Figure S1: (a) Scatter plot between MAE and elevation. (b) Spatial distribution of MAE between model prediction and observation over prediction period 2010--2018 for T9--T28 period.

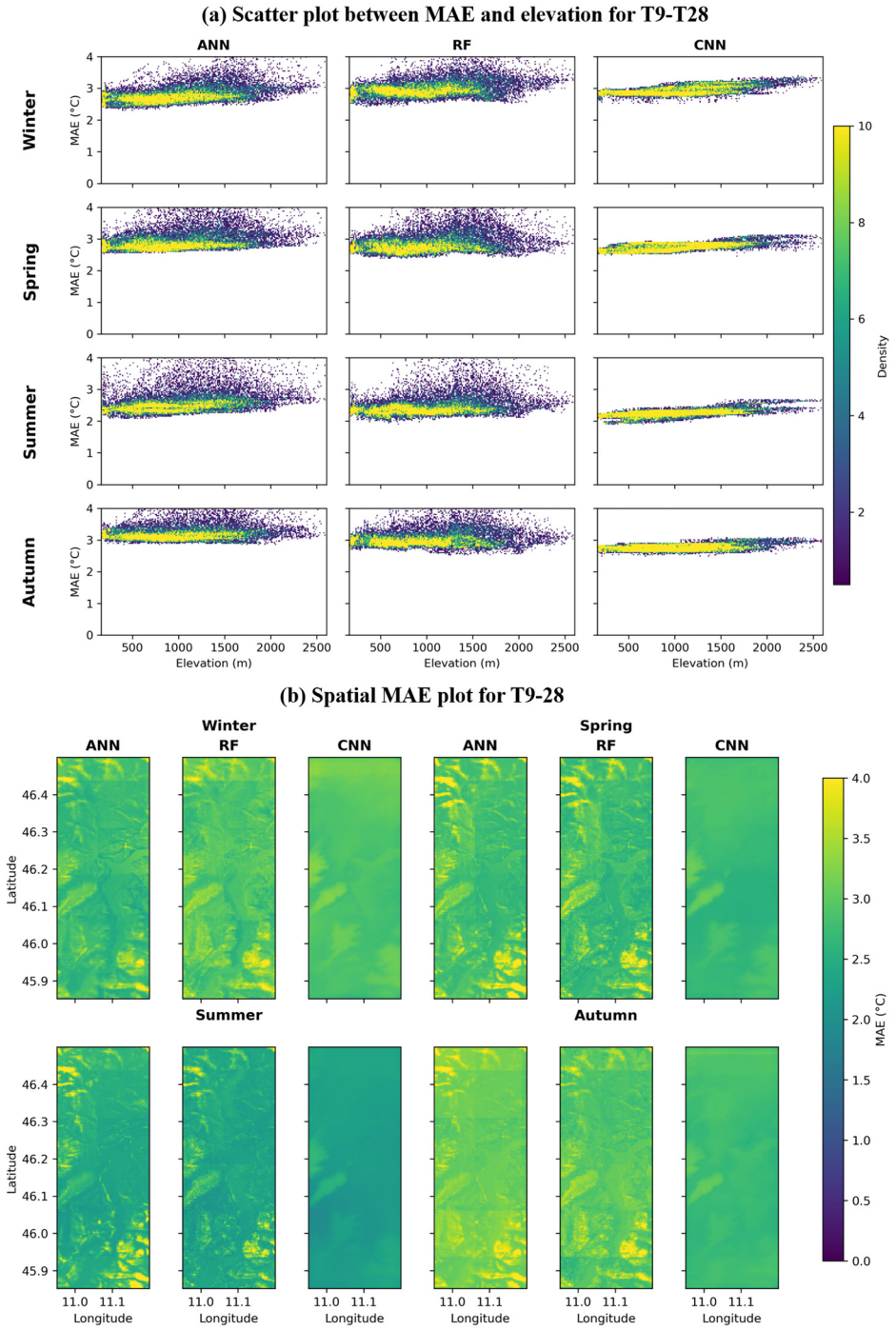
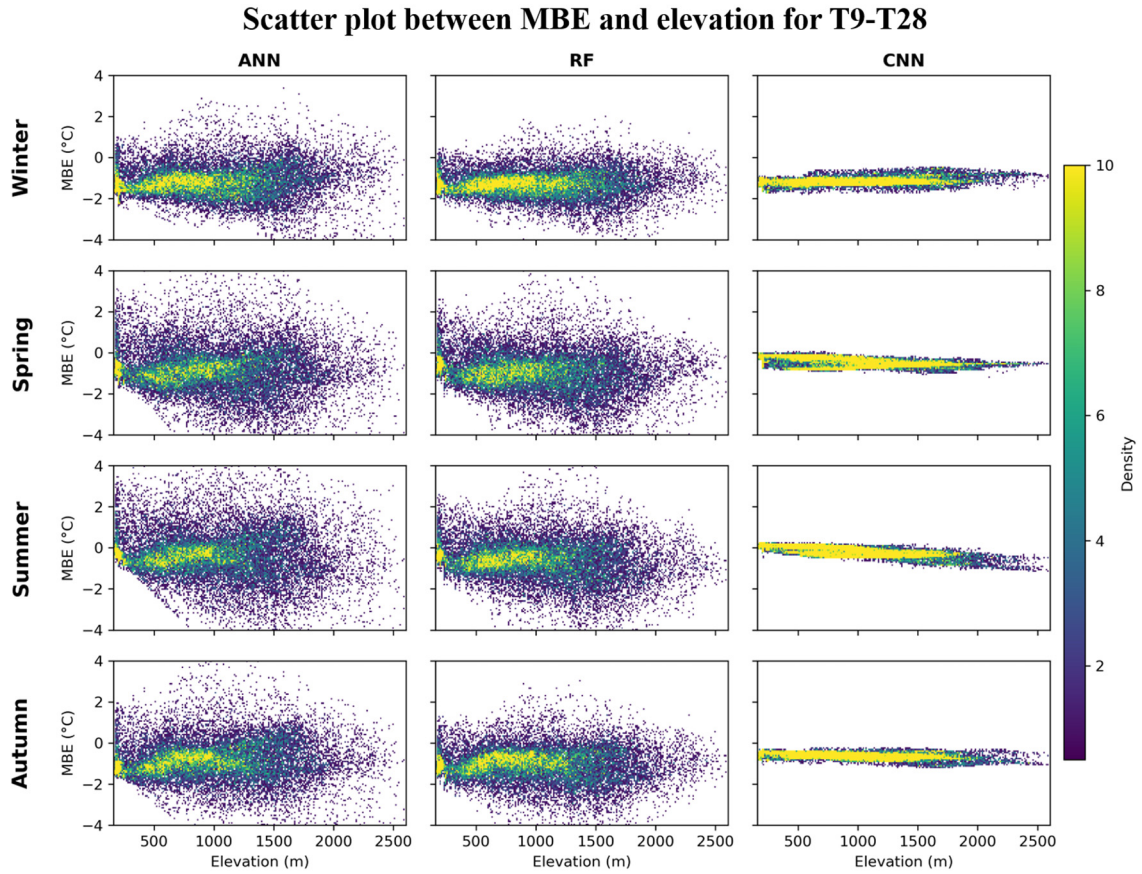


