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Interactive comment on "Energetic electron enhancements under radiation belt (L < 1.2) during nonstorm interval on August 1, 2008" *by* Alla V. Suvorova et al.

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Dear Referee1, Thank you very much for your comments and suggestions. Before to address all your concerns, we feel necessary to explain some crucial points regarding the manuscript.

"In the present study, the authors propose that the magnetic perturbation near the magnetopause causes a mixture of magnetosheath plasma and magnetospheric plasma to precipitate in high latitude (high L regions) which further induce a large transient electric field that could transport the electrons to L<1.2. However, there is no solid evidence reported to prove that the flux enhancements at L<1.2 are caused by magnetic per-

turbation near the magnetopause, nor analysis on the possibilities that this proposed chain of processes could work." "2. As is stated in the general comments, the authors have not present any solid evidence that the electron enhancements at L=1.2 could be caused by magnetic perturbations near the magnetopause which is at quite large L."

We want to clarify this point because it is important for overall understanding of our study. We did not state that the observed magnetic perturbations near the magnetopause or inside the outer magnetosphere, at large L, can cause such a mixture of plasma at high latitudes and electron enhancements at the equator. These perturbations had small amplitudes of about of several to tens of nT [e.g., line 332]. We wrote [line 513] "A series of night injections of >30 keV electrons could be associated with transient magnetospheric magnetic field perturbations." We wrote about the association in other parts of text also. These magnetic perturbations are only a response of the geomagnetic field on occasional pressure pulses produced by magnetosheath plasma jets at the magnetopause. In the study, we emphasized an important role of transient subsolar foreshock condition, under which plasma jets are generated, for the magnetosphere–ionosphere coupling, particularly for non-storm events. The transient subsolar foreshock was only recently recognized as a major driver for a throat aurora, as we mentioned in the study.

The second important moment, which we want to clarify in this comment, concerns the paper Li et al. "Measurement of electrons from albedo neutron decay and neutron density in near-Earth space" mentioned by Referee. In particular, the Referee puts attention that Li et al. "state that the large electric field can only cause an L shell distortion of 0.01 and this process is energy-dependent. Please comment on it and the possibility that the electric field moves the electrons to L<1.2 in this case".

First of all, that study is about relativistic electrons (~500 keV) during a geomagnetic storm. We think it has a little relation to our study of low-energy (>30 keV) electrons during quiet nonstorm conditions. Moreover, we note that Li et al. have cited the studies by Selesnik et al (2016) and Su et al. (2016). In the text we also discussed results of these studies. These studies compared observations of electron injections below L=2 with simulations. Su et al. demonstrated that “an enhanced large-scale electric field can be responsible for injection of $\sim$100 keV electrons in the inner radiation belt.” They also noted that “it is thus not necessary for electrons to be transported all the way from the outer zone during a single injection.” Selesnik et al. investigated a more deep injections at L<1.2 for energies 100-400 keV. They wrote “Injection to L<1.2 is demonstrated in both observations and simulations by the end of 23 June, but the simulated injection is smaller because the model Ec (electric field) was reduced to zero for L<1.17”. The both studies pointed out that none of the existing electric field models can accurately describe the penetration field and, hence, deep injections (L<1.2). Su et al. (2016) : “An accurate global electric field model is a necessary requirement in order to correctly capture the nondiffusive radial transport in the inner radiation belt.” Our paper presents new experimental results, which help to develop a new model. The new model should be a subject of another paper.

Sincerely, Alla Suvorova

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