Supporting Information for "Global Precipitation Correction Across a Range of Climates Using CycleGAN"

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Contents of this file

Additional Supporting Information (Files uploaded separately)

Introduction

Movie S1. Four-year ramping simulations, depicting the real input C48 and C384 precipitation, and the generated C384 (ML) and C48 (ML) precipitation based on these inputs for each 3-hourly sample.
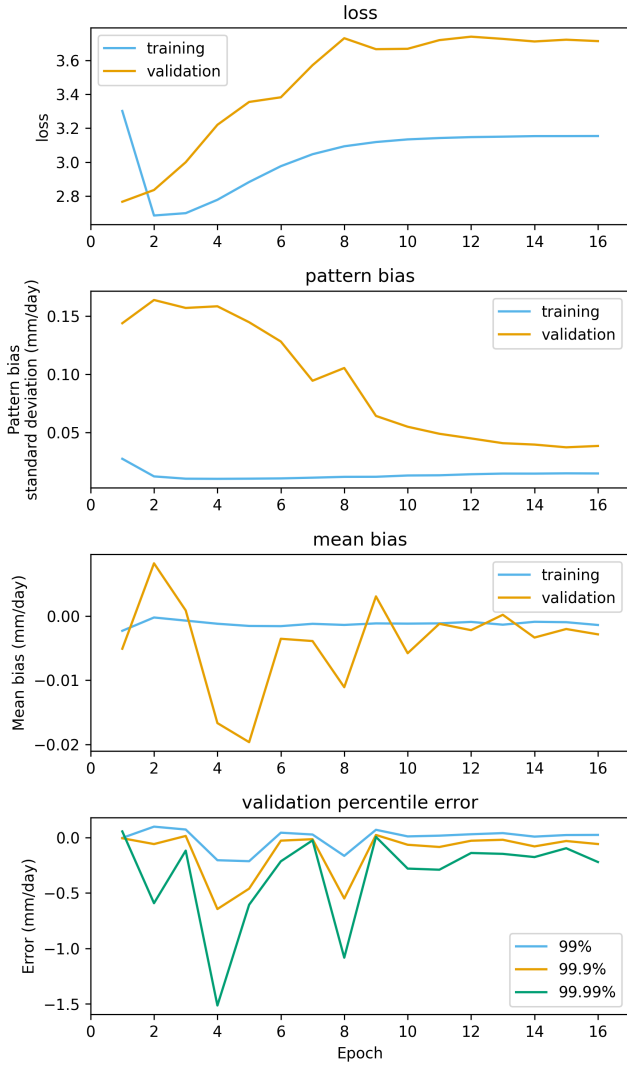
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June 22, 2023, 4:09pm

