Reference to the article by Wei et al. "The current sheet flapping motions induced by non-adiabatic ions: case study"

This article deals with important question of the sources of vertical flapping motions of relatively thin current sheet in the Earth's magnetotail. General interpretations of this phenomenon have been proposed by Sergeev et al. (2004) as kink-wave propagating from the magnetotail center toward its flanks. However, available interpretations can not explain all features of flapping waves. In this work authors tried to explain vertical current sheet oscillations by the asymmetric distribution of plasma population that can play the role of their driver. Thus the shape of magnetic shear component (symmetric and anti-symmetric cases are considered) is followed by the North-South asymmetry of ion distribution, that can be a source of flapping motion of current sheet. This result agrees with works by Malova et al., JGR, 2012, 2015 where it was shown that (1) magnetic shear component By, symmetric and antisymmetric relatively Z coordinate in GSM system, can be self-organized in current sheet; (2) magnetic shear in current sheet can lead to the Northern-Southern asymmetry of plasma distributions in the vicinity of current sheet.

The general question of this investigation is the identification of quasi-adiabatic plasma population. Generally one can use two well known methods: 1) estimate of parameter of quasi-adiabaticity kappa (introduced by Buechner and Zelenyi, JGR, 1989) in current sheet neutral plane, that should be less than 1 for quasi-adiabatic particles; 2) investigation of {Vx, Vy} plasma velocity distribution, that should have characteristic "banana" shape in the neutral plane (such identification in the magnetotail was done, e.g., in (Artemyev et al., Ann. Geo., 27, 2009; JGR, 115, A12255, 2010) and theoretically predicted by Burkhart et al., JGR, 1992).

Since the kappa estimate is rather approximate (I leave aside the question raised by Referent#2 about the transition to the local coordinate system related with current sheet), one should supplement the article by figure with plasma velocity distribution {Vx,Vy}, which the authors presented in Fig.4 in their partial response to Referent#1 (and possibly other figures 1-3 with corresponding interpretations). This distribution has a pronounced "banana" shape, which indicates a quasi-adiabatic particle dynamics. Generally I think the general idea of this work is new and interesting. Authors presented quite convincing and reasonable results. I recommend this work for publication after inserting additional figures with appropriate explanations of the presence of quasi-adiabatic particles in current sheet.