Contribution ID: **28** Type: **Presentation**

Approximation of high-resolution surface wind speed in the North Atlantic using discriminative and generative neural models based on RAS-NAAD 40-year hindcast

Thursday 7 July 2022 15:30 (15 minutes)

Surface wind is one of the most important fields in climate change research. Accurate prediction of high-resolution surface wind has a wide variety of applications, such as renewable energy and extreme weather forecasts. Downscaling is a methodology for high-resolution approximation of physical variables from low-resolution modeling outputs. Statistical downscaling methods allow to avoid computationally expensive high-resolution hydrodynamic simulations. Deep learning methods, including artificial neural networks (ANNs), are one of the typical machine-learning approaches approximating complex nonlinear functional relationships. In our study, we explored the capabilities of statistical 5x downscaling of surface wind over the ocean in the North Atlantic region. We applied several downscaling methods, including cubic interpolation as a reference solution, various convolutional ANNs, and generative adversarial networks (GANs). We compared downscaling results in terms of several quality measures including the ones representing the reconstruction of extreme winds. We evaluated the performance and the quality of different methods and reference solution to identify advantages and lacks of machine-learning downscaling. We consider GANs as the most promising ANN architectures for surface wind downscaling based on both performance and quality.

Agreement to place

Participants agree to post their abstracts and presentations online at the workshop website. All materials will be placed in the form in which they were provided by the authors

Authors: REZVOV, Vadim (MIPT); KRINITSKIY, Mikhail (Shirshov Institute of Oceanology, Russian Academy of Sciences)

Presenter: REZVOV, Vadim (MIPT)

Session Classification: Session 3. Machine learning in Biology and Other Natural Sciences

Track Classification: Track 3. Machine Learning in Natural Sciences