations for research	Assoc. for Disaster Prevention Res.	Study on seismic performance of wooden buildings	P.I.	
Yoshiyuki SUZUKI	Donations for research	Assoc. for Disaster Prevention Res.	Research aid for disaster prevention and mitigation	P.I.	2000-2001
Yoshimi HAGIHARA	Donations for research	Kansai Research Foundation for technology promotion	Restructuring of Urban Water Circulation System for Earthquake Disaster Mitigation in Kansai Metropolitan Area	P.I.	2001-2002
Hirokazu TATANO	Joint research	Central Research Institutes of Electric Power Industry	Measuring Economic Losses of Electric Power Shortage Triggered by an Earthquake Based on the Changes of Social Surplus	Member	2001
Hirokazu TATANO	Joint research	National Research Institute for Earth Science and Disaster Prevention	Risk Analysis of Resistance Capacity of Social Systems against Disaster	Member	2001-2005

Hirokazu TATANO	Joint research	EQTAP research grant	Disaster Risk Assessment and Management	Member	2001
Hirokazu TATANO	Joint research	Riken Institute	Disaster Risk Assessment and Management	Member	2000
Hirokazu TATANO	Competitive funding	Foundation of River & Watershed Environment Management	Study on Cost Allocation Schemes in Joint Infrastructure Development Including Preservation of River Environment	Member	1999-2000
Hirokazu TATANO	Competitive funding	Kansai Research Foundation for technology promotion	A Study on Renewal Planning with Safety Diagnosis for Old Wooden Houses in Inner City	P.I.	2000-2001
Hirokazu TATANO	Donations for research	Non-Life Insurance Rating Organization of Japan	Research aid for disaster prevention and mitigation	P.I.	1999-
Yasuhiro HAYASHI	Joint research	Kyoto Traditional Architecture Association	Preliminary Study on Seismic Performance of Traditional Wooden Buildings in Higashi Hongan-ji Temple	Member	2000
Yasuhiro HAYASHI	Joint research	Property and Casualty Insurance Rating Organization	Study on Method of Evaluation for Seismic Performance of houses	Member	2001
Yasuhiro HAYASHI	Competitive funding	Kansai Research Foundation for technology promotion	Various Expression of Building Damage and Disincentive Factors of Restoration	P.I.	2001
Yasuhiro HAYASHI	Competitive funding	The Obayashi Foundation	Support to Promote Restoration by Utilizing Structure and Culture of Local Wood House after Earthquakes	P.I.	2001
Yasuhiro HAYASHI	Donations for research	Osaki Research Institute.		P.I.	
Kojiro IRIKURA	Competitive funding	Grant-in-Aid for JSPS fellows	Study on Development of highly reliable strong motion prediction	P.I.	1999-2000
			Study on Non-linear soil response to strong ground motions	P.I.	2000
Kojiro IRIKURA	Donations for research	Nihon Kernel System Co., Ltd.	Studies on prevention and reduction of disasters	P.I.	2000
Kojiro IRIKURA	Donations for research	Chikyu Sogo Research Institute	Studies on prevention and reduction of disasters	P.I.	2000
		Osaki Research Institute.		P.I.	2000
		Tokyo Soil Research Co.,Ltd.		P.I.	2001
		Osaki Research Institute.		P.I.	2001
		Kobori Research Institute.		P.I.	2001
Tadanobu SATO	Donations for research	Oyo Soil Co.Ltd.	Studies on prevention and reduction of disasters	P.I.	2001
Hitoshi Tanaka	Donations for research	Sekisui House Co.Ltd.	Development of Dineconcrete Panel	P.I.	2001
Hitoshi Tanaka	Donations for research	Arai Co. Ltd.	Seismic Perofomance Evaluation of Reinforced Concrete Buildings	P.I.	2000
Masayoshi Nakashima	Competitive funding	Research Grant of Kajima Research Foundation	Prediction of maximum deformations of base-isolated building structures subjected to near-fault ground motion	P.I.	1998-2000
Masayoshi Nakashima	Donations for research	Nikken Sekkei Co.,Ltd.	Studies on prevention and reduction of disasters	P.I.	2000

