Correction to "Nonlinear interaction of radiation belt electrons with electromagnetic ion cyclotron waves"

J. M. Albert and J. Bortnik

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[1] The paper "Nonlinear interaction of radiation belt electrons with electromagnetic ion cyclotron waves," by J. M. Albert and J. Bortnik (*Geophysical Research Letters*, *36*, L12110, doi:10.1029/2009GL038904, 2009), contained several minor errors which should be noted, although they do not affect any of the results substantially.

[2] Equation (4) for the Hamiltonian expression for the inhomogeneity ratio R should read

$$R = \frac{\partial^2 K_0/\partial s \partial I}{K_1(\partial^2 K_0/\partial I^2)}. \tag{4}$$

[3] The formula for R as originally given in equation (5) is valid for parallel-propagating whistler mode waves, but for EMIC waves a sign correction gives

$$R = \frac{-B}{B_w}\frac{\mu}{\mu^2 - 1}\frac{c}{v_\perp}\frac{c}{\omega}\left\{\left[\mu\frac{\gamma}{2}\frac{\omega}{\Omega_e}\frac{v_\perp^2}{c^2} + \frac{v_\parallel}{c}\right]\frac{1}{\Omega_e}\frac{\partial \Omega_e}{\partial s} - \mu\frac{\gamma}{2}\frac{\omega}{\Omega_e}\frac{v_\parallel^2}{c^2}\frac{1}{\mu^2}\frac{\partial(\mu^2)}{\partial s}\right\}. \tag{5}$$

Figure 1 shows the recalculated values of R using equation (5). The term in question is neglected in the approximation for R, so both equation (7) and the plot on the right side of the original Figure 1 are unchanged.

[4] The value of $|R|$ for a 2 MeV electron with $\alpha_0 = 15°$ interacting with a small amplitude wave (5 pT), reported as "nearly 1000" (more precisely, about 970) is actually about 1445. For the large amplitude wave (2 nT), the values of R for particles with $\alpha_0 = 15°$, 45°, and 55°, previously given as 2.4, 0.54, and 0.2, respectively, become 3.6, 0.68, and 0.23. In each case, the qualitative behavior expected from these values, namely diffusive for $|R| > 1$ and nonlinear for $|R| < 1$, still agrees with the corresponding numerical simulations of Figures 2–4, which are unchanged.

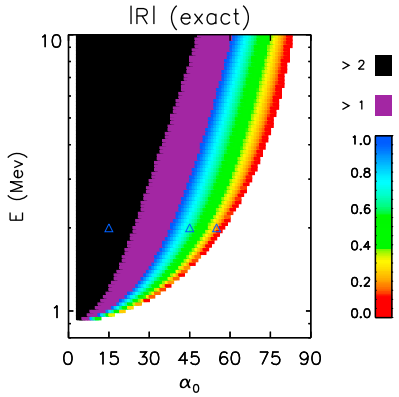

Figure 1. Redrafted portion of Figure 1 from the original article, showing the inhomogeneity parameter R for a model of 2 nT EMIC waves in a high density plume. Nonlinear interactions are expected for particles with $|R| < 1$.

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