

## 9. Research Topics

The mission of the Institute for Space–Earth Environmental Research (ISEE) is to understand the mechanisms and interactions of diverse processes occurring in the integrated space–Sun–Earth system to deal with global environmental problems and to contribute to human society in the space age. To develop this new research field, four subjects of Interdisciplinary Research are being conducted with strong collaborations from seven Research Divisions (Divisions for Integrated Studies, Cosmic Ray Research, Heliospheric Research, Ionospheric and Magnetospheric Research, Meteorological and Atmospheric Research, Land–Ocean Ecosystem Research, and Chronological Research). The “Project for Space–Earth Environmental Prediction” aims to develop our understanding and predictive capabilities of the influences of solar dynamics and atmosphere–ocean activities on the global environment. The “Project for the Interaction of Neutral and Plasma Atmospheres” aims to improve our understanding of the connection between the Earth’s atmosphere and space using a global observation network of interactions between the upper plasma and middle atmosphere. The “Project for Solar–Terrestrial Climate Research” aims to observe the long-term variability in the solar activity over more than several thousands of years via radioisotopes and to examine the influences of the solar activity on the atmosphere using observations and models to understand the influence of solar activity on global climate variability. The “Project for Aerosol and Cloud Formation” aims to understand the processes that form cloud and precipitation particles from aerosol particles with regard to the influence of cosmic rays and the processes of scattering and absorption of radiation by clouds and aerosol particles using experiments, field observations, and simulations.

ISEE has also organized three Research Centers to contribute to national and international research development of the relevant disciplines in cooperation with the Research Divisions. The Center for International Collaborative Research (CICR) conducts extensive observations with four domestic observatories (Moshiri, Rikubetsu, Fuji, and Kagoshima) and a global observation network and enhances collaboration and joint research with domestic and international researchers and institutions. The Center for Integrated Data Science (CIDAS) conducts infrastructure and research development of intensive studies of the space–Sun–Earth system through the analysis of big data and advanced computer simulations. The Center for Orbital and Suborbital Observation (COSO) conducts planning and technological development of research using orbital and suborbital observation vehicles, such as aircraft, balloons, rockets, and satellites, with national and international networks.

