



Source Location of the Wedge-like Dispersed Ring Current in the Morning Sector During a Substorm.

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Source of the wedge-like dispersed sub-keV ring current ions (wedge-like structure) is investigated. Cluster traversed a newly formed wedge-like dispersed ring current ions ("wedge-like structure") at around 23:50 UT on 21 October 2001. The spacecraft 1 and 4 detected the wedge-like structure in a wide energy range (0.1-10 keV) at 23:50 UT during the outbound traversal while spacecraft 3 did not detect it 10 minutes before in the same magnetic tube. With the observed electric field < 3 mV/m, this fact indicates that the dispersion is formed within half an hour and within 3 RE. Local time distribution of the wedge-like structure obtained from 2 and half year data (over 550 traversals) and Viking half-year data (over 700 traversals) also indicate that the source of the wedge-like structure is often located in the morning sector, with energy extending beyond several keV. The pitch-angle distribution of the wedge-like structure is in most cases double conic-like butterfly distribution, but oxygen ions during the 21 October 2001 event flow in the anti-parallel direction without loss cone. While the double conic distribution suggests that the wedge-like dispersion is formed after several mirror bouncing with ultimate source at low-altitude, the oxygen at 23:50 UT on 21 October 2001 event is newly ejected one from the northern hemisphere about 20 minutes before. All these data suggests that the morning sector is responsible for the formation of the wedge-like structure during the latest substorm started at 23:13 UT.