Generating Tree Genus Classification and Change Maps to Assist Mitigate Climate Change

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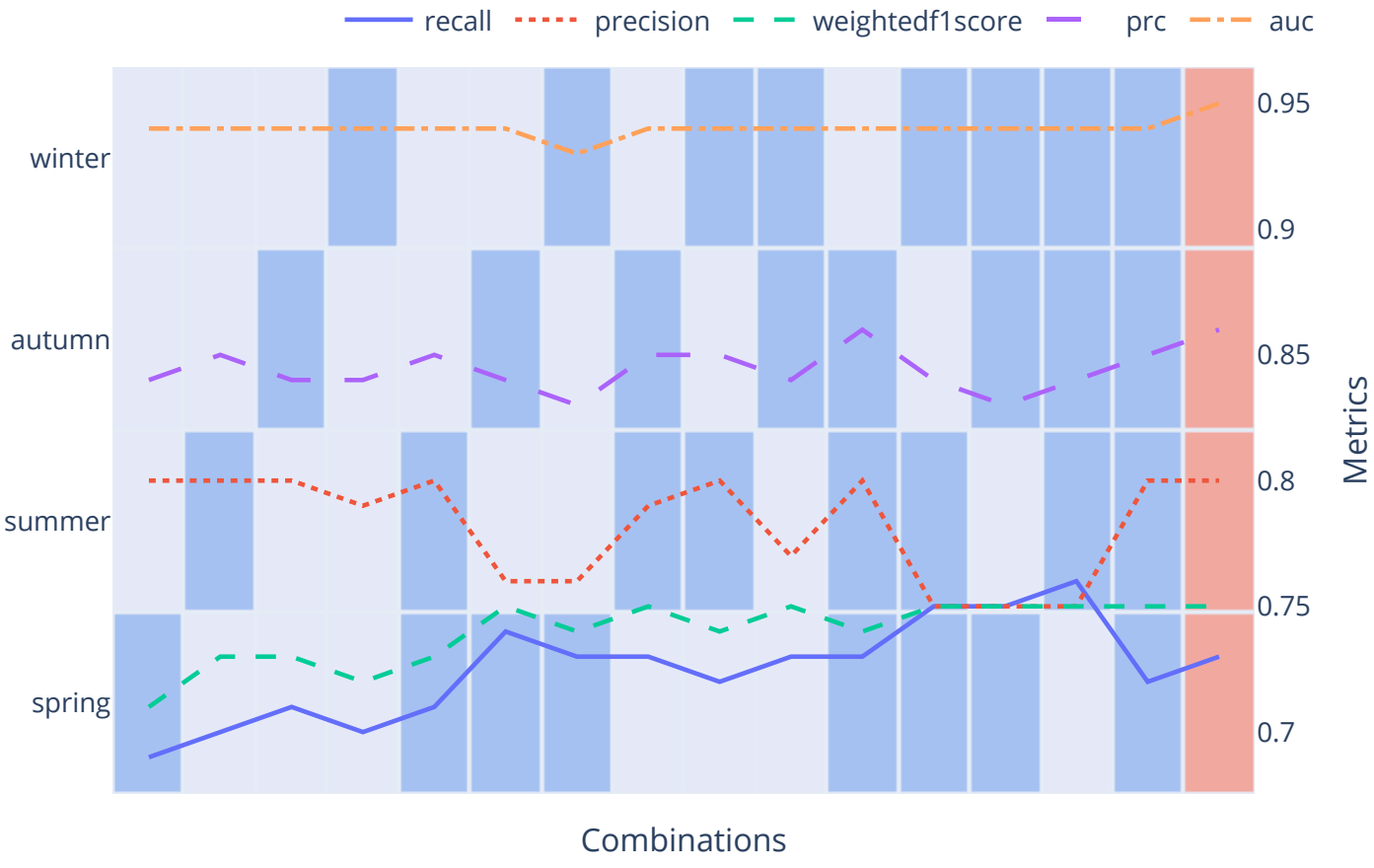
Introduction

