Nonlinear Processes
in Geophysics

Open Access

EGU

Discussions

Interactive comment on "Precision Annealing Monte Carlo Methods for Statistical Data Assimilation: Metropolis-Hastings Procedures" *by* Adrian S. et al.

Anonymous Referee #2

The authors appear to introduce a new version of data assimilation, referred to as statistical data assimilation, that is Monte Carlo based. I found the manuscript very difficult to follow, and that distracted from the potential of the work it is presenting.

The major problem with the manuscript is the presentation. It is to dense and very difficult to follow the flow of the mathematics at times, especially when it is included in the sentence. the first major change that has to occur if for the notation to conform to that of Ide (1997) so it is possible for the reader to compare to other DA systems, rather than translating what we think you are doing. You refer to at one point a diagonal precision matrix, but how is that related to the error covariance matrices of current DA

systems?

Another troublesome point is the fact that you mention the Laplace approach but then define this mathematically, or if you did it was obvious and this flows back into my previous comment.

My other comments are below:

The grammar is quite bad in places with tenses and pluralities incorrect too many times.

What is beta? you perform a whole set of analyses on this parameter but it is never defined, nor is it named correctly. Having just looked over the manuscript i find that beta is defined in the caption of figure 2, this need to be in the text when it is first introduce so the reader is prepared for this to understand the discussion and the figure itself.

Equation 4: You make no reference to the two previous papers that introduced this formulation of 4DVAR, van Leeuven and Evensen (1996) and Fletcher (2010).

Sections 3.1 and 3.2 need to be better presented, either in the form of a flow chart figure to indicate the steps, or in a table

the figure caption for Figure 3 is too long.

It appears from what i could see that there are no real conclusions about this work, nor is there a discussion on how this could be extended to more complex systems.

I do believe that the manuscript has potential but it also need to address the following questions for it to be really be considered to be published.: 1) How does this approach compare relative to CPU time to current variational and ensemble based system? 2) How operationally viable is this approach? You need to address the feature or wall clock time for this approach.