

in Section 2.3, and tuning is only performed with the training set. Furthermore, we perform a six fold cross-validation over the sensors in order to validate the model at locations not included in the OI calculation. We then perform a grid search through the parameter space and define the optimal parameters as those that give the lowest mean (over the cross-validation sets) MSE of the withheld sensors. This tuning is performed for both spatial and

cloudiness correlation parameterizations and for both the SE and UASIBS models.

The optimal parameters for the UASIBS and SE models using both cloudiness and spatial covariances computed only using the training data are presented in Table 1. We note that these parameters are optimal for Tucson, AZ. Other areas, sensors, or study periods may require a different parameterization of the error covariances.

Table 1

Optimal parameters for the UASIBS and SE models for both cloudiness and spatial covariances. l has units of adjusted visible albedo for cloudiness covariances and units of kilometers for spatial covariances.

		d	l	k
UASIBS	Cloudiness	156	0.2	Linear
	Spatial	225	20	Exp.
SE	Cloudiness	1.56	0.6	Exp.
	Spatial	0.25	100	Exp.

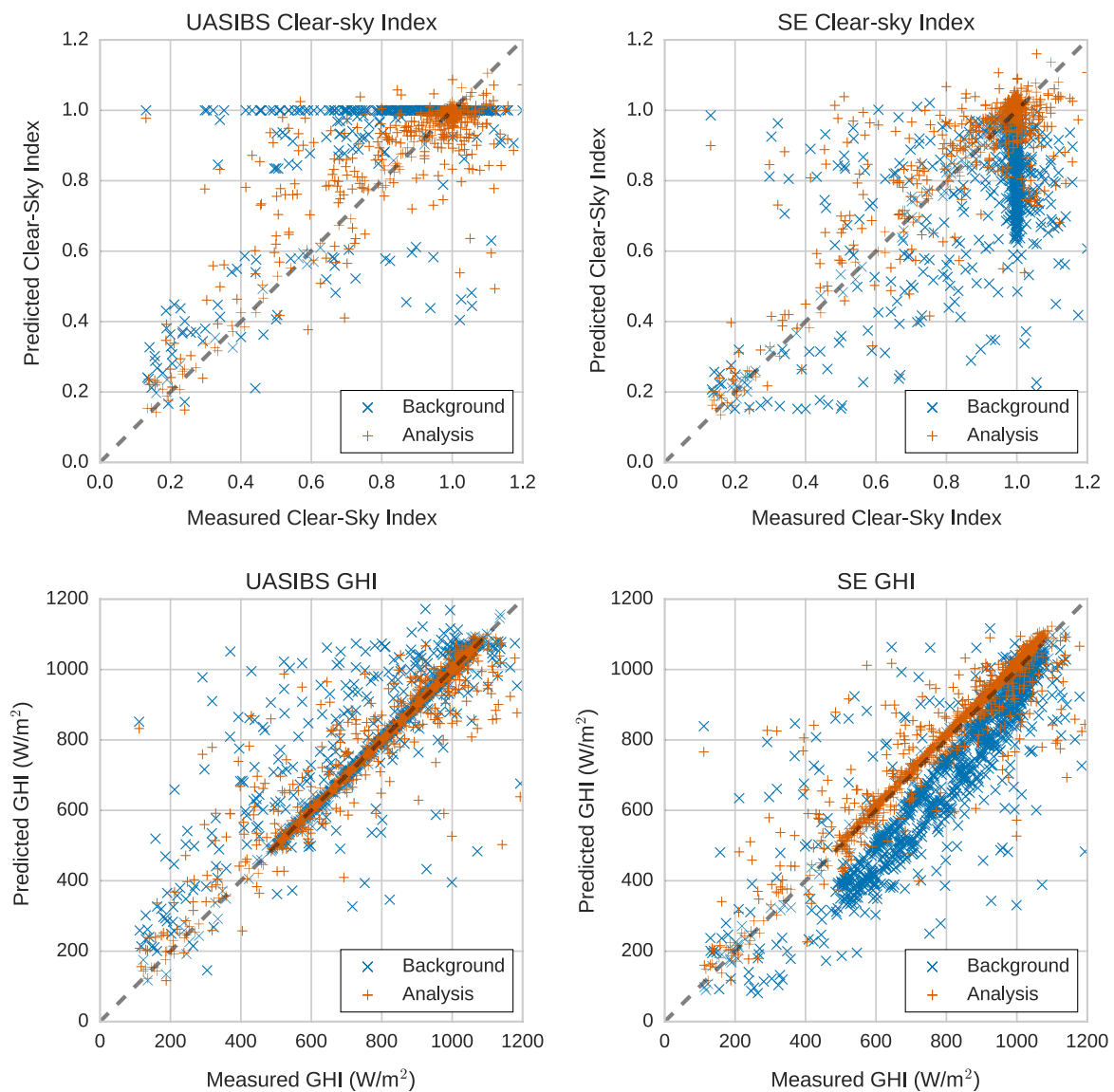


Fig. 4. Scatter plots of predicted versus measured clear-sky index (top row) and GHI (bottom row) for the calibrated NREL MIDC GHI sensor on the University of Arizona campus for both the UASIBS model (left column) and SE model (right column). The analysis was computed using cloudiness covariance, the optimal parameters listed in Table 1, and the verification data set. Data from the background images is plotted as blue \times 's and data from the OI analysis is plotted as orange $+$'s. GHI is computed by multiplying clear-sky indices and an appropriate clear-sky profile. In each case, we see that the analysis values are more tightly scattered around the dashed $y = x$ line. Also notice that the UASIBS model does not predict clear-sky index values from roughly 0.6 to 0.8 but that the analysis does move some values into this range. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)