Ref.No.57

September 5, 2019

Director Kenji SATAKE
Earthquake Research Institute
The University of Tokyo

To whom it may concern,

Earthquake Research Institute Joint Usage/Research Program

Call for proposals for research projects and workshops for the Academic Year 2020

The Earthquake Research Institute (ERI) has been designated as a nationwide Joint Usage/Research Center for Earthquake and Volcano Sciences by the Ministry of Education, Culture, Sports, Science and Technology since the academic year 2010.

The goal of this center is to promote solid-earth sciences related to earthquakes and volcanoes, science and engineering to mitigate disasters caused by earthquakes and volcanic eruptions, and observational research both in Japan and abroad for the prediction of earthquakes and volcanic eruptions. In order to achieve this goal, the ERI conducts joint researches, accepts visiting researchers from both Japan and abroad, and provides facilities, equipment, materials, and data held by the ERI to related research institutions nationwide.

This time, we call for proposals for joint research projects, those for workshops and participants for Specific Research Projects for the Academic Year 2020.

1. Categories (See the Application Guidelines for the details)
   (1) Joint Research
   (2) Workshop/Symposium
   (3) Usage of Facilities, Observation Equipment, and Laboratory Equipment
   (4) Usage of Data and Records
   * We call for proposals for (1) and (2) annually. Please be aware that the period of application submission varies depending on the specific category. Applications for (3) and (4) are accepted all the year-round, but with some exceptions.

2. Eligibility for application:
   Faculty members and researchers of national, public, and private universities, or national and public research institutions, and their equivalents (a professor emeritus, graduate students, and researchers in private companies) are eligible to apply. For more explanations about students, please refer to the “13. precautions (5).”

3. Submission of proposals:
   Fill out necessary fields on the specified forms to be found on the joint usage homepage

(http://www.eri.u-tokyo.ac.jp/en/joint-usage-top/) and submit the form online.

Please follow the procedure shown on the homepage on Web-application guideline (https://erikyodo.confit.atlas.jp/en/)

4. Period of research: From April 2020 to March 2021.

5. Review Policy:

The Joint Usage Committee of the ERI will review the submitted applications. It is important that the content of the research plan follows the intent of the category for the joint usage/research program. It is required that a proposed project/workshop has relevance to the researches conducted in the ERI and/or to the facilities, equipment, records and data provided by the ERI. Applications are reviewed by all members of the Joint Usage Committee from several research fields.

For specific research projects (A), (B), and (C), the ERI will compile submitted participation applications for each project and send them to each principal investigator of the project. The principal investigator should submit a proposal for review by summarizing the application information before mid-November.

6. Application Deadline: October 31, 2019 (Thu).

7. Submission of Letter of Consent:

All members of a "1. Joint Research," except those who belong to the ERI, must submit a Letter of Consent (Form N-1-E) by the project. Please submit one with signature of the head of your affiliated institution within two weeks after you submitted application by postal mail to the mailing address shown at the end of this document. In case an applicant moves to a new institution, he/she should submit a Letter of Consent signed by the head of the new place without delay.

Submission of the Letter of Consent is not required for the one applying for "2. Workshop/Symposium," "3. Usage of facilities, observation equipment, and laboratory equipment" or "4. Usage of data and records."

Researchers who belong to ERI do not need to submit the letter of the consent.

8. Submission of Confirmation of Research Ethics form:

The Confirmation of Research Ethics form (Form N-2-E) must be submitted by the all participants for "1. Joint Research", "3. Usage of facilities, observation equipment, and laboratory equipment", and "4. Usage of data and records".

Submission of the form is not required for the participants for "2. Workshop/Symposium". Members of the University of Tokyo do not have to submit the form, either. Please send a signed Confirmation of Research Ethics form by postal mail to the mailing address shown at the end.

9. Submission of Confirmation of intellectual property

All members of a Cooperative Study on High Energy Geophysics Research project must submit a Confirmation of intellectual property (Form N-3-E). Those who submitted it once in FY 2016 - 2021, or belong to the University of Tokyo are not required to submit it.

10. Review Results:

The Joint Usage Committee of the ERI will evaluate all applications, and principal investigators of the projects will be informed about the results before late March 2020.

11. Funds for research/workshop:

The ERI will make expenditures for research/workshop expenses (travel costs, consumables, honorarium for simple labor, and service fees) within its budget. Expense for equipment is not allowed basically. Please check the definition and examples of the equipment and the consumable in "13. precautions (6)."

12. Acknowledgments:

On publishing papers based on the results of the researches performed under the ERI's joint usage/research program, please acknowledge the program in the paper. Also, please provide a copy of the paper to the ERI.

The following is an example of an acknowledgment format:

"This study was supported by ERI JURP 20XX-X-XX (project number) "

13. Lodging facilities:

The ERI is not equipped with lodging facilities. Please arrange accommodations by yourself.

14. Precautions:

(1) When using facilities, comply with the rules of the ERI as well as relevant laws, and follow the directions of the director for better management and safety.

(2) Keep in adequate contact with and follow the orders of the contact person and/or related members in the ERI when executing budget, implementing research, and using equipment.

(3) Losses and damages suffered by participants of the joint research projects or users of the equipment from outside the University of Tokyo shall be covered by their institution, and the University of Tokyo is not liable for them. A student participating in a joint research project expect Supercomputer Joint Research, should take out accident insurance. If provided equipment or accessories are damaged or lost, repairs or replacement will be made in the sole responsibility of the user. If defects are found after a device is returned, repair fee may be claimed.

(4) If you create intellectual property through this joint usage program, please inform the contact person at the ERI and research group members before making copyright or patent application. Additionally, please contact the intellectual property department of your affiliated institution. Division of rights and the application procedures will be determined following discussion among related parties.

(5) Graduate students may participate in the projects as members of a research group with acceptance of his / her supervisor, but they cannot be a principal investigator. Graduate

students may, however, apply as a principal investigator to use facilities, equipment, and data. Undergraduate students cannot participate in the projects but can be a "research assistant" by request of the principal investigator. A letter of consent is needed for the "research assistant", too. Please contact the "Research Support Team" if you want to add a new "research assistant".

(6) A material that is durable more than one year and costs more than ¥100,000 per one piece/set is considered as the equipment. Batteries/cells, chemicals, or software are, however, handled as the consumable, even if they are expensive. Please contact the Research Support Team (Joint Usage Section), if it is difficult to decide.

(7) Honorarium for simple labor is the reward for research assistant, administrative assistant, event support, unskilled labor, which is defined as the table of standard reward in "10. The reward for the unskilled labor such as counting and site management.

(8) If research meetings etc. are to be held using these funds, then please make sure to include the ERI as one of the organizers

(9) Reports on the joint research and research meetings will be posted on the Joint Usage page of the ERI's website.

(10) If the participants' personal information is to be acquired, please make sure to obtain the consent from the ERI and follow procedures in accordance with the Personal Information Protection Law, such as stating that the number of participants will be given in reports submitted to the ERI as well as in the progress reports of the ERI in such a way that individuals cannot be identified.

(11) If you have any other inquiries with regard to the joint usage program, please ask the Research Support Team (Joint Usage Section).

[Contact Information]
1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-0032
Earthquake Research Institute, the University of Tokyo
Research Support Team (Joint Usage Section)
Phone: 03-5841-1769, 5710
FAX: 03-5689-4467
Email: k-kyodoriyo@eri.u-tokyo.ac.jp

Application Guidelines

In order to facilitate researches in the fields relevant to earthquakes and volcanoes across Japan, the ERI conducts various joint usage/research programs. Applications for joint researches are accepted annually.

Please refer to the following explanations, and apply from online web system in the following website.

http://www.eri.u-tokyo.ac.jp/en/joint-usage-top/

Forms required for applications and related information are posted to the above URL.

If you apply for usage of equipment, please arrange a plan for the usage with a person in charge for the equipment at the ERI before submitting an application.

1. Joint Research

(1) Specific Research Project (A):

Specific Research Project (A) is for research projects that already have funds other than that by the joint usage/research program. Individual projects are being conducted nationwide by the ERI and/or other institutions, such as joint research based on "Promoting the Second Earthquake and Volcano Hazards Observation and Research Program (proposition)" hereinafter "Earthquake and Volcano Hazard Reduction Research." We call for applications to participate in these projects.

Research projects in this category are listed in Appendix A. Expenses to work for the projects will be supported. The maximum research expenses for each project should be ¥300,000 or less annually. Applicants to participate in projects under "Earthquake and Volcano Hazard Reduction Research" (Research Title No. 2020-A-01, see Table A-01 for projects) must not be a member of a research institution that receives project funds from "Earthquake and Volcano Hazard Reduction Research." Details of each research project can be found at the following website.

http://www.eri.u-tokyo.ac.jp/YOTIKYO/2020/project.html

An applicant should contact the principal investigator of the project or the contact person of the project at the ERI that he/she wishes to join to arrange research plan and submits the participation application (Form A-2a-E) with the principal investigator.

Applicants who wish to participate in the project listed in Appendix A but other than those for No. 2020-A-01 should submit application form A-2b-E.

As for the projects in No. 2020-A-01, acknowledgements for the joint usage/research program by the ERI must be included in publications and participants shall be obligated to submit reprints of the publications.

(2) Specific Research Project (B):

The projects in this category include those planned by individual researchers or research groups with the aim of forming future large-scale projects. Those who wish to participate in these projects are invited for application. The projects in this category are not currently supported by large-scale project-funds such as the "Earthquake and Volcano Hazard Reduction Research." Exploratory or international/interdisciplinary subjects are registered as in Appendix B.

Those who are interested in joining the project should inquire about the details of the research project with

the principal investigator of it or the contact person of the project at the ERI. Those who wish to join the research projects listed in Appendix B should submit application form B-2-E.

(3) Specific Research Project (C):

The projects in this category include those operated with funding other than joint usage/research program but the ERI approved as projects that belong to the program. The projects are listed in Appendix C.

Those who are interested in participating a project should inquire about the details of the research content with the principal investigator of it or the contact person of the project at the ERI. Those who wish to join the research projects listed in Appendix C should submit application form C-2-E. Some research titles are open to applications at all times of a year.

(4) General Research Project: （including grant program for Early-Career Scientists）

This category is for joint research projects conducted by small group of researchers formed from inside and outside of the ERI. Proposals that advance researches performed at the ERI further, or that stimulate research activities in the ERI are welcome. In addition, proposals that involve foreign visiting researchers accepted by the ERI's International Research Promotion Office for the joint usage/research program are given appropriate consideration. Proposals for researches that are not yet conducted at the ERI are also welcome. A principal investigator of a project must be a faculty member or researcher of university/institution other than the ERI, and at least a member of the ERI must be involved in the project. A principal investigator of a project should submit an application (Form G-1-E).

A project in this category shall receive ¥500,000 or less for travel cost, consumables and services to conduct the research. However, appropriate considerations shall be made for research projects that require more than ¥500,000 by some reasons, which must be explained in the application.

