

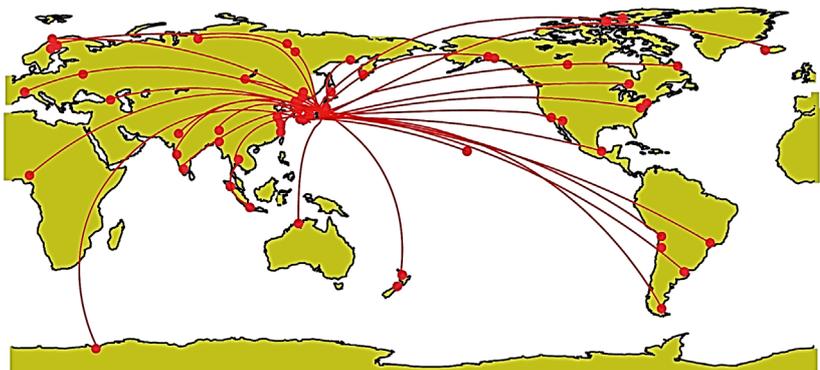
# Center for International Collaborative Research (CICR)



- Coordinated international programs
- Ground-based observation networks and satellite projects
- Hosting international workshops
- International exchange of foreign and Japanese researchers and students
- Capacity-building courses and schools in developing countries
- Observatories

To promote international collaborative studies, the Center for International Collaborative Research (CICR) provides leadership to comprehend the physical mechanisms of phenomena occurring in the space–Sun–Earth environmental system and their interactions. The CICR encourages programs to develop ground-based observation networks and international satellite projects and to host international workshops or conferences. It also supports international exchanges between overseas and Japanese researchers and students and encourages capacity-building activities in developing countries through training courses and schools. CICR took over the Geospace Research Center of the former Solar-Terrestrial Environment Laboratory at Nagoya University. It was initially established in October 2015 for a 5-year fixed term until FY2020. However, another 5-year term (FY2021–2026) for continued activity was approved by Nagoya University.

The phenomena contained in solar activity have various timescales, from solar flares and coronal holes, to the 11-year cycle, and further long-term variations. World scientists are greatly interested in these types of solar activities and their consequences on the Earth’s geospace environment and climate change. The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), under the International Science Council (ISC), commenced a 5-year international program entitled “Predictability of the variable Solar–Terrestrial Coupling (PRESTO)” for 2020–2024. The main objective of this program is to identify the predictability of the variable solar–terrestrial coupling performance metrics using modeling, measurements, and data analysis while strengthening the communication between scientists and users. The President of SCOSTEP is also a member of the CICR and is responsible for operating this international program. On January 8, 2021, ISEE and SCOSTEP exchanged a Memorandum of Understanding to define the conditions under which ISEE will contribute to SCOSTEP activities. In agreement with this Memorandum of Understanding, the CICR publishes the SCOSTEP/PRESTO newsletter every three months, organizes online seminars and capacity-building lectures, and coordinates international symposiums related to SCOSTEP/PRESTO. The CICR also contributes to other international programs related to the space–Sun–Earth environment, such as Future Earth and the Integrated Land Ecosystem-Atmosphere Processes Study (iLEAPS). Since 2016, the CICR has participated in or operates ground-based observation projects, such as the EISCAT radar project, OMTIs, the ISEE VLF/ELF and magnetometer network, SuperDARN radar network (including the Hokkaido HF radars), and the Arctic Challenge for Sustainability operation office. It also has four domestic observatories at Moshiri, Rikubetsu, Fuji, and Kagoshima, which conduct observations of the solar wind, geomagnetic field, and upper atmosphere. Some of these observations have been conducted for more than 30 years.



Observation sites and ISEE's overseas collaborating organizations compiled by CICR.

## Main Activities in FY2022

In FY2022, CICR performed the following international collaborative research: 1) Twenty International Joint Research programs for domestic scientists; 2) twenty-three ISEE International Joint Research programs, inviting researchers from overseas; 3) two ISEE/CICR International Workshops; 13) ten International Travel Support programs for field and laboratory experiments by students and early career scientists; 14) four International Technical Exchange programs; 15) two ISEE International School Support programs; and 16) two International Travel Support programs for students. Two designated professors from overseas were hired through cross-appointments with U.S. universities and institutions. Four English-speaking staff members were hired to provide the administrative support. In collaboration with the SCOSTEP, the CICR hosted four international online seminars and four online lectures for students in FY2022. It has also supported six graduate students in their presentations at international conferences. Through the PRESTO program (2020–2024), the CICR published four newsletters in FY2022 (April, July, October, and January). The CICR also supports three international schools in Nigeria, Spain, and Finland. Nine students from India, Nigeria, Ethiopia, Egypt, and the United States visited the ISEE for three months for collaborative research under the SCOSTEP Visiting Scholar program.

The EISCAT radar project was undertaken in collaboration with a group from the NIPR, and ten EISCAT special experiments proposed by Japanese colleagues were conducted. Discussions about the EISCAT\_3D radar were organized with foreign EISCAT associate members. The PWING project continued running eight stations around the North Pole at MLATs of  $\sim 60^\circ$  connecting the OMTIs, ISEE magnetometer, and ELF/VLF networks. A research project entitled “Pan-Arctic Water-Carbon Cycles (PAWCs)” was funded for 2019–2024. PAWCs are designed to integrate atmospheric–terrestrial water and carbon cycles in northern Eurasia, for which very limited data on the fluxes of greenhouse gases exist.

Our four domestic observatories will continue to operate until FY2022. The Moshiri Observatory became an unmanned observatory in FY2018, but has continued to run electromagnetic instruments, such as auroral photometers, magnetometers, and ELF/VLF receivers. The fluxgate and induction magnetometers will be repaired in 2021. Additionally, continuous measurements of atmospheric black carbon were initiated in FY2022. The Rikubetsu Observatory operates several spectrometers for comprehensive measurements of ozone and other minor constituents in the atmosphere, all-sky imagers and photometers for aurora and airglow monitoring, SuperDARN Hokkaido radars for ionospheric disturbances, and an ELF atmospheric receiver.

Multistation IPS observations using Fuji, Kiso, and Toyokawa antennas were performed between April and December 2021. However, IPS observations at Kiso stopped due to a serious failure of the antenna and did not restart in this FY, despite intensive restoration. The Kiso Observatory was opened to the public on August 6, 2022.

The Kagoshima Observatory and Sata Station operate an all-sky camera, a photometer for airglow detection, VLF/LF radio wave receivers, and induction magnetometers in collaboration with Tohoku University, the University of Electro-Communications, Chiba University, and the Georgia Institute of Technology.



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Rikubetsu Observatory