Masayoshi Nakashima	Donations for research	Building Center of Japan	Studies on prevention and reduction of disasters	P.I.	1999-2000
Masayoshi Nakashima	Donations for research	Research Foundation for Housing	Studies on prevention and reduction of disasters	P.I.	2002
Masayoshi Nakashima	Donations for research	Building Center of Japan	Studies on prevention and reduction of disasters	P.I.	2002
Keiichiro Suita	Competitive funding	Grants for Scientific researches, The Kajima Foundation	Seismic Retrofit of Existing Steel Moment Frame by Perforated Reduced Beam Section	P.I.	2001
Shigehiro Morooka	Donations for research	Fujimori Sangyo Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2000
Masashi KAMON	Donations for research		Studies on prevention and reduction of disasters		2000
Masashi KAMON	Donations for research		Diffusion Analysis for Steel Cutoff Wall		2000
Mamoru MIMURA	Donations for research		Research on Geo-disasters	P.I.	2000
Mamoru MIMURA	Donations for research		Research on Geo-disasters	P.I.	2001
Mamoru MIMURA	Donations for research		Research on Geo-disasters	P.I.	2001
Kyoji SASSA	Joint Research	funded research	Development of techniques for ground disaster prevention	P.I.	1999-2003
Kyoji SASSA	Competitive funding	Research and Development Organization	Mechanism of earthquake-induced ground failure disaster occurrence	P.I.	1998
Kyoji SASSA	Donations for research		Studies on prevention and reduction of disasters	P.I.	1997
Kyoji SASSA	Donations for research		Studies on prevention and reduction of disasters	P.I.	1996
Kyoji SASSA	Donations for research		Studies on prevention and reduction of disasters	P.I.	1997
Kyoji SASSA	Donations for research		Studies on prevention and reduction of disasters	P.I.	1998
Kyoji SASSA	Donations for research		Studies on prevention and reduction of disasters	P.I.	1999
Kazuo Okunishi	Competitive funding	General hazard prevention	Landslides of steep slope damage to energy transportation line	P.I.	2001
Kazuo Okunishi	Competitive funding	Grant-in-Aid for Scientific Research of strategic field in Asia	Environmental observation in Jinzhaiyou valley of sichuan ,China	P.I.	2001
Tamotsu Takahashi	Joint Research		A study on maintenance of navigation channels	P.I.	2001
Tamotsu Takahashi	Donations for research	Yachiyo Engineering Co., Ltd.	A study on prevention and reduction of sediment related disasters	P.I.	2001
Tamotsu Takahashi	Donations for research	Hydro-soft Technology Institute Co., Ltd.	Studies on prevention and reduction of disasters	P.I.	2001
Kaoru Takara	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000-2001
Kaoru Takara	Donations for research		Research grant for rainfall characteristics analysis in an meteorological view point	P.I.	2000

Kazuya Inoue	Competitive funding		Construction of Inundation Flow Model in Urban Area	P.I.	2000
Kazuya Inoue	Donations for research	Newjec Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2000-2001
Tomotsuka Takayama	Competitive funding		Fundamental study on advancement of storm surge and wave forecasting technology and disaster mitigation	P.I.	2000-2002
Tomotsuka Takayama	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000-2001
Yasuto Tachikawa	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000-2001
Hajime Mase	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000
Hajime Mase	Donations for research		Numerical Analysis of Mach Reflection of Random Waves	P.I.	2001
Hiroshi Yoshioka	Donations for research		Studies on prevention and reduction of disasters	Member	2000-2001
Hiromasa Kawai	Donations for research	Denki Kogyo Co., Ltd.	Studies on prevention and reduction of disasters	P.I.	2000
Hiromasa Kawai		Denki Kogyo Co., Ltd.		P.I.	2000
Hiromasa Kawai		Kinden Co. Ltd.		P.I.	2001
Hiromasa Kawai		Wind Engineering Center Co. Ltd.		P.I.	2001
Hiromasa Kawai		Mitsubishi Electric Co.		P.I.	2001
Hiromasa Kawai		Yuasa Co.		P.I.	2001
Hiromasa Kawai	Donations for research	Eru-Plan Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2001
Takashi Maruyama	Joint Research		Study on prediction method of expectation value for mean annual wind	P.I.	2000
Takashi Maruyama	Joint Research		Study on prediction method of expectation value for mean annual wind	P.I.	2001
Takashi Maruyama	Competitive funding	Grant of Nomura-makukozogijutsusinko-foundation	Study on turbulence characteristics of natural wind for wind load on membrane construction	P.I.	2001
Takashi Maruyama	Donations for research	Grant of Kokusaikisyokaiyou	Studies on prevention and reduction of disasters	P.I.	2000
Takashi Maruyama	Donations for research	Grant of Kokusaikisyokaiyou	Studies on prevention and reduction of disasters	P.I.	2001
Hajime NAKAGAWA	Cooperative Research	Section B	Research on Maintenance of Navigation Channels for Transportation by Ships	P.I.	2001 2002
Hajime NAKAGAWA	Public Research Funds	Program for Promoting Fundamental Transport Technology Research	Fundamental Study on Advancement of Storm Surge and Wave Forecasting Technology and Disaster Mitigation	Member	2000 2001 2002
Hajime NAKAGAWA	Public Research Funds	CREST	Development of Interaction Evaluation Model between Social Change and Water Circulation	Member	2001 2002 2003 2004