- Overview of tree genus classification
- Use of Sentinel-2 data and climate variables
- Objectives of the study

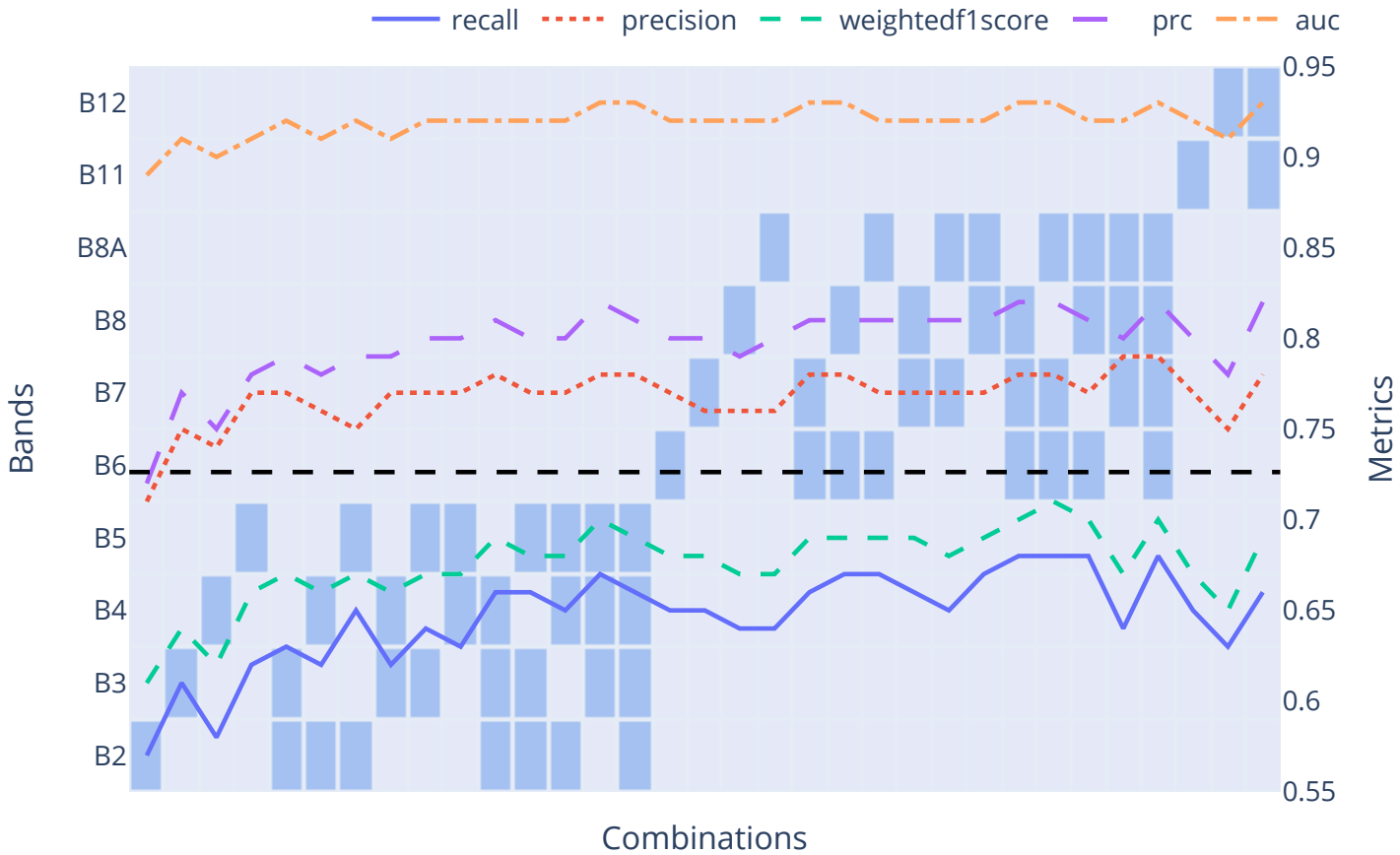
Sentinel-2 Seasons

- Performance across different seasons
- Metrics: recall, precision, f1-score, PRC AUC, ROC AUC
- Optimal seasons for classification



