

Interactive comment on “Influence of the Earth’s ring current strength on the Størmer’s allowed and forbidden regions of charged particles motion” by Alexander S. Lavrukhin et al.

Anonymous Referee #1

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General comments:

This paper contains new approach for evaluation of the influence of the Earth’s ring current strength on the Størmer’s allowed and forbidden regions based on the solution of the analytical expression, which describes the boundaries of the Størmer’s allowed and forbidden regions using the special parameter "gamma". Also, authors discuss how various parameters influence on the geometry of those boundaries and which consequences it has on the particles motion.

- Does the paper contain new data or new ideas or both of them? – new approach.
- Are these up to international standards? – after some corrections.

C1

- Is the presentation clear? – after some corrections.
- Does the author reach substantial conclusions? - yes
- Is the length of the paper adequate? - yes
- Is the language fluent and precise? – after some corrections.
- Are the title and the abstract pertinent and understandable? - yes
- Is the size of each figure adequate to the quantity of data it contains? – yes, except the figure 9.
- Does the author give proper credit to related work and does he/she indicate clearly his/her own contribution? – I would suggest authors to review some of the previous works about the impact of the ring current on the cosmic rays access to the Earth, for instance, the corresponding chapter in the book by Dorman “Cosmic Rays in Magnetosphere of the Earth and other Planets” (2009) and the references included there.

Specific comments:

Page 1, line 17 – Please, correct “one have to. . .” -> “one has to. . .”

Page 2, line 18 – “enable” -> “enables”

Page 3, line 20 – here and below I would suggest to rephrase the “south IMF” and “north IMF” to more correct version of this term, for instant, “southward oriented IMF”.

Page 3, line 22 – “this phenomena” -> “this phenomenon”

Page 3, line 26 (and the entire chapter 3) – when you mention the index Dst for the first time, please introduce it clearly. The same comment goes to all other variables and parameters used in the paper, especially in the chapter 3: beta, c, m, etc. Some authors prefer to make the list of variables separately in the end of the paper, for example.

Page 3, lines 26, 30, page 4, line 25 – here and below sometimes you write “storm-time ring current”, and sometimes “stormtime ring current”. Please, use one version.

C2

Page 3, line 27 – please, rephrase the sentence, which contains “After the IMF is rotated to the north..”

Page 4, line 28 – please, rephrase the sentence, which contains “. . .and the sudden rotation of the IMF to the north..”

Page 5, line 5 – please, remove the parentheses

Page 7, line 19 / p.8 l.20 – “can not” -> “cannot”

Page 8, line 10 – “definition” -> “definition”

Page 9, line 15 – “appears” -> “appear”

Page 16 – Figure 9 is absolutely identical to Figure 8 and does not correspond to the text below and the values in the table 2, probably it is a technical error and another figure should be here?

Page 16, lines 11-13 – here you state that the Dst index strongly depends on bz and the radius of the ring, and on page 18, lines 3-4 you state, that this radius has almost no effect. Please, be consistent and rephrase those sentences and the corresponding text between on pages 16-17.

Page 17 - here you provide two tables, but you don't discuss them in the text. I would suggest to add some comments on those tables.

Page 18, line 21-22 – Please, rephrase the sentence “for At a certain current strength magnitude..”

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