

## Study of coupling processes in the solar-terrestrial system = Current status in 2020 =

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Energy from the sun is divided into radiation and solar wind (high-speed particles), which are maximum at the equatorial and polar regions, respectively. We study the flow of the energy and materials in the whole atmosphere by establishing following two large atmospheric radars at these singular points, and global observation network.

### (1) Equatorial fountain

The energy and material flows that occur in all height regions of the equatorial atmosphere are named as "Equatorial Fountain." These processes from the bottom also cause various effects in the upper atmosphere. We establish Equatorial MU Rdar (EMU radar) in Indonesia as main instrument for the studies.

### (2) Energy inputs into polar upper atmosphere and its response

The energy/particle inflow results in auroral Joule heating and ion drag of the atmosphere. The ion outflow from the polar ionosphere controls ambient plasma constituents in the magnetosphere. We will contribute the international EISCAT\_3D radar project that has started in northern Scandinavia since 2017.

### (3) Global network of observation and data

We develop a global observation network of compact radio and optical remote sensing equipment from the equator to polar region. Data from the observations will be archived and utilized by the data exchange framework of IUGONET.

This project was selected as one of important projects in both Masterplan 2014, 2017, and 2020. It was also selected as a new project in the roadmap 2014 by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). We now apply this plan to MEXT Roadmap 2020.

Keywords: coupling processes in solar-terrestrial system, SCJ Masterplan, MEXT Roadmap