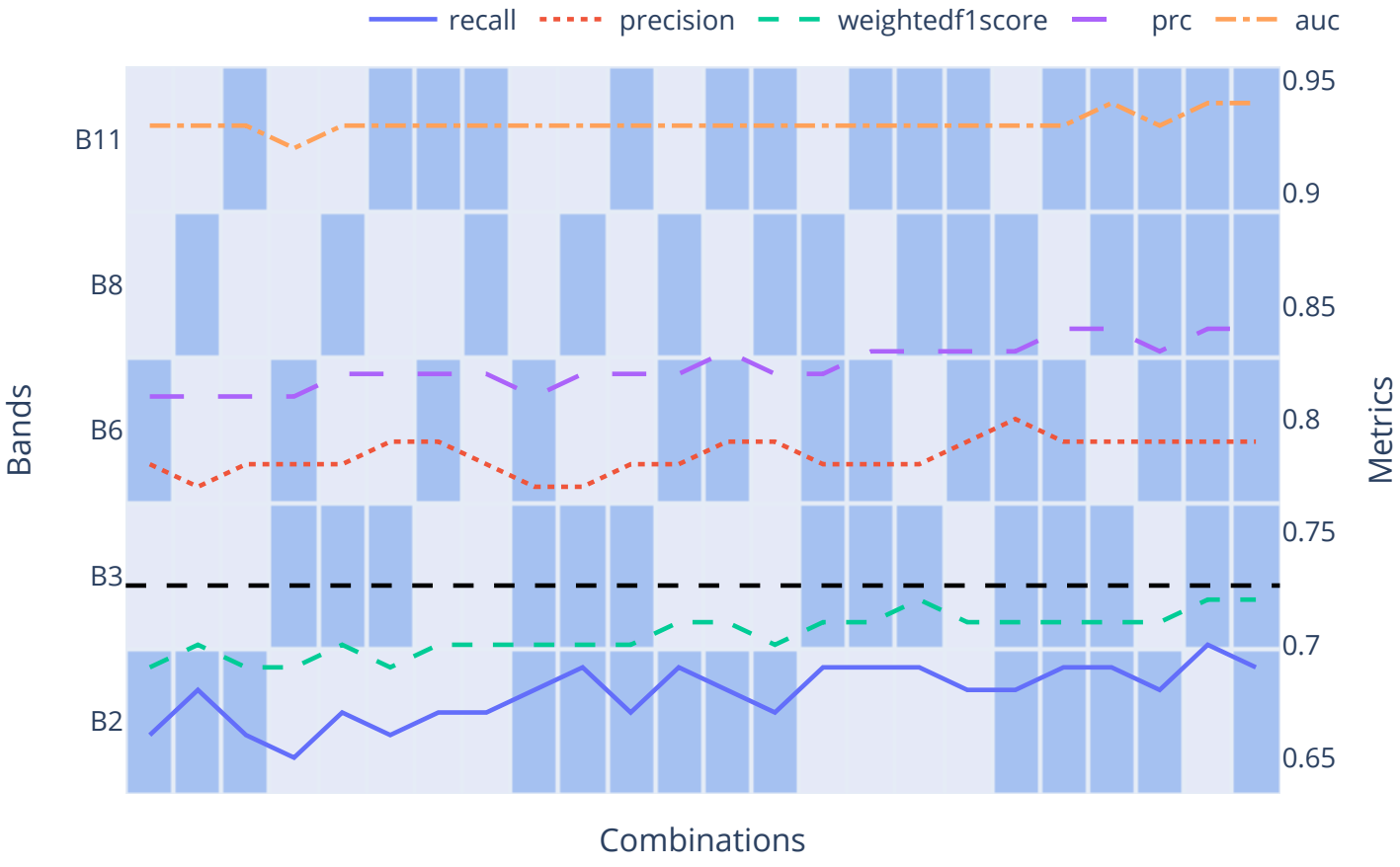
Sentinel-2 Bands Part I

- Band selection and its impact on performance
- Analysis of band groups



