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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.

J. Koller et al.

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General comments

We would like to thank the reviewer for taking the time to comment on our paper. We agree that the description of the neural network technique is somewhat lacking. We will make changes in the manuscript to reflect that a neural network is not a hardware solution but simply an algorithm that solves Eq. 3. We hope that the added information will make this more clear (see specific comments below).

Specific comments

Below we provide a response to each comments. The reviewer's comments are paraphrased and summarized in italics.

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1. *What is a neural network?*
   A neural network is not a hardware solution but a mathematical programming construct that mimics the behavior of biological neurons. Using a trained neural network is as simple as solving Eq. 3 in the paper. Neural networks have proved useful for a number of real-world application including credit-scoring, fraud detection, speech recognition and optical character recognition (OCR), just to name a few.
   We will also add a few more words on training the neural network. The interconnection weights (components in matrix **W**) have to be determined through training. Typically, the training starts with a randomly chosen set of weights. The output (here L*) is calculated using Eq. 3 and compared to the real L* (output from the Tsyganenko model). The comparison is made by calculating the error using Eq. 5. A different set of weights is chosen over and over again until the error is minimized for *all* training patterns.

2. *Is it a torus or rather a ring?*
   We agree that "ring" would be a better description. We will change the manuscript accordingly.

3. *Leap-frog method:*
   The second reviewer has made a similar point. A better technical term is "bisection search algorithm". Initially we step out in radial direction until we find a bad value for L*. Then we step back inwards and outwards similar to the bisection search algorithm until a reasonable accuracy has been achieved.

4. *Could a neural network technique be also used to calculate, e.g., K values?*
   Calculating K values is much faster that calculating L*. But if that turns into a bottle neck, a neural network would be also feasible. We will point this out in the manuscript.

Technical corrections

1. *Commas and period after equations:*
   We will make the change in the manuscript.

2. *OMNIWeb:*
   We will make the change in the manuscript.

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

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