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From Super-Resolution to Downscaling - An Image-Inpainting Deep Neural Network for High Resolution Weather and Climate Models

High resolution in weather and climate was always a common and ongoing goal of the community. In this regards, machine learning techniques accompanied numerical and statistical methods in recent years. Here we demonstrate that artificial intelligence can skilfully downscale low resolution climate model data when combined with numerical climate model data. We show that recently developed image inpainting technique perform accurate super-resolution via transfer learning using the HighResMIP of CMIP6 (Coupled Model Intercomparison Project Phase 6) experiments. Its huge data base offers a unique training opportunity for machine learning approaches. The transfer learning purpose allows also to downscale other CMIP6 experiments and models, as well as observational data like HadCRUT5.

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Keywords

Aftificial Intelligence, Super Resolution, Inpainting, Climate Modeling, Observations

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