For researches conducted at the ERI, please see the "2017 Handbook for Earthquake Research Institute, the University of Tokyo" or check the ERI website at (http://www.eri.u-tokyo.ac.jp/en/).

A principal investigator of a project must submit a project report (Form G-2-E) within 30 days of the completion of the research period through the online web system.

grant program for Early-Career Scientists

We Research conducted by an individual researcher (*) who is less than 8 years after Ph.D. acquisition. As an interim measures, a non-Ph.D. researcher who is 39 years old or younger can apply.

(5) Cooperative Study on Elucidation and Prediction of Earthquakes and Volcanic Eruptions:

This category is for research projects related to items in "Earthquake and Volcano Hazard Reduction Research." The items are "1. Research for elucidation of earthquakes and volcanic phenomenon, " "2. Research for prediction of earthquakes and volcanic eruptions, " "4. Research to improve literacy for preventing disasters due to earthquakes and volcanic eruptions," or "5. Improvement of a system for research

promotion" and proposals for new researches that are not listed in Table A-01 are accepted. Period of research for a project is one year, but it may be continued as long as three years or until end of the project. Research funds shall be ¥1,000,000 or less per research project per year. Expenses shall include travel costs and joint research expenses (consumables and service fees). Please clarify which research item the proposed research is related [Ex: 2. (5) Volcanic eruption forecasting by constructing a volcanic activity transition model]. Proposals for research projects related to item "3. Research for inducement to earthquake and volcanic eruption disasters" will be accepted by another program run jointly by the ERI and the Disaster Prevention Research Institute, Kyoto University.

Please refer to the following URL for details on "Earthquake and Volcano Hazard Reduction Research."

http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu6/toushin/1413118.htm

We focus on the relevance of the items in "Earthquake and Volcano Hazard Reduction Research" and the novelty of the research. In particular, priority will be given to research topics closely related to 2. (1) New long-term forecasting of earthquake occurrence, 2. (2) Earthquake forecasting based on crustal activity monitoring, 2. (5) Volcanic eruption forecasting by constructing a volcanic activity transition model, or 5. (2) System that promotes integrated research across several fields (Great earthquakes along the Nankai Trough, Tokyo inland earthquakes, Great earthquakes along the Chishima Trench (Kuril Trench), Large-scale volcanic eruptions at Sakurajima, and Small-scale but high-risk volcanic eruptions), which are listed as priority research.

A faculty member from the Coordination Center for Prediction Research of Earthquakes and Volcanic Eruptions shall be the contact person at the ERI for accepted research projects. Principal investigator of a project should submit an application (Form Y-1-E).

A principal investigator of a project must submit a project report (Form Y-2-E) within 30 days of the completion of research period through the online web system. Another project report in the format set by the Coordinating Committee of Earthquake and Volcanic Eruption Prediction Researches must be submitted at the end of every academic year. Also, the results of the project should be presented at the annual-report-meeting held by the Committee in March every year.

As for the projects in this category, acknowledgements for the joint usage/research program by the ERI must be included in publications and participants shall be obligated to submit reprints of the publications.

(6) Cooperative Study on High Energy Geophysics Research:

This category is for research projects related to items in "High Energy Geophysics Research." Proposals based on industry-academia collaboration are given high priorities, in particular with matching funds of the applicants themselves.

Period of research for a project is one year, but it may be continued as long as three years. Research funds shall be ¥1,000,000 or less per research project per year. Expenses shall include travel costs and joint research expenses (consumables and service fees).

The Coordinating Committee of High Energy Geophysics Research conducts initial review of the proposals, and the Earthquake Research Institute Joint Usage Committee will make final decision regarding the review.

A faculty member shall be the contact person at the ERI for accepted research projects. Principal

investigator of a project should submit an application form H-1-E. All members of a project must submit a Confirmation of intellectual property (Form N-3-E). Those who submitted it once in FY 2016 - 2021, or belong to the University of Tokyo are not required to submit it.

A principal investigator of a project must submit a project report (Form H-2-E) within 30 days of the completion of research period through the online web system. As for the projects in this category, acknowledgements for the joint usage/research program by the ERI must be included in publications and participants shall be obligated to submit reprints of the publications.

(7) Supercomputer Joint Research

In the research fields related to earthquakes, volcanos, and disaster prevention, research that uses a big data and supercomputer is increasing. However, supercomputer is a limited resource and is not yet widely available. Therefore, the ERI call for researches that use supercomputer related to earthquakes, volcanos, and disaster prevention from FY2020.

ERI call for strategic researches related to (1) large-scale simulation or (2) data science research shown as follows. In addition, ERI call for researches related to earthquakes, volcanos, and disaster prevention. The earthquake and volcano information center computer system (EIC System) can be used at any time separately form this joint research. If you plan to do a large scale computations, please apply for this call.

(1) Large-scale simulation research (Prof. Furumura)

Research on ground motion, tsunami, and volcanic eruption based on numerical research or research for disaster mitigation and forecast of disaster.

(2) Data science research (Associate Prof. Tsuruoka)

Research that derives information, rules, and relationship, etc. from a big data related to earthquakes, volcanos, and disaster prevention

2. Workshop/Symposium

This category is for holding workshop and symposium for topics on earthquakes, volcanoes and related sciences. The length of a workshop or symposium is supposed as one to three days. The category includes summer school and other workshops that are expected to contribute to the development of the research community on earthquakes, volcanos and related field. A representative of workshop/symposium should submit an application (Form W-1-E). At least one member of the ERI must be included in the application as a contact person. The venue shall be in the ERI. If a workshop is to be held outside of the ERI (including overseas), please state the necessity for this clearly. And, if you accept to attend public people with the workshop, please select “open”, otherwise select “closed”.

(1) Domestic workshop/symposium

Domestic workshop/symposium will receive ¥1,000,000 or less, per a workshop/symposium.

The fund is spent to cover travel and printing costs.

(2) International workshop/symposium

International workshop/symposium will receive ¥2,000,000 or less, per a workshop/symposium. The fund is spent to cover travel and printing costs.

If major changes in the plan, such as a change of venue, are needed, those should be reviewed again at the Joint Usage Committee of the ERI. The representative of the workshop/symposium should submit a statement of the reason explaining the changes as soon as possible to the Research Support Team of the ERI.

The Joint Usage Committee will evaluate the original proposal and the statement of the reason to decide whether to approve the changes or not.

The representative to the workshop/symposium must submit a workshop/symposium report (Form W-2-E) within 30 days of the completion of the workshop/symposium through the online web system.

3. Usage of Facilities, Observation Equipment, and Laboratory Equipment

Some of the facilities, observation equipment, and laboratory equipment managed by the ERI are available for joint usage. Available items are listed in Appendix J-3. Those who wish to use the items should contact the contact person at the ERI for arrangement, and submit an application (Form F-1-E). It is necessary to submit another form, a specified items lease form (Form F-3-E), to take observation equipment outside the institute. If funds are required to use these facilities, please apply to the general research project instead.

A user of the item must submit a report (Form F-2-E) within 30 days of the completion of the usage of the items through the online web system.

4. Usage of Data and Records

Appendix J-4 is a list of earthquake and other earth science data and records, which are available for joint usage, managed by the ERI. Those who wish to use them should contact the contact person of the data and records at the ERI for arrangement, and submit an application (Form D-1-E) by the online system. Applications to use the computer system database of the Earthquake Information Center are accepted by the Earthquake Information Center homepage below.

http://wwweic.eri.u-tokyo.ac.jp/computer/manual/eic2015/index.php?English

If funds are required to use these data and records, please apply to the general research project instead.

If you wish to receive national earthquake observation system data using satellite communications, please submit an application (Form T-1-E). In addition, please submit reports (Forms D-2-E, T-2-E) within 30 days of the completion of the research using the data and records through the online web system.

【Appendix A】 2020FY Specific Research Project (A) Titles

Project code Project title	○ Principle investigator ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-A-01 Earthquake and Volcano Hazards Observation and Research Program	○ List of principal investigators is given in Table A-01 ・Head of Coordination Center for Prediction Research of Earthquakes and Volcanic Eruptions	The Second Earthquake and Volcano Hazards Observation and Research Program (Earthquake and Volcano Hazard Reduction Research) is a 5-year plan beginning in Fiscal Year 2019, based on a proposal in January, 2019, by the Council for Science and Technology (refer to the website; http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu6/toushin/1413118.htm). The program is composed of the four components as follows; 1. Research for elucidation of earthquakes and volcanic phenomenon, 2. Research for prediction of earthquakes and volcanic eruptions, 3. Research for prediction of inducement to earthquake and volcanic eruption disasters, 4. Research to improve literacy for preventing disasters due to earthquakes and volcanic eruptions, and 5. Improvement of a system for research promotion. Researchers from 28 universities, research institutions and government agencies across the country have been jointly conducting about 170 specific research projects under the program. The Earthquake Research Institute will subsidize the expense of joining any of Universities' projects under this program listed in【Table A-01】for researcher(s) from universities or research institutes which do not participate in the Earthquake and Volcano Hazard Reduction Research. Those researcher(s) who wish to join a specific project should take contact with the Principal Investigator of the project, and submit the application form A-3a. Please refer Table A-01 or the following URL for detail information about the respective projects; http://www.eri.u-tokyo.ac.jp/YOTIKYO/2020/project.html
2020-A-02 Structure and dynamics of Earth's deep interior	○Satoru Tanaka （JAMSTEC） ・Hisayoshi Shimizu	This collaboration aims to reveal the structure and dynamics of the Earth's deep interior mainly by observational approach. We carry out long-term observation by geophysical network in the Pacific region (Ocean Hemisphere Network) and seismic and/or electromagnetic array studies both on land and seafloor, and contribute to the scientific aim by analyzing data from these observations. **Project name of the financial base to conduct this specific research project :** Contribution to Global Seismographic Network Geophysical studies by using submarine cables, TPC-1 and TPC-2.

