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Determining Cloud Cover with Machine Learning

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Abstract

The cloud cover provided by boundary layer cumulus clouds is one of the greatest uncertainties in climate and weather prediction models. It is difficult with current technology to cheaply and accurately collect cloud cover data. The TSI (Total Sky Imager) provides a hemispheric field of view in order to maximize the area it can see. The farther away from the center of the image, the more angled the view of the the cloud is. Therefore, more of the side of the cloud is captured in addition to the cloud base. Machine learning is well suited to seeing through this bias. In this study, LES (Large Eddy Simulation) generated fields are used to train a convolutional neural network based on DeepLab to use semantic segmentation distinguish between the cloud side and base.