

Virtual Event: ECMWF-ESA Workshop on Machine Learning for Earth System Observation and Prediction



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Type: **Oral presentation**

Artificial Neural Network at the service of Data Assimilation (and vice versa)

Tuesday, 6 October 2020 11:30 (30 minutes)

Can Artificial Neural Network (NN) learn (and/or replace) a Data Assimilation (DA) process? What would be the effect of this approach?

DA is the Bayesian approximation of the true state of some physical systems at a given time by combining time-distributed observations with a dynamic model in an optimal way. NN models can be used to learn the assimilation process in different ways. In particular, Recurrent Neural Networks can be efficiently applied for this purpose.

NNs can approximate any non-linear dynamical system. How DA can be used to improve the performance of a NN?

DA can be used, for example, to improve the accuracy of a NN by including information provided by external data. In general, DA can be used to ingest meaningful data in the training process of a NN.

We show the effectiveness of these methods by case studies and sensitivities studies.

Thematic area

1. Machine Learning for Data Assimilation - Including Model Error Estimation and Correction, Parameter estimation, Fast linearised models for DA, Hybrid DA

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