Project code Project title	○ Principle investigator ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-A-03 Science of Slow Earthquakes	○Kazushige Obara（Earthquake Research Institute） ・Kazushige Obara	Our research will shed light on the mystery of "slow earthquakes", which have been detected in succession in recent years. This will require an approach integrating the conventional fields of geophysics, seismology, and geodesy with materials science and non-equilibrium statistical physics, among others. By explaining the mechanisms, environmental conditions and principles of slow earthquakes, our goal is to accelerate a unified understanding of all earthquake events, from low-speed deformation to high-speed slip, and at the same time, to rebuild the way research is conducted on earthquakes. We collaborate with many researchers not only in Japan but also in various countries in the world in order to clarify (A) mechanisms involved in the occurrence of slow earthquakes, (B) environment in which slow earthquakes occur, and (C) principles by which slow earthquakes occur. We welcome research collaborators who are interested in this project【Table A-03】. If your proposal is accepted, a part of the travel fee will be supported. URL:http://www.eri.u-tokyo.ac.jp/project/sloweq/ **Eligibility for application:** Faculty members and researchers of national, public, and private universities, or national and public research institutions, and their equivalents are eligible to apply. **Project name of the financial base to conduct this specific research project :** 2016-2020 Japan Society for the Promotion of Science, Grant-in-Aid for Scientific Research on Innovative Areas "Science of Slow Earthquakes"
2020-A-04 Upper mantle structure of the northern Okinawa Trough	○Kazuo Nakahigashi（Tokyo University of Marine Science and Technology） ・Masanao Shinohara	We conducted bathymetric and seismic surveys, and a seismic and magnetic observation in the northern Okinawa Trough. We will try to elucidate the relationship between the earthquake occurrence and the inhomogeneity structure of the upper mantle, and propose a large earthquake occurrence model in the northern Okinawa Trough. We welcome the participation of those who wish to board the observation cruise. **Project name of the financial base to conduct this specific research project :** Grant-in-Aid for Scientific Research (B) Upper mantle structure and its implications for the earthquake occurrence and the back-arc rifting in the Okinawa Trough

Project code Project title	○ Principle investigator ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-A-05 Intelligent seismic data processing based on integration of next-generation seismic observations and the forefront of Bayesian statistics	○Naoshi Hirata（Earthquake Research Institute） ・Hiromichi Nagao	In our country, more than 1,000 seismic stations have been continuously acquiring high-resolution digital seismic data. A large amount of instrumentally measured vibration data, which can be so-called big-data, will be available in near future. The data consist of both the conventional high-quality seismic data by well-calibrated seismometers and many kinds of new vibration data measured by accelerometers based on Micro Electro Mechanical Systems (MEMS), which are installed in such as infrastructures, lifelines and smartphones. This project, which consists of the three research topics shown in the attached table【Table A-05】, aims to develop, collaborating with the forefront of Bayesian statistics, a set of algorithms that enable us to comprehensively analyze the seismic data obtained by sensors of various types. This project will eventually contribute to prevention/mitigation of seismic disasters and clarification of earthquake phenomena. **Requirement for participation:** Applicants must contribute to the promotion of the JST CREST project that this collaborative research bases. **Project name of the financial base to conduct this specific research project :** JST CREST “Intelligent seismic data processing based on integration of next-generation seismic observations and the forefront of Bayesian statistics”

【Table A-01】 2020-A-01 projects

2019/8/20

課題番号	代表機関名	課題代表者	研究課題名
1．地震・火山現象の解明のための研究 (1) 地震・火山現象に関する史料・考古データ、地質データ等の収集と解析			
ERI_01	東京大学地震研究所	加納 靖之	歴史地震史料を活用した地震学的解析
IRID01	東北大学災害科学国際研究所	蝦名 裕一	東北地方における地震・津波・火山情報に関する歴史資料の所在調査とデータ収集
NGT_01	新潟大学	中村 元	日本海沿岸地域を中心とした地震・火山現象の解明のための史料収集と解析
NGY_01	名古屋大学	山中 佳子	古文書解読による南海トラフ巨大歴史地震像の解明　～歴史地震情報の可視化システムの構築とその活用～
UTH_01	東京大学史料編纂所	榎原 雅治	地震火山関連史料の収集・分析とデータベースの構築・公開
NAB_01	奈良文化財研究所埋蔵文化財センター	村田 泰輔	考古・文献資料からみた歴史災害情報の収集とデータベース構築・公開ならびにその地質考古学的解析
HKD_01	北海道大学	西村 裕一	津波堆積物情報の高度化と実践的活用に関する研究
UTS_01	東京大学理学系研究科	後藤 和久	沿岸巨礫を用いた古津波評価法の検討：南海トラフ～琉球海溝の連動可能性評価に向けて
ERI_02	東京大学地震研究所	安田 敦	マグマ溜まりの時間発展と噴火様式との関連性
TYM_01	富山大学	石﨑 泰男	極小規模噴火を含めた草津白根火山の噴火履歴の解明と噴火ポテンシャル評価
(2) 低頻度大規模地震・火山噴火現象の解明			
HMEV01	東京大学地震火山史料連携研究機構	佐竹 健治	地震火山関連史資料に基づく低頻度大規模地震火山災害の調査
UTS_02	東京大学理学系研究科	田中 愛幸	巨大地震に伴う粘弾性余効変動の解明
ERI_03	東京大学地震研究所	前野 深	大規模噴火に伴う諸現象とそれを駆動するマグマ溜り―火道システムの解明
HKD_02	北海道大学	栗谷 豪	大規模噴火に関わるマグマプロセスの時間スケールの解明
(3) 地震発生過程の解明とモデル化			
ERI_05	東京大学地震研究所	篠原 雅尚	千島海溝・日本海溝における複合海底地震測地観測によるプレート境界の挙動解明とそのモデル化
ERI_04	東京大学地震研究所	亀 伸樹	非線形動力学・計算材料科学との学際連携に基づく地震現象の多様性の統一的理解
THK_01	東北大学	岡田 知己	国際共同研究によるニュージーランドにおける地震発生機構の解明
UTS_03	東京大学理学系研究科	井出 哲	地震発生場のテクトニクスとマルチスケール地震現象の予測可能性
ERI_06	東京大学地震研究所	中谷 正生	より現実的な断層面ダイナミクス

課題番号	代表機関名	課題代表者	研究課題名
RTM_01	立命館大学	小笠原 宏	南アフリカ大深度金鉱山からの地震発生場における応力と物質の直接調査
THK_02	東北大学	松澤 暢	流体の寄与に注目した地震断層すべり物理モデルの高度化
(4) 火山現象の解明とモデル化			
ERI_07	東京大学地震研究所	大湊 隆雄	多項目観測データの比較研究に基づく噴火過程の理解とモデル構築
THK_03	東北大学	西村 太志	噴火発生時刻の即時把握と噴火ダイナミクスの研究
TIT_01	東京工業大学	野上 健治	海域火山活動に伴う熱水活動の実験的研究と観測研究
TIT_02	東京工業大学	野上 健治	小型拡散放出二酸化炭素率測定装置の開発
TYM_02	富山大学	堀田 耕平	富山県弥陀ヶ原火山における地球物理学的観測による火山活動モニタリング
HKD_03	北海道大学	吉村 俊平	マグマ脱ガス実験と火山噴出物の揮発性成分解析に基づく噴火分岐メカニズムの解明
THK_04	東北大学	中村 美千彦	浅部貫入マグマの結晶化速度と噴火挙動の推定手法の開発
(5) 地震発生及び火山活動を支配する場の解明とモデル化			
ERI_08	東京大学地震研究所	望月 公廣	日本・NZ国際協力によるヒクランギ沈み込み帯における多様な地震活動と，その発生環境との関係の解明
THK_06	東北大学	東 龍介	スラブ内地震の発生メカニズムに関する研究
KGSM01	鹿児島大学	八木原 寛	南西諸島北部域におけるプレート間すべりの特性に関する地震・地殻変動観測研究
AORI01	東京大学大気海洋研究所	朴 進午	巨大津波を引き起こす震源断層の実態解明と流体変動モニタリング
DPRI01	京都大学防災研究所	伊藤 喜宏	津波生成過程の理解に向けた浅部スロー地震の活動様式・発生場の解明とモデル化
DPRI02	京都大学防災研究所	澁谷 拓郎	南海トラフ巨大地震の予測高度化を目指したフィリピン海スラブ周辺域での総合的観測研究
THK_05	東北大学	趙 大鵬	世界各地の大地震発生域との比較研究に基づく地震・火山現象の理解
IRID02	東北大学災害科学国際研究所	木戸 元之	GPS-A観測による効率的な上下変動検出技術の開発と根室沖観測への適用
HRS_01	弘前大学理工学研究科	小菅 正裕	東北日本弧・千島弧会合部とその周辺における地震発生場の解明
DPRI03	京都大学防災研究所	飯尾 能久	内陸地震の発生機構と発生場の解明とモデル化
ERI_09	東京大学地震研究所	飯高 隆	内陸地震発生ポテンシャルの予測を目指した島弧の地殻応答と断層における地殻内流体の影響の解明
THK_07	東北大学	岡田 知己	地殻応答による断層への応力載荷過程と断層間相互作用の解明と予測
ERI_10	東京大学地震研究所	今西 祐一	東日本における長期的重力変化の観測とモデリング
UTS_04	東京大学理学系研究科	角森 史昭	地殻流体の化学的観測による地震火山活動評価システムの高度化と応用

課題番号	代表機関名	課題代表者	研究課題名
KOBE01	神戸大学海洋底探査センター	島 伸和	鬼界海底カルデラにおけるマグマ供給系の構造・進化の解明
TIT_03	東京工業大学	寺田 暁彦	水蒸気噴火の準備過程を捉えるための火山熱水系構造モデルの精緻化
AORI02	東京大学大気海洋研究所	佐野 有司	地球物理・化学的探査による海底火山および海底熱水活動の調査
THK_08	東北大学	山本 希	集中地震観測による火山体構造・火山現象発生場の解明
KYU_01	九州大学	相澤 広記	地震火山相互作用下の内陸地震空間ポテンシャル評価
DPRI04	京都大学防災研究所	深畑 幸俊	日本列島の地震—火山噴火の基本場解明：地殻とマントルにおける応力、流体-マグマ、温度・流動－変形場
２．地震・火山噴火の予測のための研究 (1) 地震発生の新たな長期予測			
NGY_02	名古屋大学	田所 敬一	南西諸島海溝におけるプレート間固着状態の解明
HMEV02	東京大学地震火山史料連携研究機構	西山 昭仁	地震関連史料に基づく近代以前の地震活動の調査
ERI_11	東京大学地震研究所	篠原 雅尚	地震発生予測のための島弧-海溝システムの観測-モデリング統合研究
UTS_05	東京大学理学系研究科	安藤 亮輔	物理モデルと地形・地質学およびテクトニックな観測データを統合した地震発生の長期予測手法の開発と検証
DPRI05	京都大学防災研究所	西村 卓也	測地観測データに基づく内陸地震長期評価手法の開発
NGY_03	名古屋大学	鈴木 康弘	変動地形学的手法による内陸地震発生モデルと活断層長期評価手法の再検討
(2) 地殻活動モニタリングに基づく地震発生予測			
ERI_12	東京大学地震研究所	蔵下 英司	スロー地震モニタリングに基づく南海トラフ域の地震発生可能性評価手法に関する研究
KUS_01	京都大学理学研究科	宮崎 真一	地殻活動データの同化による沈み込みプレート境界面すべり予測に関する研究
THK_09	東北大学	内田 直希	繰り返し地震再来特性の理解に基づく地殻活動モニタリング
NGY_04	名古屋大学	田所 敬一	南海トラフ域におけるプレート間固着・滑りの時空間変化の把握
(3) 先行現象に基づく地震発生の確率予測			
THK_10	東北大学	長濱 裕幸	地殻変動に伴う大気中ラドン濃度変動
CBA_01	千葉大学	服部 克巳	電磁気学的な地震先行現象の総合的研究
ERI_13	東京大学地震研究所	中谷 正生	経験的アプローチによる大地震の確率予測のパフォーマンス調査
RTM_02	立命館大学	川方 裕則	地震に先行する極微小な前震活動の異常度評価と発生環境の評価