Figure S2: (a) Scatter plot between MBE and elevation. (b) Spatial distribution of MBE between model prediction and observation over prediction period 2010--2018 for T9--T28 days



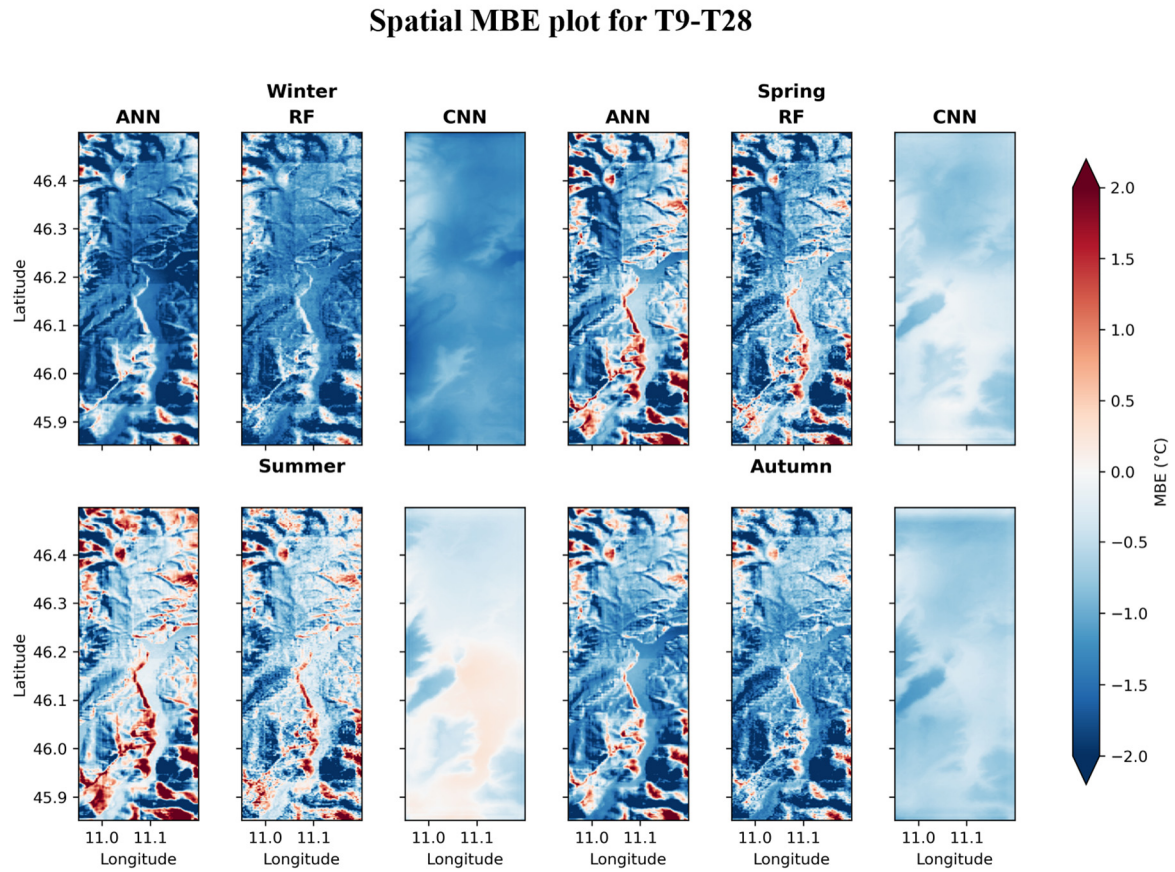


Figure S3: Metrics heatmap for frost prediction over spring months for prediction period 2010--2018 for T9--T28 days. The darker blue color represents the models with better performance, whereas the lighter green and yellow color shows models with poor and poorest performance.

