August 31, 2023
Japan Science and Technology Agency (JST)
5-3, Yonbancho, Chiyoda-ku, Tokyo 102-8666

JST to fund ten projects on the 2023 Southeastern Türkiye Earthquakes under the J-RAPID Collaborative Research/Survey Program for Urgent Research

The Japan Science and Technology Agency (JST) (HASHIMOTO Kazuhito, President) has approved funding for ten new projects for research on the 2023 Southeastern Türkiye earthquakes under the J-RAPID Collaborative Research/Survey Program for Urgent Research* (Appendix 1).

JST launched the J-RAPID call targeting researchers who are currently in or anticipate collaboration with Turkish researchers supported by Scientific and Technological Research Council of Türkiye (TÜBİTAK) on the 2023 Southeastern Türkiye earthquakes (Appendix 2).

A total of 15 proposals were submitted to the call out of which 10 were selected for funding following an evaluation by a panel of experts (Appendix 3).

The research projects commenced in August 2023 and the support period is scheduled to last until March 2024.

* J-RAPID Collaborative Research/Survey Program for Urgent Research
URL: https://www.jst.go.jp/inter/english/program_e/j-rapid_e/j-rapid.html

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List of Funded Projects

	Title	Principal Investigator (Japan)	Research Abstract
		Principal Investigator (Türkiye)	
1	Creation support and utilization of the 2023 Kahramanmaraş Earthquake related digital archive	IMAMURA Fumihiko Professor, International Research Institute of Disaster Science, Tohoku University Yalciner Ahmet Cevdet Professor, Department of Civil Engineering, Middle East Technical University	In light of the Türkiye and Syria earthquake disasters and the continuing emergency response and restoration activities, large amounts of data and information have been generated, data which often is not organized systematically. In order to address this, it is essential to construct a system that can be comprehensively analyzed as well as widely used by the general public by aggregating and archiving data information on earthquakes and their impact. In particular, this needs to be done by integrating information not only from domestic and foreign governments and experts, but also from the media and citizens, in order to make it possible to understand the actual state of damage and clarify the process of restoration and reconstruction, and to consider its use. In constructing this archive, this project aims to increase the versatility by linking the earthquake disaster archives in Türkiye and Japan.

| 2 | Imaging focal zone of the 2023 Kahramanmaraş earthquake by electromagnetic method | OGAWA Yasuo

Professor,
Institute of Innovative Research,
Tokyo Institute of Technology | The devastating Kahramanmaraş earthquakes (magnitudes 7.8 and 7.6) occurred in the East Anatolian Fault system. In this study, we use the magnetotelluric (MT) method, a geo-electromagnetic subsurface survey technique, to elucidate the distribution of subsurface fluids around the hypocenters.
The MT method can analyze the resistivity structure around the hypocenters from observations of the natural electromagnetic field. Since resistivity is sensitive to fluid distribution and connectivity, it leads to visualization of fluid distribution that constrains the earthquake generation process. We will test the assumption that there is a fluid pool below the hypocenters, and that the fluid flowed into the hypocentral region and triggered the major earthquakes.
The resistivity structure obtained in this study will also become a baseline for time-varying studies of crustal fluids around the hypocenter. |
| | | Sabri Bülent Tank

Professor,
Kandilli Observatory and Earthquake Research Institute,
Boğaziçi University | |

| 3 | Resilience of Public Healthcare Systems for 'Build Back Better': An evaluation analysis using a scorecard approach | KAKO Mayumi

Associate Professor, Graduate School of Biomedical and Health Sciences, Hiroshima University

İsmail Tayfur

Associate Professor, Department of Emergency Medicine, University of Health Sciences | This study will assess the public healthcare system by implementing a scorecard in Hatay and Kahramanmaraş provinces. The scorecard assesses the planning, coordination, and functioning of public healthcare systems from pre-disaster to post-disaster and make recommendations for strengthening public healthcare systems for the future Build Back Better of the region, which is currently in the recovery phase.
The methodology employed in this study, action research, informs the active interaction between participants who have been involved in disaster risk reduction in the variety of capacities, such as affected local government, emergency medicine department, nursing and care association. With the participation in scorecard workshops, communications between these stakeholders for community public healthcare system will be able to discuss better ways to prepare and collaborate to promote further community disaster risk reduction planning. |

| 4 | Damage mechanisms focusing on ground motion and liquefaction characteristics caused by Kahramanmaraş earthquake | KIYOTA Takashi