課題番号	代表機関名	課題代表者	研究課題名
(4) 中長期的な火山活動の評価			
UTS_06	東京大学理学系研究科	森 俊哉	遠隔地火山、特に離島火山における火山ガスモニタリングの高度化
KUS_02	京都大学理学研究科	大倉 敬宏	地震・地殻変動モニタリングによる中期的な火山活動の評価
HKD_04	北海道大学	橋本 武志	電磁気・熱・ガス観測に基づく火山活動推移モデルの構築
(5) 火山活動推移モデルの構築による火山噴火予測			
DPRI06	京都大学防災研究所	井口 正人	インドネシアの活動的火山における火山活動推移モデルの構築
DPRI07	京都大学防災研究所	中道 治久	桜島火山における火山活動推移モデルの構築による火山噴火予測のための総合的観測研究
THK_11	東北大学	西村 太志	多項目観測データに基づく火山活動のモデル化と活動分岐判断指標の作成
3．地震・火山噴火の災害誘因予測のための研究 (1) 地震・火山噴火の災害誘因の事前評価手法の高度化			
DPRI08	京都大学防災研究所	関口 春子	広帯域強震動予測の高度化に関する研究
DPRI09	京都大学防災研究所	岩田 知孝	断層破壊過程と極大強震動生成に関する研究
ERI_14	東京大学地震研究所	古村 孝志	大規模数値シミュレーションに基づく広帯域強震動災害の事前・即時予測
ERI_15	東京大学地震研究所	酒井 慎一	首都圏の地震被害分布と地震像の解明
NGY_05	名古屋大学	鈴木 康弘	地表地震断層の特性を重視した断層近傍の強震動ハザード評価
ERI_16	東京大学地震研究所	三宅 弘恵	堆積平野・堆積盆地における地震災害発生機構の解明
TTR_01	鳥取大学	香川 敬生	地方自治体の地震被害想定，災害リスク評価を高度化するための基盤整備
DPRI10	京都大学防災研究所	釜井 俊孝	火山地域を含む地震地すべり発生場の評価と斜面における強震動及び不安定化の事前予測手法の展開
IRID03	東北大学災害科学国際研究所	佐藤 源之	地表設置型合成開口レーダ(GB-SAR)による地表面変位計測の高精度化
DPRI11	京都大学防災研究所	為栗 健	火砕流の発生と流下予測
HKD_05	北海道大学	谷岡 勇市郎	巨大地震に伴う海底斜面崩壊による津波の事前評価・即時予測に関する研究
(2) 地震・火山噴火の災害誘因の即時予測手法の高度化			
THK_12	東北大学	太田 雄策	海陸測地データを活用したプレート境界面すべり即時把握能力の向上とそれにもとづく津波即時推定手法の高度化
HRS_02	弘前大学理工学研究科	前田 拓人	データ同化に基づく津波現況把握と即時予測の高度化
DPRI12	京都大学防災研究所	藤田 正治	噴火後の土石流および泥流の発生に関する観測と予測手法の開発

課題番号	代表機関名	課題代表者	研究課題名
ERI_17	東京大学地震研究所	前野 深	堆積物に基づく噴火物理化学パラメータ推定手法の高度化と事象分岐判断への活用
(3) 地震・火山噴火の災害誘因予測を災害情報につなげる研究			
IRID04	東北大学災害科学国際研究所	福島 洋	地震の事前情報を起点とするハザード事象系統樹の開発
III_01	東京大学情報学環	関谷 直也	ニーズ・アセスメントに基づく地震・火山災害に関する発生確率、被害想定、災害情報のコミュニケーション戦略の開発
HKD_06	北海道大学	橋本 武志	火山活動即時解析表示システムの開発
4．地震・火山噴火に対する防災リテラシー向上のための研究 (1) 地震・火山噴火の災害事例による災害発生機構の解明			
NGY_06	名古屋大学	室井 研二	被害の地域的な発現過程とコミュニティの社会・空間構造に着目した地震・津波災害発生機構に関する文理融合的研究
UTH_02	東京大学史料編纂所	杉森 玲子	近代以前の地震・火山災害に関する多角的研究
(2) 地震・火山噴火災害に関する社会の共通理解醸成のための研究			
DPRI14	京都大学防災研究所	矢守 克也	災害リテラシーの育成のためのオープンサイエンス手法の検討
HKD_07	北海道大学	橋本 雄一	地理空間情報の総合的活用による災害への社会的脆弱性克服に関する人間科学的研究
HYG_02	兵庫県立大学	澤田 雅浩	地震観測研究の成果を活用した土地利用に係る事例収集に基づく枠組みの提案
NGT_02	新潟大学	田村 圭子	地震・火山噴火災害における被害軽減のために利活用可能な要素・知識体系の整理・検証
KUS_03	京都大学理学研究科	大倉 敬宏	阿蘇で学ぶ地震・火山災害への備え
HYG_01	兵庫県立大学	阪本 真由美	地震・火山観測データを活用した減災・復興モデルの構築とリスクコミュニケーションに資する事例収集
DPRI13	京都大学防災研究所	中道 治久	桜島火山における地域との連携による火山災害に関する社会の共通理解醸成のための研究
IRID06	東北大学災害科学国際研究所	杉浦 元亮	災害に関わる個人の心理・行動特性とその評価・活用・調整に関わる研究
TYM_03	富山大学	井ノ口 宗成	地震学・火山学の知見に基づくコンパクトシティをデザインする情報科学からの被災生活シミュレーション
NGY_07	名古屋大学	山岡 耕春	御嶽山地域の防災力向上の総合的推進に関する研究
IRID05	東北大学災害科学国際研究所	蝦名 裕一	歴史地形の復元・可視化手法の確立と災害発生要因の分析
5．研究を推進するための体制の整備 (2) 分野横断で取り組む総合的研究を推進する体制			
HKD_09	北海道大学	高橋 浩晃	千島海溝沿いの巨大地震津波災害軽減に向けた総合研究

課題番号	代表機関名	課題代表者	研究課題名
(3) 研究基盤の開発・整備			
ERI_18	東京大学地震研究所	加納 靖之	観測研究データへの永続的識別子付与
ERI_19	東京大学地震研究所	鶴岡 弘	データ流通網の高度化
THK_13	東北大学	内田 直希	地震・火山データの無線伝送技術の開発
NGY_08	名古屋大学	山中 佳子	小電力・小型・携帯テレメータ地震観測装置の改良開発
ERI_22	東京大学地震研究所	篠原 雅尚	海底ケーブルを用いる地震・地殻変動・津波リアムタイム観測技術開発
ERI_23	東京大学地震研究所	塩原 肇	海底での地震・地殻変動観測に向けた機動的観測技術の高度化
KOC_01	高知大学	大久保 慎人	地震動観測点観測環境の時間変化把握に向けた、解析手法の検討・開発
ERI_21	東京大学地震研究所	田中 宏幸	高精細ミュオグラフィ画像自動診断による火山活動状況の推移との相関評価
ERI_20	東京大学地震研究所	新谷 昌人	光技術を用いた地下深部・火山近傍における地震・地殻変動計測技術の確立
HKD_08	北海道大学	高橋 浩晃	地殻変動等多項目データの全国流通一元化公開解析システムの高度化
KOC_02	高知大学	大久保 慎人	地震波形データ流通のための、新ＷＩＮ伝送プロトコルの検討・開発
ERI_24	東京大学地震研究所	中川 茂樹	マルチプラットフォーム次世代WINシステムの開発
ERI_25	東京大学地震研究所	鶴岡 弘	研究成果共有データベースの構築

【Table A-03】 2020-A-03 Projects

No	PI	Institution	Research Project
A0101	Kazushige Obara	Earthquake Research Institute, The University of Tokyo	Study on activity pattern of deep slow earthquakes based on inland broadband seismograph observations
A0102	Kazushige Obara	Earthquake Research Institute, The University of Tokyo	Study on activity pattern of deep slow earthquakes based on inland very dense array observations by using short-period seismometers
A0103	Youichi Asano	National Research Institute for Earth Science and Disaster Resilience	Temporary observation of regular and very low-frequency earthquakes for understanding on seismic behavior along the Ryukyu trench
A0104	Sachiko Tanaka	National Research Institute for Earth Science and Disaster Resilience	Spatial and temporal changes in tidal modulation of low frequency tremor and very low frequency earthquakes
A0105	Mamoru Nakamura	University of Ryukyus	Study of spatiotemporal variation in tidal response of very low frequency earthquakes in the Ryukyu Trench
A0106	Naoki Uchida	Tohoku University	Study on the interaction between various slip phenomena on the plate boundary
A0107	Masatoshi Miyazawa	Disaster Prevention Research Institute, Kyoto University	Temporal changes of frictional parameters on the plate interface estimated by using dynamic triggering of tectonic tremor
A0108	Yusuke Yamashita	Disaster Prevention Research Institute, Kyoto University	Study on modeling of shallow SSE based on ocean bottom pressure observations
A0109	Masanao Shinohara	Earthquake Research Institute, The University of Tokyo	Study on activity pattern of shallow slow earthquakes based on offshore broadband seismological observations
A0201	Hitoshi Hirose	Research Center for Urban Safety and Security, Kobe University	GNSS Observations for crustal deformations due to slow slip events in southwest Japan (around the Bungo channel area etc.)
A0202	Shinichi Miyazaki	Kyoto University	GNSS Observations for crustal deformations due to slow slip events in southwest Japan (Okinawa islands) and data assimilation to infer slip evolutions
A0203	Takeshi Matsushima	Kyushu University	GNSS Observations for crustal deformations due to slow slip events in southwest Japan (remote islands)
A0204	Takao Tabei	Kochi University	GNSS Observations for crustal deformations due to slow slip events in southwest Japan (Shikoku district)
A0205	Kenichi Yamazaki	Disaster Prevention Research Institute, Kyoto University	GNSS Observations for crustal deformations due to slow slip events in southwest Japan (around the Kyushu area etc.)
A0206	Yoshiyuki Tanaka	The University of Tokyo	Detection of crustal fluid flow associated with slow slip events
A0207	Ryota Takagi	Tohoku University	Detecting slow slip events and understanding interaction with tremor activity based on GNSS data analysis
A0208	Takeshi Kimura	National Research Institute for Earth Science and Disaster Resilience	Development of automated system for detection of slow slip events from continuous tilt and strain data
A0209	Satoshi Itaba	National Institute of Advanced Industrial Science and Technology	Detection of shallow and deep SSE by onland and ocean area crustal movement records

