E137-013 **Room: 201B** **Time: May 14 14:00-14:15**

Contribution of low energy O+ ions to the storm-time ring current:A semi-statistical study based on FAST observation

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The ring current (RC) usually consists mainly of H+ ions. On the other hand, it is also observationally known that O+ contribution to the RC energy density becomes comparable to or larger than that from H+ in some intense storms especially when the Dst index goes down below -200 nT. There are two sources of RC, i.e., the solar wind and ionosphere. The O+ ions originate in the ionosphere, while H+ ions can come both from the solar wind and the ionosphere. The large O+ flux in RC can play an important role in the RC buildup and decay processes. However, mechanisms responsible for the drastic composition change of RC are far from understood. In order to understand supply and loss mechanisms of the storm-time ring current, we conducted a semi-statistical survey of time evolution of low-energy (less than 24keV) H+ and O+ ions during magnetic storms using FAST data.

In this study, we selected nine magnetic storm events during the period from Jan 1999 to Dec. 2005, when the middle-latitude particle data are available from the FAST satellite, with three selection criteria: 1. The absolute value of the peak Dst is great than 100 nT, 2. Time profile of Dst is simple (no multiple main phases), and 3. FAST orbit has a good coverage in pre-midnight sector (18:00-24:00 MLT). In the nine selected magnetic storms, there are both moderate and intense storm cases, and the absolute values of the peak Dst range from 123 nT to 472 nT. In order to investigate the contribution of the low energy ions to the magnetic disturbance induced by RC, we estimated corrected Dst (Dst$*$) values with two methods. In the first method, the Dessler-Parker-Sckopke (DPS) relation is utilized by assessing the equatorial total energetic density. In the second method, the current distribution is calculated from pressure gradient in the L direction, and the Dst$*$is derived from the Biot-Savart integral over the L profile of the current density. The results indicate that contribution from the low-energy O+ ions becomes important during intense storms and sometimes amounts for ~10 % of Dst$*$. We also investigated the detailed properties of low energy H+ and O+ ions during initial recovery phases of both moderate and intense storms. The relationship of O+ ions with the RC decay process and dependence on solar cycle will be discussed.