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Interactive comment on "LANL* V2.0: global modeling and validation" *by* J. Koller and S. Zaharia

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The third adiabatic invariant described by L* is very important for radiation belt modeling and, contrary to the comment by Lemaire, the MacIlwain L does not suffice in accuracy. L* is needed when studying radiation belts as it is directly connected to the third adiabatic invariant. Only by analyzing the distribution function in adiabatic coordinates, we can filter out the adiabatic effects and focus on wave-particle and other non-adiabatic acceleration.

The fact that L was used a lot in the past does not mean that it is the best parameter. In a dipole field, L and L* are the same, and if the field is not too different from a dipole the comment might be relevant. However, in recent years we learned that the field can be very different from a dipole during storms, even in the inner magnetosphere. As models

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of the magnetic field have evolved from simple dipole into much more accurate (as validated by observations) empirical (e.g. TS05) and physics-based models, so needs to evolve our quantification of the field effect on particles, part of which is reflected in L*.

Interactive comment on Geosci. Model Dev. Discuss., 4, 575, 2011.