Magnetic and ion kinetic structures of dayside reconnection layer

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The magnetic and ion kinetic structure of the reconnection layer at the dayside magnetopause is studied by using two-dimensional hybrid simulation (ion particle, charge neutralizing massless electron fluid). The magnetic structure generated by anti-parallel reconnection (the pure southward interplanetary magnetic field case) is symmetric in the northern and southern reconnection layers. The field rotations of the rotational discontinuities are R-mode (electron mode) as predicted by the formation of symmetric Hall current system in the vicinity of diffusion region. However, the magnetic structures are asymmetric in the non-anti-parallel cases with a nonzero By component of the interplanetary magnetic field. The rotational discontinuities are also asymmetric (the one is R-mode, the other is L-mode) and their field rotation angles become less than 180 degrees. Thus, the Hall current system is no more symmetric. We will discuss the magnetic and ion kinetic structures and the role of the Hall current system in the transition from the diffusion region to the northern and southern rotational discontinuities at the dayside magnetopause boundary layer.