

**S6 Table. MAE of our proposed approach against the other model set-ups from the ensemble mean mean  $\pm$ sd estimate of the 50 runs.** *LSTM* = LSTM model using the full depth of the Landsat time series and climate data; *LSTM<sub>perm</sub>* = *LSTM* model but the temporal patterns of both the predictive and the target variables were randomly permuted while instantaneous relationships between predictive and target variables were kept; *LSTM<sub>m<sub>sc</sub></sub>* = *LSTM* model but the Landsat time series for each band were replaced by their mean seasonal cycle, while using the actual values of air temperature ( $T_{air}$ ), precipitation (P), global radiation (Rg), and vapor pressure deficit (VPD); *LSTM<sub>annual</sub>* = *LSTM* model but the Landsat time series for each band were replaced by their annual mean, while using the actual values of  $T_{air}$ , P, Rg, and VPD, RF = Random Forest model using the actual values of the Landsat time series and climate data.

	Seasonal	Seasonal anomaly	Across-site	Interannual anomaly
LSTM	<b>0.81</b> $\pm$ 0.01	<b>0.42</b> $\pm$ 0.003	<b>0.48</b> $\pm$ 0.02	<b>0.22</b> $\pm$ 0.003
LSTM <sub>m<sub>sc</sub></sub>	<b>0.83</b> $\pm$ 0.01	<b>0.42</b> $\pm$ 0.002	<b>0.50</b> $\pm$ 0.02	<b>0.22</b> $\pm$ 0.002
LSTM <sub>annual</sub>	<b>0.89</b> $\pm$ 0.02	<b>0.42</b> $\pm$ 0.006	<b>0.51</b> $\pm$ 0.02	<b>0.22</b> $\pm$ 0.006
LSTM <sub>perm</sub>	<b>0.86</b> $\pm$ 0.01	<b>0.43</b> $\pm$ 0.003	<b>0.50</b> $\pm$ 0.02	<b>0.22</b> $\pm$ 0.003
RF	<b>0.91</b> $\pm$ 0.00004	<b>0.51</b> $\pm$ 0.00008	<b>0.51</b> $\pm$ 0.0001	<b>0.24</b> $\pm$ 0.00009