



Contribution ID: 9

Type: not specified

Bayesian methods in neural networks for inverse atmospheric modelling

Friday, 21 June 2024 15:40 (20 minutes)

Recovering a source and an amount of an emitted substance from distant measurement is an ill-posed problem. In this contribution, two methods based on Bayes theorem will be compared on a realistic toy problem with microplastics. First of them is a Bayesian neural network pretrained to mimic a lognormal process and second one is hierarchical variational model, where the parameters of the posterior distribution are modeled by a convolutional neural network. Both these approaches allow to incorporate spatial dependency of the locations of the source and offer an estimate of uncertainty to assess the reliability of the method.

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Session Classification: Dynamic Decision Making