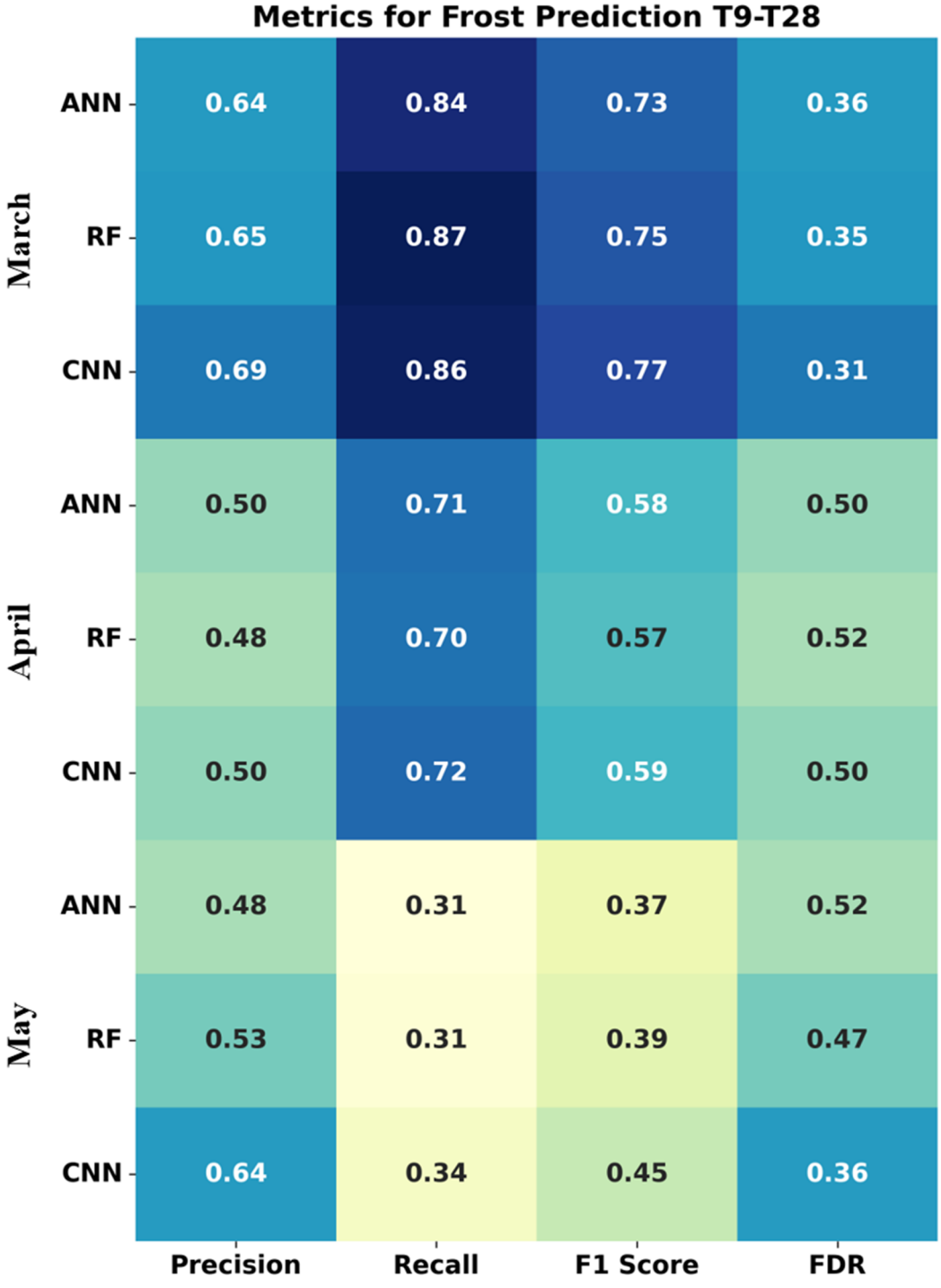


Figure S4: F1 score and FDR for frost prediction over spring months for prediction period 2010--2018 for T9--T28.