Professor, Institute of Industrial Science, The University of Tokyo

Ozer Cinicioglu

Professor, Department of Civil Engineering, Boğaziçi University | The Kahramanmaraş earthquakes caused severe inundation of coastal areas and various patterns of structural damage in Iskenderun due to the soil characteristics. In Golbasi, liquefaction caused significant settlement and tilting of mid-rise structures. In collaboration with a Turkish team, this study aims to map the damage patterns in Iskenderun and Golbasi, as well as to assess the site characteristics of the earthquake ground motion, and to determine the damage mechanisms of structures based on various in-situ investigations, laboratory soil tests and numerical analysis. In addition, seismic micro zonation maps and liquefaction hazard maps will be prepared for both Iskenderun and Golbasi, which will be used to make recommendations for future reconstruction and to propose countermeasure works. |

| 5 | Investigation of the seismic performance of buildings in Turkey and sorting out the issues to be improved | KUSUNOKI Koichi

Professor,
Earthquake Research Institute,
The University of Tokyo

Alper Ilki

Professor,
Faculty of Civil Engineering,
Istanbul Technical University | In this project, damage level of the buildings that were designed according to current and previous regulations will be investigated in a context of the 2023 Türkiye earthquakes. Areas to be improved in terms of structural design and construction will be sorted by using a detailed structural analysis. To verify the accuracy of the structural analysis, a microtremor measurement will be conducted with target buildings. The measured and calculated predominant frequencies will be compared, and the model will be updated accordingly. The Turkish and Japanese rapid inspection methods will be applied for the target buildings to compare the results. The Japanese performance evaluation method, which was added to the building code in year 2000, will be applied to the severely damaged building to evaluate the accuracy of the response estimation. |

| 6 | Verification study on long-term forecast of the 2023 Kahramanmaraş earthquake along the East Anatolian fault system | KONDO Hisao

Senior Researcher, Research Institute of Earthquake and Volcano Geology, National Institute of Advanced Industrial Science and Technology

Selim Özalp

Coordinator, Department of Geological Research, General Directorate of Mineral Research and Exploration | This study will compare long-term forecasts before the earthquakes and the situation after the earthquakes in order to verify how to evaluate the potential of earthquake occurrences. Specifically, this will be done by re-excavating a 3-D trench on the same fault section where this team previously excavated trenches in 2014 and compare the amounts of surface displacement between the estimated values of pre-earthquake and the observed values of post-earthquake at several sites. This comparative study can provide a unique opportunity to evaluate the surface displacement in order to improve recurrence models, long-term forecasts, and hazard mitigation for future destructive earthquakes. |

| 7 | Business Continuity and Economic Recovery of Companies and Organized Industrial Zone in the Kahramanmaraş Earthquake | SAKAMOTO Mayumi

Professor, Graduate School of Disaster Resilience and Governance, University of Hyogo | This joint research focuses on the economic recovery of disaster-affected regions by analyzing business continuities of companies and Organized Industrial Zones (OIZ). This study surveys business continuity of companies affected by the earthquake to identify which measures contributed to minimizing disaster damage and facilitating quick restoration. It also surveys infrastructural and lifeline resilience, supply chain conditions and mutual collaboration among companies in OIZ to find relevant characteristics of OIZ district continuity. Based on the evidence obtained, the study proposes effective Business Continuity and Recovery Plan (BCRP) measures to be taken to be applied to large scale disasters in other areas such as earthquake in Marmara region in Türkiye or Nankai Trough in Japan. |
| | | Selcuk Toprak

Professor, Department of Civil Engineering, Gebze Technical University | |

8	Survey on the impact of the 2023 Kahramanmaraş earthquake on schools and the situation of disaster education	FUKUSHIMA Yo Associate Professor, International Research Institute of Disaster Science, Tohoku University	This study will conduct surveys on the impacts of the Kahramanmaraş earthquakes on schools and children in the disaster-affected areas given their backgrounds. Specifically, the project will survey the damages to schools, recovery of the education infrastructure and school activities, disaster experiences and mental health, effective disaster education cases, and previous disaster education in schools. The survey will be conducted through interviews with schools and non-profit organizations related to children health and development under the support from administrative bodies that take charge of education and through gathering the outputs of previous independent surveys. The collected data will be the basis for developing new disaster education materials for building a disaster-resilient society.
		Canay Doğulu Assistant Professor, Department of Psychology, TED University	

| 9 | Development of a new seismic intensity calculation formula based on seismic records and structural damage in the strong motion zone of the Kahramanmaraş earthquake and elucidation of the intensity in the damage concentration zone based on microtremor measurements and shaking questionnaire survey | MORI Shinichiro

Endowed Chair Professor, Graduate School of Science and Technology, Ehime University

Nurcan Meral Ozel

Professor, Kandilli Observatory and Earthquake Research Institute, Boğaziçi University | The objective of this study is to develop a new MM seismic intensity calculation formula using seismic motion records that can appropriately evaluate the seismic intensity higher than 9 MM intensity, based on the correspondence between the degree of structural and ground damage around the seismograph and the seismic motion recorded in high density wide areas, and to clarify the seismic intensity in the damage concentration area of each city by microtremor measurements and seismic intensity questionnaire survey.
In order to evaluate the distribution of high-density seismic intensity, a questionnaire survey of citizens will be conducted in cooperation with members in Türkiye and Japan, as well as interviews in seismograph areas and questionnaire surveys through elementary and junior high schools. The results are expected to be useful for the reconstruction of Türkiye, future revision of building design standards, and earthquake risk management. |

| 10 | Strong motion observation in damaged areas of the 2023 Kahramanmaraş, Turkey, Earthquake | YAMANAKA Hiroaki

