

次期太陽観測衛星 SOLAR-C 計画 SOLAR-C: the planned next solar observing satellite mission

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The solar chromosphere, 10,000 K partially ionized atmosphere, covers above the photosphere of 5,800 K and the fully ionized 1,000,000 K solar corona extends further from the height of a few thousand km above the photosphere. The hot coronal plasma is finally flowing out from the Sun as the solar wind beyond the Earth orbit toward the boundary of the heliosphere. Explosive events on the Sun, solar flares and coronal mass ejections, are the source of disturbance to the space weather.

The solar magnetic field plays the central role in the presence of the hot atmosphere, and it is the energy source of highly dynamic phenomena occurring there. Hinode (SOLAR-B) has revealed the presence of new small-scale structures and dynamic events by high-resolution observations. They are not independent phenomena to the other solar activity, but are key ingredients to understand the presence of hot atmosphere (chromosphere and corona) and the trigger of large-scale explosive events. Major lack of information in Hinode observations is the magnetic field in the chromosphere and the magnetic connectivity from the chromosphere to the corona due to insufficient spatial resolution in coronal observations.

The JAXA SOLAR-C Working Group is planning the next solar observing satellite SOLAR-C that follows Hinode in orbit. SOLAR-C will observe the chromospheric magnetic field as well as the photospheric magnetic field from the high-resolution and high-precision spectro-polarimetric measurements, and realistically connects magnetic structures in the outer atmospheres by coronal imaging and spectroscopy of sub-arcsec resolution. This enables us to observe the entire magnetic coupling among the photosphere, chromosphere, and corona for the first time. In order to obtain such observing capabilities, a large-aperture optical telescope, high-resolution coronal imagers, and a high-resolution spectrometer are to be on-board SOLAR-C. We introduce the science goals and the observing platform of the SOLAR-C mission.

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