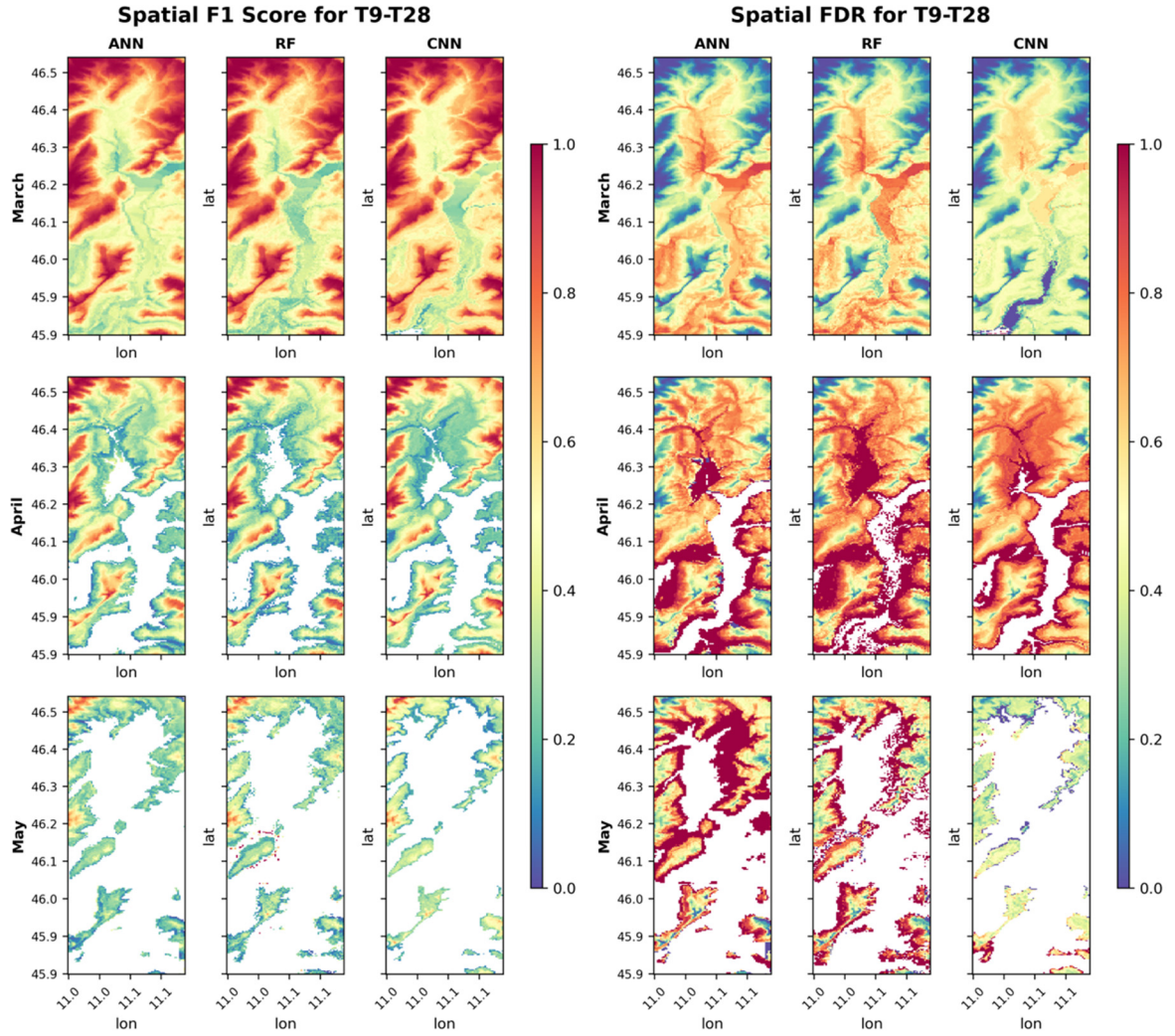


Table S1: F1 scores of ML models for different elevation bands (<1000 m and >1000 m) and different crop types (grapevines, apples, and grasslands) during the evaluation period (2010--2018).

Model	Elevation Band	Crop Type	March	April	May
ANN	<1000 m	Grapevines, Apples	45.43	24.44	13.3
ANN	>1000 m	Grasslands	80.27	51.59	28.45
RF	<1000 m	Grapevines, Apples	46.23	20.05	61.34
RF	>1000 m	Grasslands	81.55	49.63	29.74
CNN	<1000 m	Grapevines, Apples	50.87	22.64	22.27
CNN	>1000 m	Grasslands	81.88	51.02	33.42