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Current sheets and reconnection in the turbulent magnetosheath: Cluster and MMS results

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Recent results of numerical magnetohydrodynamic simulations suggest that in collisionless space plasmas turbulence can spontaneously generate reconnecting thin current sheets. On the basis of Cluster and MMS multi-point observations the distribution of magnetic field discontinuities and the associated small-scale reconnecting current sheets will be investigated in the terrestrial magnetosheath downstream of a quasi-parallel bow shock. Occurrence frequency of thin magnetic structures along the trajectory of MMS and Cluster will be studied. MMS provides the first serious opportunity to check if small proton-scale reconnection generated by turbulence resembles the reconnection events frequently observed in the magnetotail or at the magnetopause. We consider the field, plasma and particle reconnection signatures, down to the electron scales.