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Hajime NAKAGAWA	Donations for research	Pacific Consultants Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2000
Hajime NAKAGAWA	Public Research Funds	Special Coordination Funds for Promoting Science and Technology	Development of Integrated Disaster Reduction Systems on Compound Urban Floodings	Member	2000
					2001
					2002
					2003
Hajime NAKAGAWA	Donations for research	Japan Society of Civil Engineers	Research on Observation and Evaluation of Sediment yield and its Amount	P.I.	2000
				P.I.	2001
				P.I.	2002
Hajime NAKAGAWA	Donations for research	Newjec Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2001
Hajime NAKAGAWA	Donations for research	Newjec Co. Ltd.	Studies on prevention and reduction of disasters	P.I.	2002
Hideo SEKIGUCHI	Donations for research	Japan Iron and Steel Federation(JISF)	Research on strengthening of flood-control levees	P.I.	2000
				P.I.	2001
Hideo SEKIGUCHI	Donations for research	Toyo Constructon Co. Ltd.	Research on wave-soil-structure interaction,	P.I.	2001
Hideo SEKIGUCHI	Donations for research	Yachiyo Engineering Co. Ltd.	Research on the dynamics of complex fluids with disaster-reduction applications	P.I.	2001
Taisuke ISHIGAKI	Donations for research		Research on prevention and mitigation of natural disaster	P.I.	2002
Toyoaki SAWADA	Public Research Funds	Foundation of River & Watershed Environment Management	Observation system for sediment behavior in a mountain river basin	Member	2000
Takao YAMASHITA	Public Research Funds	Heiwa Nakajima Foundation	Beach Restoration in Japan's Coasts : Feasibility Study on Soft Beach Formation by Sand-Fill	P.I.	2001
Takao YAMASHITA	Public Research Funds	Kyoto Prefecture Japan Sea Academic Forum	Japan-Korea Research Project on Beach Preservation Studies in Japan Sea	P.I.	2001
Takao YAMASHITA	Donations for research	Yachiyo Engineering Co.,Ltd	Water circulation and sediment transport in the bay	P.I.	2001
Ueno TETSUO	Donations for research	Izumo Green Corporation	Studies on prevention and reduction of disasters	P.I.	2000- 2001
Naoto OSHIMAN	Donations for research		A Study on data correction methods for differences in the geomagnetic total intensity	P.I.	2000
Naoto OSHIMAN	Donations for research		A study on heterogeneity in the crustal resistivity structure in San'in region, Japan	P.I.	2001
Manabu HASHIMOTO	Donations for research	Tokio Marine Kagami Memorial Foundation,	Studies on prevention and reduction of disasters	P.I.	2002
Manabu HASHIMOTO	Donations for research	Association for the Development of Earthquake Prediction	Studies on prevention and reduction of disasters	P.I.	2002
Kunihiko WATANABE	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001
Kazuhiro Ishihara	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000- 2001

Masato Iguchi	Donations for research		Studies on prevention and reduction of disasters	P.I.	2000
Yasuhiro TAKEMON	Donations for research			P.I.	2002-2004
Yoshinobu Kido	Competitive funding			Member	12-14
Kunio TOMOSUGI	Competitive funding			Member	11-12
Yoshiaki Kawata	Joint research		Simulation analysis on urban flooding	P.I.	2001
Yoshiaki Kawata	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001
Yoshiaki Kawata	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001
Yoshiaki Kawata	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001
Haruo HAYASHI	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001
Tomoyuki Takahashi	Donations for research		Studies on prevention and reduction of disasters	P.I.	2001