Professor,
School of Environment and Society,
Tokyo Institute of Technology

Oğuz Ozel

Professor,
Department of Geophysical Engineering,
Istanbul University | Strong motion observation has been conducted in the affected areas of the 2023 Kahramanmaraş Türkiye, Earthquake by Earthquake Humanitarian Aid Campaign (AFAD). However, the existing strong motion network is not enough to cover the wide affected areas.
For this research, strong motion instruments at 22 sites have been temporarily installed in the damaged areas since the middle of March 2023 to record strong motion records occurring due to aftershocks. The observations will be continued until February 2024 as a part of study. This project also involves microtremor explorations and resistivity sounding in the damaged areas to know soil conditions. These data from temporary observations and permanent observations by Turkish organizations are jointly used to establish soil models and source models for an estimation of characteristics of the strong ground motion in the damaged areas during the two major events in February of 2023. Finally, the relationship of ground motion features with a damage distribution will be elucidated. |

Overview of Call for Proposals

1. About J-RAPID

The J-RAPID* program is designed to provide urgent support for collaborative research activities between Japan-based and foreign-based researchers in conducting research related to mitigation of natural or anthropogenic disasters.

J-RAPID aims to play an early response role by promptly providing research support before ordinary research support normally implemented by the national government and other funding sources are able to do so.

(*) Initiated by Dear Colleague Letter for New Zealand and Japan dated March 29, 2011 issued by the National Science Foundation (NSF) of the United States, JST launched the original "J-RAPID" call in April 2011.

2. Call for proposals

(1) Proposal field application requirements:

This program supports Japanese researchers who have agreed to conduct joint research and surveys with researchers belonging to Turkish research institutes, with the aim of supporting research and surveys related to the damage caused by the Southeastern Türkiye earthquakes. Specific areas of research and investigation are expected to include the following:

· Study and research on seismic potential of southeastern Türkiye
· Evaluation of strong ground motion and detailed assessment of damage to buildings and infrastructure
· Research and survey on issues related to emergency evacuation and rescue measures
· Research and survey on emergency evacuation and rescue measures, health hazards, etc.
· Other studies and surveys related to the Southeastern Türkiye earthquakes

(2) Applicant eligibility (JST side):

Funding is available to researchers affiliated with universities, research institutions, corporations and other eligible entities based in Japan.

(3) Research period:

Eight months.

(4) Amount of funding (JST):

Up to 6 million yen to researchers on the Japan side per project, inclusive of overhead costs (10 percent of direct costs).

(5) Evaluation method:

Based on evaluation by an independent panel of experts.

(6) Evaluation Criteria

i) Purpose and suitability for the target field of research
The proposed research should be in line with the purpose and conditions of the call.

ii) Value of outcomes
The proposed research should be promising in terms of its potential value both academically and in terms of its ability to have an impact on real-world issues.

iii) Synergy effects from collaboration
The proposed research should be shown to clearly benefit and derive added value from collaboration in terms of achieving its objectives.

iv) Suitability of the research plan
The proposed research should have a detailed plan which is suitable in terms of its content, structure and implementation.

v) Suitability of principal investigator
The principal investigator should have sufficient expertise and experience to successfully carry out the proposed research for the duration of the research period.

List of Panel of Experts

Name	Position and Institution
UESHIMA Makoto	Professor, Earthquake Research Institute, The University of Tokyo
OKUMURA Koji	Professor Emeritus, Department of Geography, Archaeology, and Cultural Heritage, Hiroshima University
KIMURA Shuhei	Associate Professor, Faculty of Humanities and Social Sciences, Tsukuba University
SATAKE Kenji	Professor, Earthquake Research Institute, The University of Tokyo
TADOKORO Satoshi	Professor, Graduate School of Information Sciences, Tohoku University
CHIMOTO Kosuke	Associate Professor, Faculty of Engineering and Design, Kagawa University
TSUTSUMI Hiroyuki	Professor, Faculty of Science and Engineering, Doshisha University
NAKANO Yoshiaki	Professor, Institute of Industrial Science, The University of Tokyo
HISADA Yoshiaki	Professor, School of Architecture, Kogakuin University
HONKURA Yoshimori	Professor Emeritus, Tokyo Institute of Technology
MAKI Norio	Professor, Disaster Prevention Research Institute, Kyoto University
MUROTANI Satoko	Senior Curator, National Museum of Nature and Science