No	PI	Institution	Research Project
B0101	Kimihiro Mochizuki	Earthquake Research Institute, The University of Tokyo	Seismic structure and seismicity around slow-slip region in the Hikurangi subduction margin, New Zealand
B0102	Makoto Uyeshima	Earthquake Research Institute, The University of Tokyo	EM observations on land in the vicinity of the Bungo Channel
B0103	Hiroshi Ichihara	Nagoya University	Ocean bottom electromagnetic survey in the southwestern Nankai Trough
B0104	Seiichi Miura	Japan Agency for Marine-Earth Science and Technology	Marine seismic survey in the Nankai Trough
B0105	Eiji Kurashimo	Earthquake Research Institute, The University of Tokyo	Study on heterogeneous structure in and around the slow-earthquake source region based on dense seismic array observations
B0106	Katsuhiko Shiomi	National Research Institute for Earth Science and Disaster Resilience	Seismological features around the LFE zone beneath western Shikoku
B0107	Junichi Nakajima	Tokyo Institute of Technology	Seismic properties around slow-slip areas and possible drainage from the megathrust
B0201	Kohtaro Ujiie	University of Tsukuba	Geology of slow earthquake source
B0202	Ikuo Katayama	Department of Earth and Planetary Systems Science, Hiroshima University	Experimental study of frictional properties for slow earthquakes
B0203	Yasushi Mori	Kitakyushu Museum of Natural History & Human History	Fluid flow and silica transport toward the source area of deep slow earthquakes
B0204	Simon Wallis	The University of Tokyo	Patterns of fluid flow and deformation in the shallow mantle wedge
B0205	Yoshitaka Hashimoto	Kochi University	Frictional heating and slip behavior along micro-faults in exhumed accretionary complexes
B0206	Wataru Tanigawa	Japan Agency for Marine-Earth Science and Technology	Laboratory determination of slip velocity dependence on dynamic permeability of fault zone
B0207	Akito Tsutsumi	Kyoto University	Effect of pore fluid pressure on the frictional properties of subduction zone material

No	PI	Institution	Research Project
C0101	Satoshi Ide	The University of Tokyo	Modeling broadband slow earthquakes
C0102	Takanori Matsuzawa	National Research Institute for Earth Science and Disaster Resilience	Comprehensive numerical model of observed slow slip events
C0103	Yuta Mitsui	Shizuoka University	Search for new factors of slow earthquake occurrence
C0104	Eiichi Fukuyama	Kyoto University	Modeling of slow earthquakes based on large-scale friction experiments
C0105	Keisuke Ariyoshi	Japan Agency for Marine-Earth Science and Technology	Understanding of relationship between migration speed for slow earthquake and frictional properties
C0106	Shoichi Yoshioka	Kobe University	Relationship between occurrence of slow earthquakes in circum-Pacific subduction zones and temperature and dehydration field inferred from 3D thermal modeling
C0107	Masaru Nakano	Japan Agency for Marine-Earth Science and Technology	Estimations of heterogeneous structures along source faults based on statistical characteristics of shallow slow earthquakes
C0108	Futoshi Yamashita	National Research Institute for Earth Science and Disaster Resilience	Studies on slow slip and micro seismic activity based on large-scale rock friction experiments
C0201	Takahiro Hatano,	Osaka University	Unified understanding of earthquake generation process with nonlinear dynamics approach
C0202	Tetsuo Yamaguchi	Kyushu University	Studies on control of frictional constitutive laws and earthquake cycles using gels
C0203	Yutaka Sumino	Tokyo University of Science	Construction and analysis of analogue system for slow earthquake using brittle viscoelastic fluid.
C0204	Takehito Suzuki	Aoyama Gakuin University	Analytical treatment of nonlinearity generated by the interaction among heat, fluid pressure and dilatancy associated with earthquake source process

【Table A-05】 2020-A-05 Projects
(Intelligent seismic data processing based on integration of next-generation seismic observations and the forefront of Bayesian statistics)

No.	PI	Institution	Research Project
A	Aitaro Kato	Earthquake Research Institute, The University of Tokyo	Methodology for utilization of various types of seismic data and its validation
B	Hiromichi Nagao	Earthquake Research Institute, The University of Tokyo	Development of algorithms for seismic data processing based on the forefront of Bayesian statistics
C	Takuto Maeda	Graduate school of Science and Technology, Hirosaki University	Intelligent seismic data processing: application to real data and development of data assimilation methods

【Appendix B】 2020FY Specific Research Project (B) Titles

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2018-B-01 Data-driven geoscience: application for the dynamics in mobile belts	★Kenta Yoshida（JAMSTEC） ・Hiromichi Nagao	Dynamics in the mobile belt involves several geophysical and geochemical processes and their interactions, and our observation is only the result of such comprehensive interactions. Data-driven approach, dealing with high-dimension data and seeking its hidden structure, may be an effective way to solve such complex systems. Although geophysics start to utilize data-driven approach for several purposes, it has not been common in geology and geochemistry, yet. In this project, we would like to establish an open scheme of data-driven geoscience that deals with problems in dynamics in mobile belts including volcanism, seismicity, and fluid circulations. Our target is cross-cutting research not only among earth scientists, but also involving information scientists, to construct a new analytical scheme for the challenging issues. **List of affiliations for projected participants:** Japan Agency for Marine-Earth Science and Technology, Hokkaido University, Tohoku University, The University of Tokyo, Tokyo Institute of Technology, Tokoha University, Kanazawa University, University of Tsukuba, Kyoto University, Osaka City University, Kagoshima University, Kitakyushu Museum of Natural History & Human History, National Institute of Advanced Industrial Science and Technology, National Research Institute for Earth Science and Disaster Resilience, The Institute of Statistical Mathematics
2018-B-02 Study on the crustal and surface deformation using multiple SAR techniques	○Youichiro Takada （Hokkaido University） ・Yosuke Aoki	Many has been found using various new sensors during the last five years due to the launch of ALOS-2 satellite. Due by the launch of next SAR satellite “ALOS-4” (scheduled for 2020), we must prepare the study environment which makes such latest SAR technologies available to Japanese researchers to address international competition. Such an environment has been maintained by PIXEL, a study group of SAR, founded on the joint usage of ERI, the university of Tokyo. This project serves as base of the PIXEL activities. Under this project, the participants can share the SAR data provided by JAXA. The purpose of this project is to detect various phenomena as earthquakes, volcanic unrests, landslides, glaciers, ground subsidence, etc. using multiple state-of-the-art techniques of SAR analysis and/or technologies of SAR satellites. We also pay special attention to the time evolution of crustal and/or surface deformation using ALOS and other satellites. Furthermore, we put weight on the information exchange and the lectures on the SAR analysis software “RINC”. During this project, the RINC user has been increasing. Considering overseas trend (new satellite missions, etc.), in the second year, we may put the lecture of RINC and the information exchange together. In the third year, we plan to hold a symposium to wrap up the results of this project. **List of affiliations for projected participants:** Hokkaido University, The University of Tokyo, Tohoku University, Kanazawa University, Ibaraki University, Tokyo metropolitan University, University of Aizu, Nihon University, Shizuoka University, Nagoya University, Kyoto University, Kochi University, University of Kochi, Kyushu University, Kagoshima University, Kagawa University, Tokushima University, National Research Institute for Earth Science and Disaster Resilience, National Institute of Advanced Industrial Science and Technology, Center for Environmental Science in Saitama, Tono Research Institute of Earthquake Science, Hot Springs Research Institute of Kanagawa Prefecture, National Institute of Polar Research, Japan Meteorological Agency, Meteorological Research Institute, Fukada Geological Institute

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2018-B-04 Establishment of dense infrasound observing network	○Masa-yuki Yamamoto（Kochi University of Technology） ・Yuichi Imanishi	Along with the most recent environment of rapid developing of sensors with viewing of coming IoT (Internet Of Things) era, a basic research to establish of dense infrasound observing network will be carried out. Owing to our collaborative results in past 3 years until fiscal year of 2016, collaborations with involved researchers and institutes were significantly improved, and establishment of low cost sensing with MEMS sensors was also proven. We will extend its collaboration for the next 3 years with local governments and citizens so as to realize a domestic network of low cost infrasound microphones. **List of affiliations for projected participants:** Hokkaido University, Hokkaido Information University, The University of Tokyo, Japan Weather Association, National Institute of Polar Research, National Institute of Information and Communications Technology, Nagoya University, Kanazawa University, Kochi University of Technology, Kyushu University, National Research Institute for Earth Science and Disaster Resilience, National Institute of Advanced Industrial Science and Technology, University of Shizuoka
2019-B-01 Volcano observation using MEMS infrasound sensor	○Isao Shimoyama（Toyama Prefectural University） ・Mie Ichihara	The purpose of this project is to develop and evaluate high performance compact infrasound sensor for use in volcano monitoring by using MEMS high sensitive differential pressure sensor. We plan to conduct comparative tests and field tests with the conventional sensors. By using MEMS, we believe that it is possible to realize a sensor that is compact, highly sensitive and low cost. We expect this research helps efficiently development of the proposed sensor. **List of affiliations for projected participants:** Expected collaborators are from Toyama Prefectural University, Keio University, Kyushu University, Kochi University of Technology, Mount Fuji Research Institute, and Japan Meteorological Association
2019-B-03 Unified understanding of crustal activity by a high-precision geophysical observation network	○Makoto Okubo（Kochi University） ・Akito Araya	Extensometers and water-tube tiltmeters still have been used for continuous observation of crustal activity. Recently, space-borne observational technologies such as GNSS and interferometry SAR are also available. In addition, new precise observations, such as laser extensometers, laser-ring rotational seismometers, are being developed. Interesting phenomena, such as inter-plate coupling fluctuations and crustal deformations after earthquakes, have been observed with these instruments. By connecting these observations with their different physical quantities, and by integrating analyses of these records, we aim to comprehensively understand the crust activities that change with time and space. Additionally, we will promote advanced observation technologies. We will also discuss new techniques leading to new observation methods and analyses with interdisciplinary participants. We expect participation of researchers concerned with development of a new measurement method, crustal activity observation, and its analysis. **List of affiliations for projected participants:** Hokkaido University, Tohoku University, Nagoya University, The University of Tokyo, Kyoto University, Kochi University, Kyushu University, Meteorological Research Institute, National Institute of Earth Science and Disaster Resilience, National Institute of Advanced Industrial Science and Technology, Association for the Development of Earthquake Prediction, Hot Springs Research Institute of Kanagawa Prefecture, and Japan Agency for Marine-Earth Science and Technology

