

Interactive comment on “Dynamics Geomagnetic Storm on 7–10 September 2015 as Observed by TWINS and Simulated by CIMI” by Joseph D. Perez et al.

Anonymous Referee #1

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The authors now present the meaning of the equatorial pressure p_{eq} as $p_{eq} = \frac{2\pi}{m} \int E f d e$, where m is mass, E is energy, and f is the number of ions per unit area, energy and steradian. First of all, I am unsure if f corresponds to the so-called differential number flux that is the number of ions per unit area, energy, time and steradian. If so, I have further comment.

The definition of the perpendicular and parallel pressure (P_{\perp} and P_{\parallel}) is as follows. $P_{\perp} = \frac{1}{2} \int m v^2 \sin^2 \alpha F d v$ and $P_{\parallel} = \int m v^2 \cos^2 \alpha F d v$, where F is the velocity distribution function. These equations can be derived from the original definition of pressure (probably Braginskii (1965) provided, too). Lui

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et al. (1987) also present these equations. The velocity distribution function is given by $F = \frac{m}{v^2} f$. Substituting this into above equations, I have $P_{\perp} = \int \int \pi \sqrt{2m} f \sqrt{E} \sin^2 \alpha d(\cos \alpha) dE = \int \int \pi \sqrt{2m} f \sqrt{E} dE \sin^2 \alpha d(\cos \alpha) = \int p_{eq} \sin^2 \alpha d(\cos \alpha)$ and $P_{\parallel} = \int \int 2\pi \sqrt{2m} f \sqrt{E} \cos^2 \alpha d(\cos \alpha) dE = \int 2p_{eq} \cos^2 \alpha d(\cos \alpha)$, where $p_{eq} = \int \pi \sqrt{2m} f \sqrt{E} dE$. It seems that the definition of p_{eq} is different from the authors'. The same equation is found in Eqs (7) and (8) in De Michelis et al. (1997, doi:10.1029/96JA03743).

Maybe I misunderstand, but I would like to make it clear.

I suggest avoiding the term 'equatorial pressure' because this term is confusing and misleading. The above equations can be applied for everywhere, not restricted in the equatorial plane.

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