

オーロラの残像に見られる上部電離圏プラズマの複雑な高速流

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Complex and fast plasma flow in the topside ionosphere as seen in the afterglow of aurora

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Afterglow of aurora at 732 nm can be used to track the plasma flow in the topside ionosphere at 300 km altitude (Dahlgren et al., 2009). From ground-based high-speed (50 fps and 200 fps) imaging observations made by Kataoka et al. (2015), we find two interesting afterglow events on January 7 and January 28 2015, in which the speed of the brightest arc is suddenly accelerated within the field-of-view (15 deg by 15 deg). Both events occurred at close timing to the substorm onset. The existence of the afterglow is confirmed at wavelength range of >665 nm, and any contributions from green and red lines are rejected. The life time of the afterglow is an order of 5 s, which is consistent with the expected emissions from metastable O⁺ ions at 300 km altitude. The motion of afterglow is complex and the maximum speed is more than an order of magnitude faster than those previously reported by Dahlgren et al. (2009). We report the initial results of the optical flow analysis, and discuss the possibility of such a fast and complex plasma flow in the topside ionosphere.

References

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