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# Deep Learning for Super-Resolution in ICON-O

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## Abstract

Machine learning algorithms driven by data offer a promising approach to enhancing the effective resolution of numerical circulation models. In this work, we incorporate a U-Net-type neural network into the ICON-O general circulation model developed by the Max Planck Institute for Meteorology. The network is trained using high-resolution data from ICON-O simulations. Through numerical experiments of varying complexity, our analysis highlights the potential of the ML-enhanced ICON-O model to improve low-resolution simulations in a physically meaningful way while maintaining a reasonable computational cost.

**Keywords:** Machine Learning, Shallow, water, ICON, O

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