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2019-B-04 Development of data assimilation methods for understanding and predicting seismic and volcanic phenomena	★Masayuki Kano（Tohoku University） ・Junichi Fukuda	For understanding and predicting seismic and volcanic phenomena, it is important to estimate state variables and model parameters used in physics-based numerical simulations based on observation data. Data assimilation can effectively combine numerical simulation and observation data based on Bayesian statistics. Data assimilation has been originally developed and widely used in meteorology and oceanology. In these days, data assimilation has been introduced in the field of solid earth science to estimate frictional parameters on the plate interface, seismic wavefield, physical parameters inside volcanoes, and to predict fault slip, ground motions and tsunami arrivals. As the next step for further understanding seismic and volcanic phenomena, it is necessary to develop new methods that are applicable to problems with strong non-linearity such as earthquakes and volcanic eruptions and high degrees-of-freedom. In this project, to solve such problems, researches in solid earth science and researchers in statistical science and meteorology, who are familiar with algorithms on data assimilation, collaborate together to develop data assimilation methods. Applying the developed methods to observations, we aim to further understand and predict seismic and volcanic phenomena. **List of affiliations for projected participants:** Earthquake Research Institute, The University of Tokyo, Graduate School of Information Science and Technology, The University of Tokyo, The Institute of Statistical Mathematics, University of Ryukyus, Kyoto University, Tohoku University, Prefectural University of Hiroshima, Japan Agency for Marine-Earth Science and Technology, RIKEN, Meteorological Research Institute
2019-B-05 Study on movement of crustal fluid and viscoelastic crustal response based on combined gravimetric and geodetic techniques	○Satoshi Miura（Tohoku University） ・Yuichi Imanishi	Gravimetry is a powerful tool for tracking movement of underground material and spatiotemporal changes in subsurface density distributions. For example, gravity changes have been observed associated with magma movements in conduits of volcanoes, occurrences of slow earthquakes, and viscoelastic response after the 2011 Tohoku-oki earthquake. These gravity changes are so small, a few micro-Gal, that the improvement of the accuracy of measurements is essential through excluding external disturbances such as soil moisture. In addition, densification of measurements by miniaturization of conventional gravimeters, and developments of new instruments based on brand-new principles to measure spatial derivatives or integrals of gravity acceleration are also important. Nationwide participants in this project will share these issues and integrate the recent advances toward applications to a wide variety of geosciences. **List of affiliations for projected participants:** The University of Tokyo, Kyoto University, Hokkaido University, Kyushu University, National Institute of Polar Research, National Institute of Advanced Industrial Science and Technology, Hokkaido Research Organization, Mount Fuji Research Institute, Tono Research Institute of Earthquake Science

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2019-B-06 Frontier earth observation	○Hitoshi Kawakatsu（Earthquake Research Institute） ・Masanao Shinohara ・Hajime Shiobara ・Kimihiro Mochizuki	For future observational research in solid earth science in Japan, it is necessary to develop a direction to promote research based on the optimal field on the Earth for scientific problems (referred as to "frontier earth observation"). Researchers who have made similar attempts in the past and researchers who have similar ideas and hopes in the future gather together to exchange opinions and information, and discuss the necessary infrastructures (shared use framework, software/hardware support, etc.) for promoting such observational research. **List of affiliations for projected participants:** Earthquake Research Institute, The University of Tokyo, Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute, The University of Tokyo , Hokkaido University, Tohoku University, Chiba University, Nagoya University, Kyoto University, Kobe University, Hiroshima University, Kyushu University, Kagoshima University, and major national universities in Japan
2019-B-07 Compilation of damages of castles caused by historical disasters	○Yasuyuki Kano（Earthquake Research Institute） ・Yasuyuki Kano	Examine the history of damages and repair of the castles caused by natural disasters. Collaborations among researchers from multiple fields such as archaeologists, historians, seismologists, engineers, geologists, meteorologists are expected. The collaborative research will provide rich information to historical earthquake study such as distribution and strength of damages. Since the castles are symbol of the city, past damages of castles will be good example to improve social awareness on local disasters. The result may provide a suggestion to restoration of castles from present disasters or protection and preservation of cultural properties. **List of affiliations for projected participants:** The University of Siga Prefecture, Graduate School of Science, Kyoto University, Disaster Prevention Research Institute, Kyoto University, Ritsumeikan University, National Museum of Japanese History, Earthquake Research Institute, The University of Tokyo, Collaborative Research Organization for Historical Materials on Earthquakes and Volcanoes, The University of Tokyo

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2019-B-08 Basic research of quantum sensing technologies to realize the portable absolute gravity measurement at the field	○Hajime Shiobara （Earthquake Research Institute） ・Hajime Shiobara	The gravity measurement is the most important and reliable technique to know density distribution below the ground for researches in solid geophysics and mineral resources. But, the off-line and long-term gravity measurement at the remote area, such as deep seafloor or active volcanoes, is still impossible with the latest measurement technology. The aim of this research is to realize an absolute gravimeter of small, portable, low power and low cost by using the quantum technology, which is highly advanced in abroad. At the first step to develop basic technologies, we have several discussions of understanding the quantum technology, practical implementations, and geophysical new findings expected, to apply the large KAKENHI program to start the real developments. Other than the gravimeter but related with the practical quantum sensing is also for considerations. **Condition to join this proposal:** The core member expected is already in the team of the application for the MEXT Q-LEAP project and KAKENHI in 2018. We welcome ones have interest in development of the practical absolute gravity measurement in the remote field, its technical and geophysical applications and other quantum sensing. In this research proposal, we only have a few specific interest group meetings. **List of affiliations for projected participants:** The University of Tokyo, National Institute of Advanced Industrial Science and Technology, Kobe University, University of Electro-Communications, Japan Agency for Marine-Earth Science and Technology, Tono Research Institute of Earthquake Science, Tokyo University of Marine Science and Technology
2020-B-01 Synthesis and distribution of standard polycrystalline minerals for room experiments	○Takehiko Hiraga （Earthquake Research Institute） ・Takehiko Hiraga	We will distribute synthetic highly-dense fine grained mineral aggregates that are suitable for room experiments. Any research groups that focus on measuring mineral/rock physical properties are welcome to join this project. **List of affiliations for projected participants:** Tohoku University, The University of Tokyo, National Institute for Materials Science, Shizuoka University, Okayama University, Kyushu University, University of Bayreuth, University of Minnesota, University of Montpellier

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-B-02 Image analysis of muography applying the deep learning method used in medical image AI development	○Naoto Hayashi（The University of Tokyo Hospital） ・Hiroyuki Tanaka	The Department of Computational Diagnostic Radiology and Preventive Medicine, University of Tokyo is a donated division established in 2005. In this department, medical health screenings are conducted to collect epidemiological data, including medical images. With this data, diagnostic AI software and its platform are developed as a research project of this department. Meanwhile, muographic visualization of a volcano's internal structure has been demonstrated to the rest of the world by the Earthquake Research Institute, The University of Tokyo. This project aims to combine AI software development technology with muography to facilitate the observation of the eruption style and the eruption process, and to accelerate the research of volcanos. Muography visualizes density distribution of the object by measuring the direction and number of muons that pass through it. Although muography is expected to be useful to understand the internal structure of volcanoes, it has not been sufficiently utilized in connection with volcanic activity. That was because analysis of muon track information more than ten million per year has takes time, and tens of thousands of muographic images has not been evaluated. The reason was that it has not been possible to evaluate the massive number of images of muography. On the other hand, technologies for displaying and analyzing images have been highly developed in the medical field. Recently, diagnostic AI software using deep learning has shown superior image recognition ability beyond human eyes. The ultimate goal of the research of volcanic muography is to utilize the muon track information to search for abnormalities and to assess the condition within a volcano, which is quite similar to medical image analysis. In this project, we aim to apply the medical image analysis technology to muography, and we aim to establish a new method to analyze the internal structure of the volcano with the muography. We will establish this new method with application of deep learning based on our previous pilot study using the second generation muography data of Sakurajima up to 2017. This time, however, we will use the third generation muography data after 2018 in which the number of pixels has increased by about 30 times. In order to use this method in other volcanos, we will further examine the prerequisites of the parameters of muographic data. By establishing this analysis method, the observation of various volcanic eruption styles and volcanic structural changes will be facilitated so that it will contribute to the research for the prediction of the volcanic eruption. **Condition to join this proposal:** The requirements for participating in this project is to be familiar with the methods of machine learning of images, especially with deep learning. **List of affiliations for projected participants:** Department of Computational Radiology and Preventive Medicine, The University of Tokyo Hospital, Department of Radiology, The University of Tokyo Hospital, Faculty of Information Sciences and Graduate School of Information Sciences, Hiroshima City University, Faculty of Biology-Oriented Science and Technology, Kindai University, Department of Management, Japan University of Economics

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-B-03 New developments on crustal deformation research based on the ultra-dense GNSS observation	○Yusaku Ohta（Tohoku University） ・Yosuke Aoki	Recently, very low-price multi-frequency GNSS receivers appeared through expanded use of GNSS system for many purposes. In this study, we will utilize these new GNSS system for the understanding the high-spatial resolution crustal deformation. We will observe the specific areas which were observed by past repeated campaign observations such as strain concentration areas in Niigata and Miyake-jima volcano. Through the GNSS observation, we will provide the chance to communicate between the students, young and senior researchers, and technical staffs. Furthermore, we will share and hand down the skills for the GNSS observation through the observations. **Requirement for participation:** Nothing **List of affiliations for projected participants:** Hokkaido University, Tohoku University, The University of Tokyo, Nihon University, Toyama University, Kanazawa University, Nagoya University, Kyoto University, Kochi University, Kyushu University, Kagoshima University, National Astronomical Observatory of Japan, National Institute of Polar Research, Geospatial information Authority of Japan, National Research Institute for Earth Science and Disaster Resilience, National Institute of Advanced Industrial Science and Technology, Meteorological Research Institute, National Institute of Information and Communications Technology, RIKEN, Japan Agency for Marine-Earth Science and Technology, Tono Research Institute of Earthquake Science
2020-B-04 Construction of overriding plate deformation in subduction zones	○Tatsuya Ishiyama（Earthquake Research Institute） ・Hiroshi Sato ・Tatsuya Ishiyama	Our goal is to construct community block models of Japanese Islands including seismic source fault models and three dimensional crust and mantle rheology models based on seismic tomography, elastic wave velocity experiments, and structural and thermal evolution of Japanese islands. Our purpose also includes comparison between these models with a long-term crustal deformation. **Requirement for participation:** Nothing **List of affiliations for projected participants:** Iwate University, Tohoku University, Niigata University, Yokohama National University, Kyoto University, Okayama University, Shinsyu University, National Research Institute for Earth Science and Disaster Resilience, and Japan Agency for Marine-Earth Science and Technology
2020-B-05 Development of muography technologies using nuclear emulsion	○Kunihiro Morishima（Nagoya University） ・Hiroyuki Tanaka	Muography is the non-destructive inspection technology of the giant objects. By using muography, we can take transmission images of volcanoes. And also, density change inside of mountains can be imaged. Nuclear emulsion is a muon detector. Nuclear emulsion is high sensitive photographic film, which can record three dimensional trajectories of muons with high space resolution. Thus, Nuclear emulsion is no need of electric power. This is advantage for applying to volcanoes. In this study, It is planned to develop technologies of high-speed analysis system of nuclear emulsion for muongraphy of volcanoes. In this development, we have a plan to develop the noise rejection methods. **List of affiliations for projected participants:** Nagoya University, The University of Tokyo, Kobe University, Toho University, Gifu University, University of Salerno, Cairo University, University of Bern, The University of Naples Federico II

