

## ***Interactive comment on “The double layers in the plasma sheet boundary layer during magnetic reconnection” by J. Guo and B. Yu***

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Anonymous Referee #2 Received and published: 9 December 2014 Response to the Referee Many thanks for your very constructive report. The manuscript has been revised following your comments and suggestions. Please note that in the revised manuscript, all of the paragraph except for ‘Simulation Model’ are rewritten, then we just list the paragraph rather than to say the lines in the reply. In what follows, your comments are listed in their original order, followed by our response and the corresponding revisions. Please note that the page numbers referred to in this letter are for the revised manuscript. In addition, all new references introduced during this revision have been properly included in the reference list.

This paper is focused on the study of generation of double layers (DLs) and phases-  
C906

pace holes in magnetic reconnection regions located several ion inertial lengths away from the electron diffusion region. There are several points which appear very unclear in the present paper:

1) The quality of the Figures is very poor and almost unreadable

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Thanks for pointing this out. The quality of all of the figures have been improved.

2) The authors are not aware of the literature on DLs. For instance, DLs are commonly observed in the auroral upward current region where Auroral Kilometric Radiation is generated. Tripolar structures have been recorded in these latter regions and have been interpreted in terms of trains of nested ion and electron holes (Pottellette and Treumann, Geophys. Res. Lett., Vol. 32, No. 12, 2005)

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Thanks for pointing this out. We have rewritten the introduction (page 3), and new figures are added to explain the formation of the DL. Please take a look at the parts that are added on page 5-6.

3) Numerical simulations have been performed during the past decade showing that double layers are highly variable structures moving with time. (Singh et al., Geophysical Research Letters, Volume 32, 2005). The results of the present simulations show that the DLs almost do not move. Why?

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Thanks for pointing this out. The propagation of DL is added in the revised paper. Please take a look at the first paragraph that are added on page 6. The reason is added on page 6, second paragraph.

4) Previous simulation results by Hosino et al. (J. Geophys. Res; 106, 2001) and Prichett and Coroniti (J. Geophys. Res; 109, 2004) show that electron beams form

mainly close to the separatrices. In this case strong DLs can be generated at the reconnection site. This is confirmed by the Cluster observations published by Vaivads et al. (Phys. Rev. Lett., 93, 2004)

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Thanks for pointing this out. We have adopted these results. Please take a look at the second paragraph 2 that are added on page 9.

5) It would be useful to plot Figure 1b as function of the electron Debye length instead of the ion inertial length.

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Thanks for pointing this out. We have changed the figure.

6) Note that the DLs reported by Ergun et al in the plasma sheet are electromagnetic structures.

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Thanks for pointing this out. We have changed the sentence. Please look at the line29-30 on page 3.

Please also note the supplement to this comment:

<http://www.nonlin-processes-geophys-discuss.net/1/C906/2015/npgd-1-C906-2015-supplement.zip>

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Interactive comment on Nonlin. Processes Geophys. Discuss., 1, 1657, 2014.