Monitoring of solar active regions using the interplanetary Lyman alpha emission measured by the Nozomi/UVS instrument

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The ultraviolet imaging spectrometer(UVS) onboard Nozomi spacecraft in a transfer orbit to Mars has continuously measured interplanetary Lyman alpha emission at 121.6 nm since January 1999. There is a uniform flow of interplanetary hydrogen and helium atoms in the solar system. This neutral hydrogen and helium flow is called the 'interstellar wind'. Interplanetary hydrogen atoms induce resonance scattering of solar Lyman alpha emission. One of the most effective factors causing the temporal variations of this interplanetary Lyman alpha emission is enhanced Lyman alpha radiation from active regions on the Sun.

Bertaux et al. [2000] showed that excesses of illumination related to active regions are clearly seen in the interplanetary Lyman alpha map constructed by the SOHO/SWAN data, including excesses resulting from active regions on the far side of the Sun. Since the CME from these active regions causes geomagnetic storms, early detection of active regions on the far side of the Sun is significantly important for space weather forecast.

In this study, we succeeded in monitoring the temporal variations of interplanetary Lyman alpha emission resulting from active regions on both the front side and the far side of the Sun using the Nozomi/UVS data. We have also examined the effect of transient phenomena on the Sun such as solar flare. The relationship between active regions on the front side and the far side of the Sun will be discussed.