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Kinetic and fluid signatures consistency during dayside reconnection observed by Double Star TC1

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The fluid evidence of magnetic reconnection at the terrestrial magnetopause is based on the tangential stress balance across the magnetopause, referred to as the Walén test, while the kinetic evidence is based on the observation of the D-shaped distributions of transmitted magnetosheath ions in the boundary layer, with a parallel velocity cutoff at the deHoffmann-Teller velocity. Kinetic signatures related to reconnection have been repeatedly reported, but they are not present at all the magnetopause crossings which satisfy the Walén test. Trenchi et al. (2008) gave fluid evidence of reconnection signatures for 143 crossings observed by the Double Star TC1 spacecraft. Here we present the detailed study of the ion distributions observed during the reconnection jets for the totality of the TC1 magnetopause crossings. In particular, we show the occurrence of the D-shaped distributions in relation to the different plasma conditions characterising each crossing and discuss whether it is the distance from the reconnection site or other local magnetopause parameters (e.g. magnetic field shear angle) to play a role in the mutual occurrence of fluid and kinetic signatures of reconnection.