

カスプにおけるクレーター型のレッドオーロラ Crater red aurora in the cusp

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A new high-resolution all-sky imager (Longyearbyen, Svalbard) detected the formation of "crater red aurora" in the cusp and the immediate ejection of the narrow auroral form from the crater during an interval of southward IMF on 29 December 2011. The crater red aurora can be defined as a circular-shaped region in which 630-nm dayside auroral emissions weaken. The emission data obtained continuously with an exposure time of 4 s show that the circular shape whose diameter was approximately 150 km at F region heights was formed for 2 min after the initial weakening at a smaller region. Immediately after the circular-shape was formed, a latitudinally-narrow (~40 km) auroral form was ejected from the inside wall of the crater in the azimuthal direction. The speed of the leading edge is estimated to be approximately 1.5 km/s. These observations strongly suggest that the crater red aurora is the ionospheric signature of a crater flux transfer event, which has been studied recently with data from spacecraft near the dayside magnetopause. Considering that the scale of a crater flux transfer event reflects the size of a flux transfer event itself, the present observation shows that the ionospheric signature of a flux transfer event is much larger than the ejected narrow auroral form. Such an auroral form, which has been regarded as a so-called poleward moving auroral form, would represent the structure inside a flux transfer event, not the whole structure of a flux transfer event.

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