

Interactive comment on “Data assimilation as a deep learning tool to infer ODE representations of dynamical models” by Marc Bocquet et al.

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Subject: Manuscript npg-2019-7: “Data assimilation as a deep learning tool to infer ODE representations of dynamical models”, Response to the Editor.

Dear Editor,
Dear Olivier,

C1

We wish to thank you for your comments and suggestions, that we have taken into account to improve the manuscript. We respond below to these comments and tell how we modified the manuscript accordingly. A pdf file showing the differences between the original and the revised manuscript is provided.

In many places in Section 4 (for instance, p. 17, l. 14), the authors mention the number K of observation times in their numerical experiments. It would be useful to say to how many Lyapunov times this corresponds (the information is available in the paper for the reader to find out by himself, but an explicit mention would be useful).

Following your suggestions, we have added the equivalent length in Lyapunov time units. Some of them are very short (below 1) and correspond to noiseless observations experiments. Noisy observation experiments require to substantially increase K as suggested in the original manuscript, which is further stressed in the revised manuscript. Thank you for the suggestion.

At a more fundamental level, could it be possible to mention and discuss, if only briefly, the question of how to combine the approach proposed by the authors with an already known dynamical model? That would naturally come through an a priori term $-\ln p(A)$ in Eq. (17). But how would $p(A)$ be known? And can we at this stage expect a significant improvement of an existing model (used, for instance, for any kind of meteorological prediction) through the learning approach presented in the paper?

We have introduced a new short discussion (new subsection 3.1) in the beginning of the theoretical discussion part. Thank you for the suggestion.

Marc Bocquet, Julien Brajard, Alberto Carrassi, Laurent Bertino.

2019-7, 2019.

C3