**Geoscientific
Model Development
Discussions**

Interactive
Comment

Interactive comment on "LANL* V1.0: a radiation belt drift shell model suitable for real-time and reanalysis applications" *by* J. Koller et al.

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Reviewer comments

1   General Comments

The paper is well written and is clear on the goal and results of the method and code. This will certainly be a valued addition to the radiation belt community. The technique stands alone and shows good innovativeness in taking a common method from another field and applying it here. Many thanks for producing code (and examples) that actually

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compiled first try on a MacOS X machine. This is a major strength of this work, I was able to run the model for a variety of inputs both real and synthetic and am convinced that it gives out correct results and does indeed degrade gracefully as input parameters are missing and/or bad values.

My only area for improvement in the model description is closer attention to explanation of the regions of validity for the model based on available training data and any other limitations. In other words where can one use this model and where can one not?

2 Specific Comments

The comment on pg 167 Line 26 "... they are typically used for interpolation and not extrapolation ..." is true and spot on, one worry for the use of the model is that it is not made sufficiently clear over what span of space and pitch angles the model is operating in interpolation not extrapolation "mode". This deserves some more mention within the paper or at least a discussion of where the model may be used and where it may not. Maybe this is a plot of relative error as a function of radius (McIlwain L) and pitch angle. Mentioned on pg 169 line 23 is $r \in [6.6R_E, 6.7R_E], \phi \in [-180°, +180°], \theta \in [-6°, 6°]$ is the only region where the model is valid and usable?

Page 170 Line 15, is this leap-frog different from using a bisection search algorithm? How do you define the last closed L^* for the empirical TSK03 model? What about different latitudes? If the model is trained in $\in [6.6R_E, 6.7R_E], \phi \in [-180°, +180°], \theta \in [-6°, 6°]$ what is the region of validly for this last closed L^* calculation?

3 Technical Comments

Page 161, line 20, references for Salammbo and DREAM would be good to add.

Page 164 line 6, is it accurate to say that TSK03 is formerly known as T01-storm model? It seems to me that more appropriately TSK03 is a refinement and improvement over T01-storm.

Page 169 line 6, hasn't the ONERA-DESP library changed names to IRBEM-LIB?

Interactive comment on Geosci. Model Dev. Discuss., 2, 159, 2009.

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