

Interactive comment on “Distribution of the Earth’s radiation belts protons over the drift frequency of particles” by Alexander S. Kovtyukh

Anonymous Referee #2

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Review of “Distribution of the Earth’s radiation belts protons over the drift frequency of particles” by Alexander S. Kovtyukh.

It is an interesting paper. It shows that the protons are better ordered by (F_d, L) then by (E, L) using data over a long period of time. The ERB protons try to conserve the flux invariant Φ in their drift orbit around the Earth. In a dipole field the drift frequency T_d is proportional to $E \cdot L$ or E/Φ . That is that for a fixed energy E the drift frequency is proportional to the inverse of the flux invariant. The drift frequency is proportional to the energy E . I recommend the paper to be published in *Annales Geophysicae* taken into account the comments below.

Some comments:

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1 Introduction The English in the paper should be improved line 85 (as an example) On the drift shells only protons (near the equatorial plane) can be trapped.

2.2 Spatial-energy distribution OK

2.3 Drift It is more common to use j for differential flux than J , but OK OK

3 Discussion The discussion part of the paper is somewhat long and should be shortened. There is a lack of references to older work.

4 Conclusions Good

On the figures. Figure 1. Good figure. It exhibits how the protons are ordered in (E, L) space. Data from some of the satellites measure particles in and near the loss cone. How are these measurements transformed to particles mirroring at the equator should be explained. Figure 2. The anisotropy factor A should be defined. Figure 3 OK Figure 4 OK Figure 5 OK

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