Figure S1. Metrics recorded while training the best-case CycleGAN model which were used to determine convergence. Note that when training GANs the model can improve as the loss increases, due to compensating increases in skill of the generator and discriminator models. Pattern bias for training is computed by first aggregating the time-mean of predicted outputs for each training batch. Loss indicates total loss optimized during training. The dataset considered in these losses includes data from all four training climates.
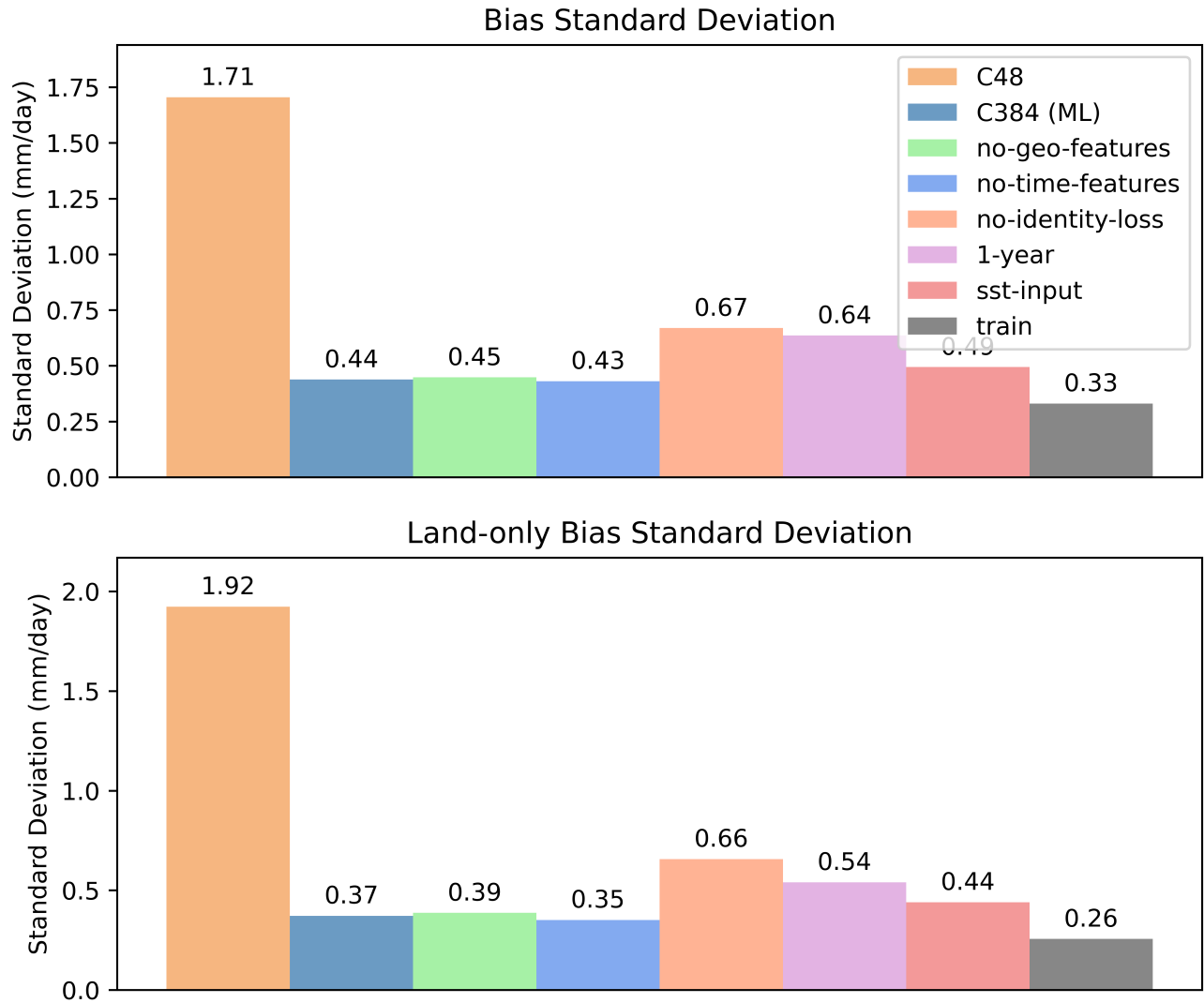
Bias Standard Deviation

