Geophysical Research Abstracts
Vol. 21, EGU2019-2559, 2019
EGU General Assembly 2019

The anisotropic electron distributions and associated whistler waves in a series of the flux transfer events at the magnetopause

Shimou Wang

University of Science and Technology of China, School of Earth and Space Sciences, Space physics, China (wsm623@mail.ustc.edu.cn)

With the measurements of the Magnetospheric Multiscale (MMS) mission at the magnetopause, we investigated the electron distribution and the whistler waves associated with a series of six ion-scale flux transfer events (FTEs) embedded in the southward reconnection outflow. Based on the magnetic field signature, each FTE can be divided into the core region and the draping region, and the electron distribution and the whistler wave characteristics were significantly different in these two sub-regions. In the draping regions of the most FTEs, the low-energy electrons displayed a bidirectional field-aligned distribution. The medium-energy electrons showed a field-aligned or beam distribution in the leading part of the draping region, while a pancake distribution was presented for the electrons in the trailing part of the draping region, which has never been reported previously. The close correlation between the pancake distribution and the compression of the localized magnetic field in the trailing part suggests that the pancake distribution may be due to the betatron acceleration. The whistler waves associated with the FTEs were observed and categorized into the lower and upper bands according to the frequency range. The lower-band whistler waves propagated in variable directions and therefore could be generated locally. The trailing part of the draping region with the electron pancake distribution was considered to be one possible source region. On the contrary, the upper-band whistler waves were all found in the core region and propagated antiparallel to the magnetic field, and therefore their source should be from the inner magnetosphere. The observations confirmed that the FTEs at the magnetopause are indeed the mass and wave channels between the magnetosheath and the inner magnetosphere, and the electron dynamics can be modified during the evolution of the FTE.