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Ionospheric ions in the reconnection region

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Magnetosheath plasma usually determines many properties of the asymmetric magnetic reconnection at the subsolar region of Earth's magnetopause. Cold plasma originating from the ionosphere can also reach the magnetopause, and modify the kinetic physics of the asymmetric reconnection. On 1^{st} November 2015, the Magnetospheric Multiscale (MMS) spacecraft observed a magnetopause crossing with high-density (10 – 60 cm^{-3}) cold plasma in the magnetosphere and reconnection jets. Jets of ionospheric and magnetosheath origin, with different velocities, are found at the same time between the current sheet and magnetosheath separatrix. The ionospheric-ion jets consisting of H^+, He^+, and O^+ are accelerated to about 300 km/s along the magnetic field. The magnetopause crossing is estimated to be about 300 ion-inertial lengths away from the magnetic reconnection X-line. The ionospheric-ion jet here is suggested to be from the cold ion inflow close the X-line.