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630-nm airglow enhancement due to the launch of H-IIA rockets
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Depletion of the ionospheric plasma density is known to be made by liquid fuel exhausted from rockets. The plasma depletion is considered to be caused by the rapid ion-atom interchange reactions of the ionospheric O^+ with H_2 and H_2O exhausted from rockets, followed by dissociative recombination of the moleculari ions. The current paper reports two evens in which enhancement of 630-nm nightglow were observed after H-IIA rocket launched from Tanegashima, Japan.

An all-sky airglow imager has been operated at Sata, Japan since 2000 as a part of Optical Mesosphere and Thermosphere Imaging system (OMTIs). 630-nm all-sky image is taken with an exposure time of 165 sec and time resolution of 5.5 min. At 1639 UT on May 17, 2012, H-IIA rocket was launched from Tanegashima, Japan. At 1647UT, when the H-IIA rockets reached the ionosphere, an enhancement of the 630-nm airlgow intensity was observed by the airglow imager at Sata. The observed airglow intensity exceeded 2 kR. The airglow enhancement disappeared around 1717 UT. We also analyzed the total electron content (TEC) data obtained from GPS receivers of GNSS receiver network in Japan, and found that the TEC depletion occurred at the same time as the 630-nm airglow enhancement. After another H-IIA rocket was launched at 1117 UT on Sep. 11, 2010, similar 630-nm airglow enhancement was observed by the Sata all-sky imager at 1124 UT. In this presentation, we discuss chemical reaction causing the 630-nm airglow enhancement due to the gasses exhausted from the rockets.

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