

## ***Interactive comment on “Terrestrial ion circulation in space” by Masatoshi Yamauchi***

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### **Reply to Reviewer #2's comments**

Thank you again for valuable comments and the recommendation. While general direction of the revision (in response to Reviewer #1) was already posted separately, I here describe specific responses to your individual comments.

The direct detections of cold ions, other than in eclipse, will be mentioned at the beginning of §3 (Hirahara et al., 2004; Sauvaud et al., 2001), in §3.2 (Hirahara et al., 2004), and §4.2 (Sauvaud et al., 2001), and §4.7 (Sauvaud et al., 2001; Toledo-Redondo et al., 2016). However, the related arguments on the mass-loading and scale length are difficult to add in the present context because §5.2 is dedicated for heavy ions but not H<sup>+</sup> or He<sup>++</sup> (majority of cold ions). Instead of Andre and Cully (2012), I would use Andre (2015) that has a similar content with a review nature.

For the ion gap observations, I would add these references in §5.1 (Kovrazhkin et al., 1999) and §5.3 (Buzulukova et al., 2002).

A sentence mentioning the return flow toward the auroral ionosphere (Hirahara et al., 1997, Sauvaud et al., 1999) will be added in §3.4.

Finally, the loss through the plasmoid (Christon et al., 1998; Kistler et al., 2010) as well as through continuous flow (Hirahara et al., 1996; Opitz et al., 2014) will be mentioned in §3.2. These contributions are already included in the estimate in §4.1.

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Discussion paper

