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Reconnection impact of an asymmetric oxygen population in the inflow regions

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Combined with the magnetic field, the distribution of charged particles in the inflow region is expected to control the rate of magnetic reconnection. While fluid models predict a simple scaling with the (hybrid) Alfven speed of the inflow regions, recent research involving cold oxygen has shown that the actual interaction is considerably more complicated and that the reconnection rate is, at least for some time, reduced much less than what would be expected from a simple Alfven-rate scaling. These recent studies involve, appropriately for the magnetotail, asymmetric, cold, oxygen population in the inflow region. At certain times, however, north-south asymmetries of ionospheric outflow may generate asymmetric oxygen inflow densities, and such asymmetries are also quite generically expected at the Earth's magnetopause. We will hence present a first look at how reconnection is impacted by a cold, asymmetrically distributed, oxygen population, which is initially located away from the current layer in the inflow regions. We will analyze to which degree feature such as oxygen waves survive, and research reconnection rate reduction effects.