Land-only Bias Standard Deviation

Figure S2. Area-weighted root mean-squared error of time-mean precipitation for ablation studies in the "0K" climate, both globally and over land only. C384 (ML) refers to the "best" model presented in the main text. no-geo-features and no-time-features are the models where we excluded all five geographic features and the two diurnally-varying geographic features, respectively. no-identity-loss is the model where the identity loss was excluded from training. 1-year is a model trained on only the first year of training data. sst-input is the model where the SST perturbation is provided as input context to the generator and discriminator networks. train is the result when using the coarsened C384 training data instead of model output.
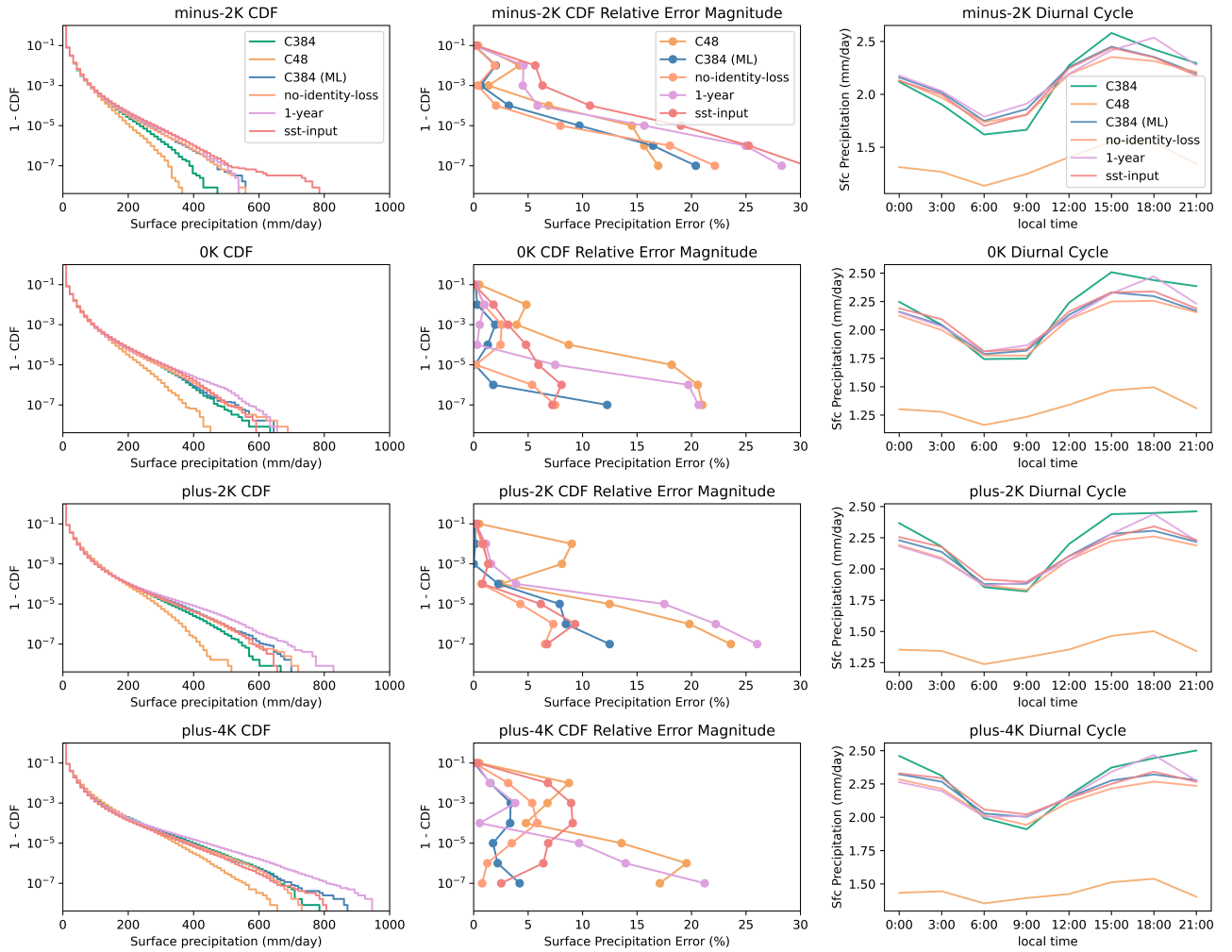
Figure S3. CDF and land-only diurnal cycle metrics for ablation study models which don't involve modifying the geographic features. Labels are as in Figure S2.
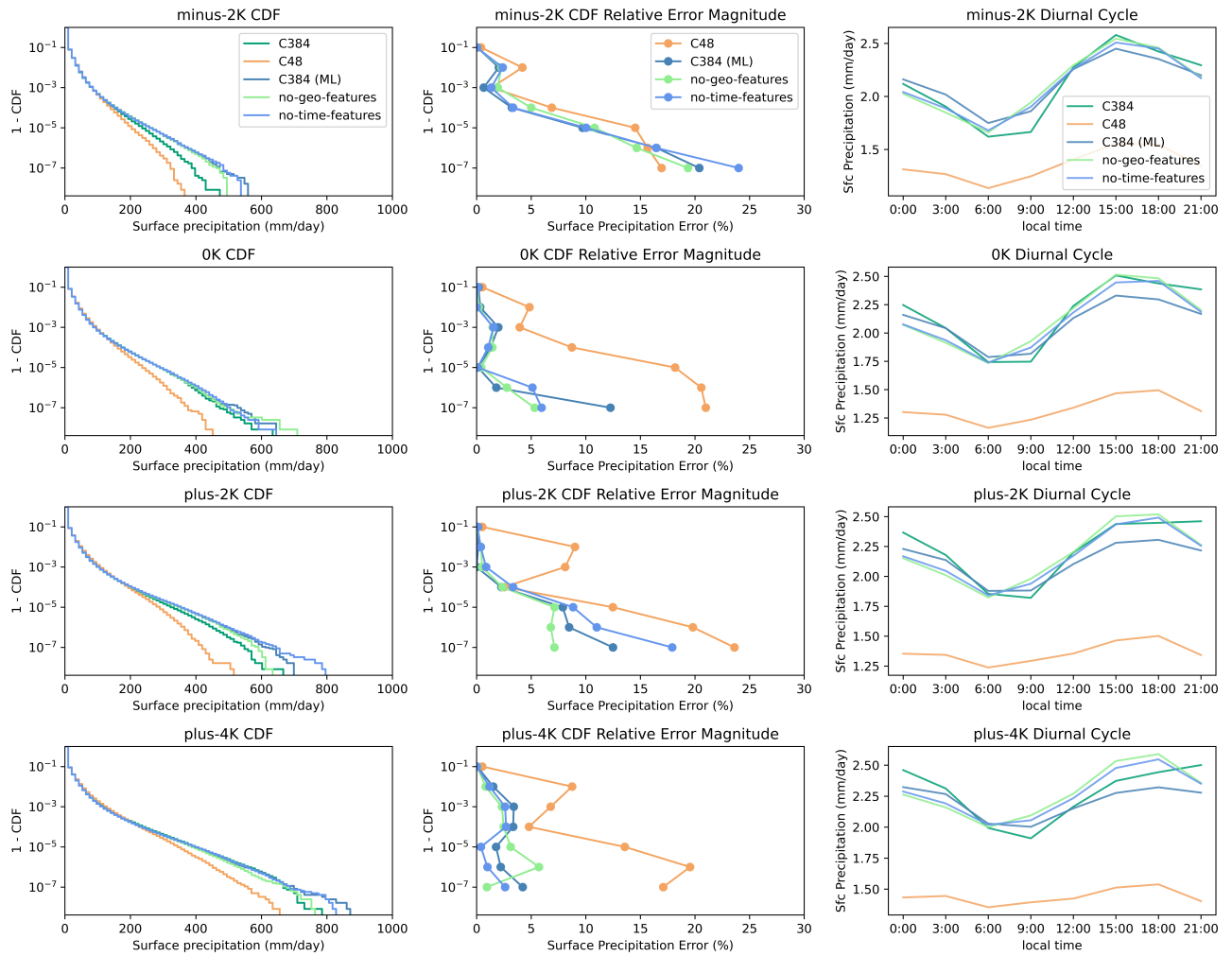
June 22, 2023, 4:09pm

Figure S4. CDF and land-only diurnal cycle metrics for ablation study models which involve modifying the geographic features. Labels are as in Figure S2.

June 22, 2023, 4:09pm