Project code Project title	○ Principle investigator/ ★Early-Career Scientist ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-B-06 Understanding the deep Earth using ocean bottom detector toward direct measurement of mantle geoneutrinos	○Kunio Inoue（Tohoku University） ・Hiroyuki Tanaka	Cooperative researches had been constructed in FY 2014 and 2017 to launch an interdisciplinary research, which provide new observation for understanding the Earth with neutrinos. Our research group developed a new technology which can be used by next generation detector, and constructed new geo-neutrino flux calculation model with integration of geological knowledges by incorporating a method which is used in physics. The cooperative research structure together with geoscience and physics has been working effectively. In this research, we will study Photomultiplier tube shield for deep sea pressure and low power electronics system for the ocean bottom detector which goes beyond the impossibilities of the modern land-based detector toward direct measurement of mantle geoneutrinos. We will study how to estimate the uncertainty of the geo-neutrino flux calculation to make higher reliable model with the cooperative research structure. **List of affiliations for projected participants:** Tohoku University, The University of Tokyo, Japan Agency for Marine-Earth Science and Technology, National Institute of Advanced Industrial Science and Technology, University of Hawaii, University of Maryland, Charles University
2020-B-07 Dynamics of plate subduction and island arc processes	○Bunichiro Shibazaki (Building Research Institute) ・Hikaru Iwamori	In the Japanese Island arc, various processes, such as inland earthquakes, volcanic activity, and mountain development, are occurring. These phenomena originate with the subduction of the oceanic plate under the island arc, which is caused by gravitational instability. The subduction of the oceanic plate induces hot upwelling flow in the mantle wedge; the transport of fluid, from the slab to the shallow part, results in the generation of magma and partial melting, as well as volcanic activity in the island arc. In addition, the fluids weaken the strength of the lithosphere and cause strain concentration which produces inland earthquakes. Recent studies indicate that the characteristics and heterogeneity of the oceanic plate subducting beneath the island arc (e.g., thermal and hydration structures) affect the heat and mass transport in the mantle wedge and surface processes. This study aims to achieve a comprehensive understanding of the dynamics of plate subduction and island arc processes: the characteristics of the subducting oceanic plate , dehydration in the slab, heat and mass transport that accompanies upwelling flow in the mantle wedge, magma generation, strain concentration, and mountain development through observational, experimental and simulation research . **List of affiliations for projected participants:** Earthquake Research Institute, The University of Tokyo, Tokyo Institute of Technology, Hiroshima University, Kobe University, Kyoto University, Nagoya University, Hokkaido University, Japan Agency for Marine-Earth Science and Technology, National Research Institute for Earth Science and Disaster Resilience, National Institute of Advanced Industrial Science and Technology, Building Research Institute

【Appendix C】 2020FY Specific Research Project (C) Titles

Project code Project title	○ Principle investigator ・ Contact Person at ERI	Details of the project and condition to participate in the project
2020-C-01 Research on Seismicity and Plate Structure by the Metropolitan Seismic Observation Network (MeSO-net)	○Hisanori Kimura（National Research Institute for Earth Science and Disaster Resilience） ・Shinichi Sakai	Metropolitan Seismic Observation Network (MeSO-net) is a dense, widely distributed seismograph network, which is unique in the world. In this project, we will conduct a research, which advances understanding of the seismotectonics beneath the metropolitan area and contributes to refinement of the assessment of the seismic hazards that have been elucidated so far and detailed evaluation of damages at cities caused by disastrous earthquakes, by using data obtained from the MeSO-net. Seismic and meteorological data until FY2016 is used in this project. **Project name of the financial base to conduct this specific research project :** Tokyo Metropolitan Resilience Project Sub-program - b; Ultra dense seismic networks by public-private partnerships

【Appendix F】
2020 FY List of Facilities, Observation Equipment, and Laboratory Equipment

Please refer to Joint usage URL（http://www.eri.u-tokyo.ac.jp/en/joint-usage-top/）

On publishing papers based on the results of the researches performed by using facilities in the Earthquake Research Institute joint usage program, **please acknowledge the program in the paper**. Also, please provide a copy of the paper or report to Earthquake Research Institute, joint usage section.

Examples of the appropriate format for the indication in the acknowledgments are given below.

This study was supported by ERI JURP 20XX-X-XX.

（facilities）

Joint Usage Code and Name of facility/equipment	Information of facility	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F1-01 Tsukuba Seismological Observatory Aburatsubo Geophysical Observatory Nokogiriyama Geophysical Observatory Wakayama Seismological Observatory Hiroshima Seismological Observatory Yahiko Geophysical Observatory Dodaira Seismological Observatory Shin-etsu Seismological Observatory Fujigawa Geophysical Observatory Muroto Geophysical Observatory Observatories and facilities	Nokogiriyama： http://eoc.eri.u-tokyo.ac.jp/GOP/ngy.html (In Japanese only) Wakayama： http://www.eri.u-tokyo.ac.jp/WSO/index.html (In Japanese only) Fujigawa： http://www.eri.u-tokyo.ac.jp/fujigawa/indexJ.html (In Japanese only) Muroto： http://eoc.eri.u-tokyo.ac.jp/GOP/Mrt/indexM.html (In Japanese only)	○Head of Center for Geophysical Observation and Instrumentation		―
2020-F1-02 Yatsugatake Geo-electromagnetic Observatory		○Tsutomu Ogawa	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F1-03 Asama Volcano Observatory Komoro observatory of Seismology and Volcanology Izu-Oshima Volcano Observatory Kirishima Volcano Observatory		○Head of Center for Geophysical Observation and Instrumentation		―

(observation equipment)

Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F2-01 Data receiver system by satellite communication for a nation-wide seismic telemetry network.	http://eoc.eri.u-tokyo.ac.jp/eisei_system/riyou/data_jushin_riyou.htm (In Japanese only)	○Shin'ichi Sakai	Must contact with the responsible person prior to the application. It is a rule that the users install it and maintain it by themselves. Another application about data use is needed.	Any time, as needed.
2020-F2-02 Temporal seismic data acquisition systems (incl. data transfer units, seismometers and recording units)	http://eoc.eri.u-tokyo.ac.jp/eisei_system/riyou/vsat_riyou.htm (In Japanese only) http://eoc.eri.u-tokyo.ac.jp/eisei_system/riyou/chijo_souti.htm (In Japanese only)	○Shin'ichi Sakai	Must contact with the responsible person prior to the application. Not always available for period of specific research projects.	Any time, as needed.
2020-F2-04 Broadband-MT instruments	Metronix 1) Main unit: ADU07e 22 sets ADU08e 2 sets 2) Induction coils MFS06: 24 coils MFS07: 4 coils MFS06e: 16 coils MFS07e: 30 coils Phoenix 1) induction coils MTC50 3 coils Basically, 5 component data (2-component E-field and 3-component H-field) can be measured. Sample frequency is 2^n Hz up to 524 kHz. In addition, we have some other items necessary to the MT survey, such as, various batteries and electrodes.	○Makoto Uyeshima	Must contact with the responsible person prior to the application. Please recognize that we cannot let you use the instruments if we have some field campaigns.	Any time, as needed.
2020-F2-05 Network-MT voltage difference measurement system	SES93: 8 channel 20 bit voltage difference acquisition systems developed by ADOSYSTEMS. We have about 20 instruments. Sampling interval is 0.1, 1 or 10 s. SESNET93: Data transfer units.	○Makoto Uyeshima	Must contact with the responsible person prior to the application. Please recognize that we cannot let you use the instruments if we have some field campaigns.	Any time, as needed.

Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F2-06※ Marine heat flow measurement system	The system consists of a data logger, probes, temperature sensors, weight, and an acoustic pinger. Heat flow is measured by penetrating a probe equipped with multiple temperature sensors into seafloor sediment. An instrument for thermal conductivity measurement on sediment samples (Quick Thermal Conductivity Meter, Kyoto Electronics Manufacturing Co., Ltd.) is also available.	○Makoto Yamano	Users must have an experience in marine heat flow measurement, unless they conduct cooperative research with the Earthquake Research Institute.	Any time, as needed.
2020-F2-07 Portable broadband seismic observation system(1)	Broadband seismometers: CMG3T,STS2 Recorders: REFTEK130 40 sets	○Kawakatsu Hitoshi	Data have to become open in public at the data center of OHRC, ERI after 2-3 years of moratorium period. For the system availability, consult with the contact person.	Any time, as needed.
2020-F2-08※ Portable broadband seismic observation system (2)	Broadband seismometers (Nanometrics Inc., Canada) Trillium 120PA Number of equipment: 14	○Jun Oikawa	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F2-09※ Absolute gravimeter	FG5 gravimeter with 1-2 microgal accuracy manufactured by microg-Lacoste corp., U.S.A.	○Yuichi Imanishi	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F2-10※ Lacoste & Romberg Land gravimeter	Spring gravimeter with 10 microgal accuracy manufactured by microg-Lacoste corp., U.S.A.	○Yuichi Imanishi	Operational instruction should be understood.	Any time, as needed.
2020-F2-11※ Potable strong motion observation system	Potable strong motion observation system(Revision of SMAR-6A3P) 16 equipment with amplifier(16 JEP-6A3P sensors with 1V/G) (Akashi Corporation) 5 equipment without amplifier (5 JEP-6A3P sensors with 10V/G) (Akashi Corporation) 10 logger LS-7000XT(Hakusan Corporation) 10 logger LS-7000 (Hakusan Corporation) ※A single set consists of an equipment and a logger. ※20 sets are available. ※Amplifier gain is a multiplication of 1, 20, 50, 100 and 0.1, 1, 10, 100.	○Kazuki Koketsu	Must contact with the responsible person prior to the application.	Any time, as needed.

※Detailed information posted at Earthquake Research Institute, joint usage page.

Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F2-12 Volcanic gas observation system		○Jun Oikawa	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F2-13 Ultra-long period MT instruments	LEMI-417 fluxgate MT observation instruments. We have 6 instruments. 4 component E-fields and 3-component H-fields can be measured with 1s sampling.	○Makoto Uyeshima, Hisayoshi Shimizu	Must contact with the responsible person prior to the application. Please recognize that we cannot let you use the instruments if we have some field campaigns.	Any time, as needed.
2020-F2-14 High accuracy gyro-compass system	A SOKIA's GP1X manual gyro-compass system. Measurement accuracy is 20 angle-seconds.	○Makoto Uyeshima, Hisayoshi Shimizu	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F2-15※ 3D deep-sea current profiler system	NORTEK Aquadopp - 6000m 1 system (http://www.nortek-as.com/en/products/CurrentMeter/Aquadopp6k) A current profiling system by combination of the Doppler current profiler (Aquadopp) and the Ti sphere transponder system of a self pop-up recovery, which enables 10 s interval observation of more than one-year-long by the external power supply. Use of the current profiler only is also available.	○Hajime Shiobara	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F2-16 High accuracy broad-band voltage difference measurement instruments	NT System Design's Elog1k. We can measure 2-component voltage differences at 1024Hz or 32 Hz with 24 bit accuracy. Very low power consumption(1.8W).	○Makoto Uyeshima	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-M-01 Specific equipment・Seismometers(1Hz, Lennarz electronic GmbH)	LE-3Dlite MkII 20 sets LE-3Dlite MkⅢ59sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.
2020-M-02 Specific equipment・Low electric power data recording units	HKS-9700a-0505 30 sets LS-8800 49 sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.
2020-M-03 Specific equipment・Broad-band seismometers	Trillium-120PA 6 sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.

