Asymmetry in mid-latitude reconnection site locations associated with the Kelvin-Helmholtz instability

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On 08 September 2015, MMS observed a long duration Kelvin-Helmholtz instability at the dayside magnetopause near the terminator. Kinetic signatures of local reconnection have been observed, showing evidences of Type I reconnection associated with the Kelvin-Helmholtz waves. Remote observations, i.e., streaming hot electrons in the magnetosheath boundary layer, suggested that reconnection occurred at higher latitudes both above and below the KH development plane. A revised analysis shows that the electron signatures have a preferred directionality, suggesting a preference for mid-latitude reconnection occurring mostly southward of the KH development plane. We investigate this preference by means of the high resolution instruments of the MMS mission combined with MHD simulations and show potential relation between the magnetic field line tension and reconnection.

Keywords: Kelvin-Helmholtz instability, mid-latitude reconnection, magnetospheric multiscale mission