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Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-M-04 Specific equipment・ Nanometrics data recording units	Centaur digital recorder 6 sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.
2020-M-05 Specific equipment・ Broad-band seismometers	TS17840/Trillium-120PA 16 sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.
2020-M-06 Specific equipment・ Seismic/volcanic observation units	LF-1100R/LF-2100R 9 sets	○Shin'ichi Sakai	Normal usage period (less than 2 months) Application required for longer usage in June.	Any time, as needed.

(laboratory equipment)

Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F3-01 Controlled Seismic source	Minivibrator T-15000 (IVI, Inc.)	○Hiroshi Sato, Tatsuya Ishiyama	Users are required to have precise and detailed knowledges on how to use the controlled Seismic source.	Any time, as needed.
2020-F3-02 Computer system of Earthquake and Volcano Information Center	http://wwweic.eri.u-tokyo.ac.jp/computer/manual/eic2015/index.php?English	○Head of Earthquake and Volcano Information Center	Limited to academic use and along with the purpose of ERI, according to the rule. Apply directly to ERI, if joint usage fund is not needed.	Any time, as needed.
2020-F3-03 Rock Fracture Apparatus with Data Acquisition System	http://www.eri.u-tokyo.ac.jp/gijyutsubu/jikken/ (In Japanese only)	○Shingo Yoshida, Masao Nakatani	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-F3-05 XRF spectrometer	RIGAKU Wavelength dispersive-X-ray fluorescence spectrometer ZSX Primus II http://www.rigaku.com/en/products/xrf/primus2	○Atsushi Yasuda	All users were requested to receive instruction beforehand upon contact to responsible persons. Consumables were users' pocket.	―
2020-F3-06※ Vibration testing system	EMIC Corp. Vibration testing system F-1400BD/LAS15 Horizontal or vertical shaking table(1-axis)	○Akito Araya	Must contact with the responsible person prior to the application. Operate the equipment by yourself in principle.	Any time, as needed.
2020-F3-07※ Laser source equipment	NEOARK Corp. Frequency stabilized He-Ne laser Emission wavelength 633nm (red light)	○Akito Araya	Must contact with the responsible person prior to the application.	Any time, as needed.

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Joint Usage Code and Name of facility/equipment	Information of Equipment	Contact person (○Responsible person)	Conditions of Use and Remarks	Application periods
2020-F3-08 National Seismogram Data System		○Head of Earthquake and Volcano Information Center	System to use national seismogram data, jointly operated with Japanese universities. Consult with corresponding faculty.	Any time, as needed.
2020-F3-09 Karl Fischer moisture titrator (Coulometric titration)	Kyoto Electronics Manufacturing Co., Ltd. Karl Fischer moisture titrator (Coulometric titration) ＜MKC-610＞ http://www.kyoto-kem.com/en/product-category/karl/ Evaporator for measurement of water in rocks ＜ADP-512＞ http://www.kyoto-kem.com/en/product-category/option-karl/	○Kenji Mibe	All users must be trained before operating the machine. It is requested that all applicants discuss their projects with contact person before submitting the proposal. The chemicals for measurements have to be purchased by users.	Any time, as needed.
2020-F3-10 Laser diffraction particle-size analyzer(wet dispersion condition)	Sympatec HELOS/KF-RODOS-QUIXEL System	○Fukashi Maeno	All users are required to receive instruction from contact persons and to adjust schedule.	Any time, as needed.
2020-F3-11※ Equipment set for thermometer calibration	Fluke 1586A, 9142, 7103 etc. Thermostatic bath(-30 degC to 150 degC), thermistor scanner, and so on	○Masao Nakatani	Must contact with the responsible person prior to the application. Operate the equipment by yourself in principle.	Any time, as needed
2020-F3-12 Large Continuous Seismic Data Analyzing System	It is the seismic waveform analysis system which stores nationwide seismic data. Users develop and execute their own codes for analyzing the data. The minimum tools are available.	○Shin'ichi Sakai	Must contact with the responsible person prior to the application. Also, all users were requested to finish the application for the Computer system of Earthquake and Volcano Information Center (2020-F3-02). Data should be used under the treatment of earthquake data of Japanese universities.	Any time, as needed

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【Appendix D】

2020 FY List of earthquake and other Earth Science Data and Records

Please also refer the our database page (http://www.eri.u-tokyo.ac.jp/en/publication/)

On publishing papers based on the results of the researches performed by using facilities in the Earthquake Research Institute joint usage program, **please acknowledge the program in the paper**. Also, please provide a copy of the paper or report to Earthquake Research Institute, joint usage section.

Examples of the appropriate format for the indication in the acknowledgments are given below.

This study was supported by ERI JURP 20XX-X-XX.

Joint Usage Code and Name of data/ records	Contact person (○Responsible person)	Conditions of Use and Related URL	Application periods
2020-D-01 WWSSN Seismogram microfiche	○Head of Committee for old seismograms and mareograms	Advance appointment required. Inquire about paper supplies. http://wwweic.eri.u-tokyo.ac.jp/wwssn/filmlist.html	Any time, as needed.
2020-D-02 Historical seismograms	○Head of Committee for old seismograms and mareograms	Use microfiche archives. Original records can be used with ERI staff. http://wwweic.eri.u-tokyo.ac.jp/susu/ (In Japanese only)	Any time, as needed.
2020-D-03 Seismological Bulletin, Selected newspaper articles, Foreign seismological reports	○Head of Committee for old seismograms and mareograms	Copies can be made in library. Bulletins: http://wwweic.eri.u-tokyo.ac.jp/record-J/index.html Foreign seismological reports: http://wwweic.eri.u-tokyo.ac.jp/record-W/index.html	Any time, as needed.
2020-D-04 Earthquake data of Center for Geophysical Observation and Instrumentation	○Shin'ichi Sakai	Data should be used under the treatment of earthquake data of Japanese universities.	—
2020-D-05 Nation-wide earthquake data transfer by satellite communication system and other facilities	○Shin'ichi Sakai	Application required under the treatment on earthquake data transfer by satellite communication system. http://eoc.eri.u-tokyo.ac.jp/eisei_system/riyou/data_jushin_riyou.htm (In Japanese only)	—
2020-D-06 Japan University Network Earthquake Catalog(JUNEC)	○Head of Earthquake and Volcano Information Center	Hypocenter data can be accessed through anonymous ftp. ftp://ftp.eri.u-tokyo.ac.jp/pub/data/junec/ Arrival time data can be provided by CD, according to rule among the universities.	Any time, as needed.
2020-D-07 Seismic data of Asama, Izu-Oshima, Kirishima, and Fuji volcanoes	○Head of Volcano Research Center	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-D-08 Broadband Seismic Waveform Data(1)	○Head of Ocean Hemisphere Research Center	none. http://ohpdmc.eri.u-tokyo.ac.jp/dataset/permanent/seismological/index.html	Any time, as needed.

Joint Usage Code and Name of data/ records	Contact person (○Responsible person)	Conditions of Use and Related URL	Application periods
2020-D-10 New J-array seismogram data	○Head of Earthquake and Volcano Information Center	Can be used through website. http://jarray.eri.u-tokyo.ac.jp/ .	Any time, as needed.
2020-D-11 Earthquake data in Nikko region, Northern Kanto, Japan, in 1993	○Shin'ichi Sakai	Treatment of data usage by participants of the 1993 Nikko seismic observation.	—
2020-D-12 Strong motion observation database (mainly Suruga bay, Izu peninsula, and Ashigara valley)	○Kazuki Koketsu	http://smsd.eri.u-tokyo.ac.jp/smad/	Any time, as needed.
2020-D-13 Copies of old historical documents and interpretation	○Kenji Satake	No limitation Copies and interpretation of a part of special database of ERI library. http://wwweic.eri.u-tokyo.ac.jp/dl/meta_pub/G0000002erilib (In Japanese only)	Any time, as needed.
2020-D-14 Geoelectromagnetic Observation Database	○Makoto Uyeshima	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-D-15 Provisional data at Yatsugatake geo-electromagnetic observatory	○Tsutomu Ogawa	Those who wish to use the data should contact the contact person at the ERI for arrangement and submit an application.	Any time, as needed.
2020-D-16 Heat flow dataset	○Makoto Yamano	No limitation. Compilation of heat flow data in the northwest Pacific area, covering an area from 0 to 60°N and from 120 to 160°E, which includes the whole Philippine Sea, Japan Sea, and Sea of Okhotsk. It consists of station name, coordinates, altitude (or water depth), number of temperature measurements, maximum measurement depth, temperature gradient, number of thermal conductivity measurements, average thermal conductivity, heat flow, reference and year of publication. The heat flow values measured with submersibles or ROVs and those estimated from depths of gas hydrate BSRs (bottom simulating reflectors) are not included. The values less than or equal to zero are also excluded.	Any time, as needed.
2020-D-17 Aerial photographs of Japan	○ERI Library	This collection is for research purposes only: active fault research, seismology, volcanology, tectonics, etc. Please have a request at the service counter of ERI library. http://www.eri.u-tokyo.ac.jp/tosho/collection-e.html	Any time, as needed.

Joint Usage Code and Name of data/ records	Contact person (○Responsible person)	Conditions of Use and Related URL	Application periods
2020-D-18 Digital images of tsunami waveforms	○Head of Committee for old seismograms and mareograms	Apply through search system of digital images of tsunami waveforms. http://wwweic.eri.u-tokyo.ac.jp/tsunamidb/ (In Japanese only) Same condition to joint usage of ERI applies.	Any time, as needed.
2020-D-19 Special Project for Earthquake Disaster Mitigation in the Tokyo Metropolitan Area Date (2008-2011)	○Shin'ichi Sakai	Must contact with the responsible person prior to the application. http://www.eri.u-tokyo.ac.jp/shuto/index.html (In Japanese only)	Any time, as needed.
2020-D-20 Superconducting Gravimeter Data	○Yuichi Imanishi	Must contact with the responsible person prior to the application.	Any time, as needed.
2020-D-21 Special Project for Reducing Vulnerability for Urban Mega Earthquake Disasters Date (2012-2016)	○Shin'ichi Sakai	Must contact with the responsible person prior to the application. http://www.eri.u-tokyo.ac.jp/project/toshi/ (In Japanese only)	Any time, as needed.