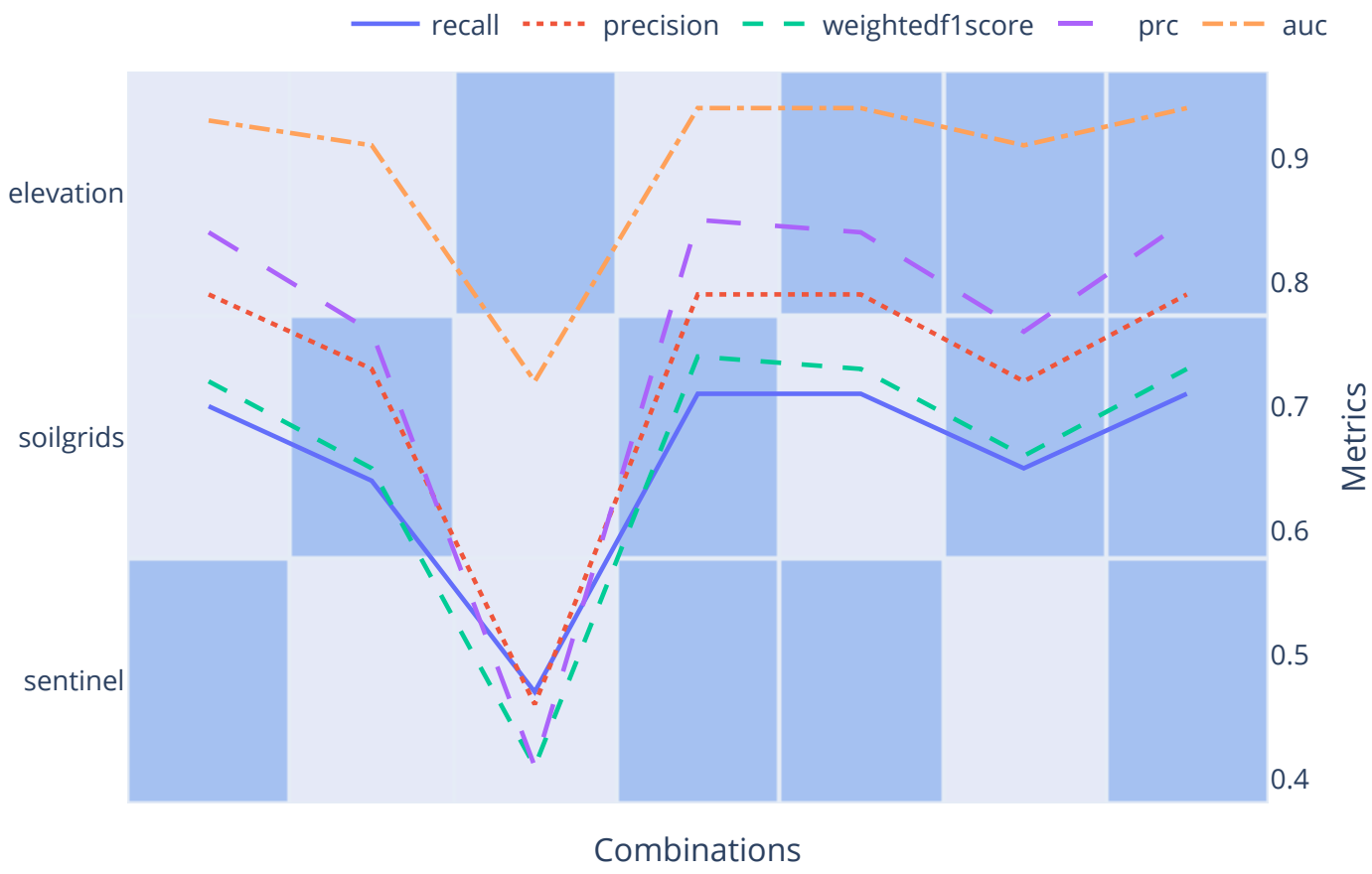
Sentinel-2 Bands Part II

- Optimal band combination for classification



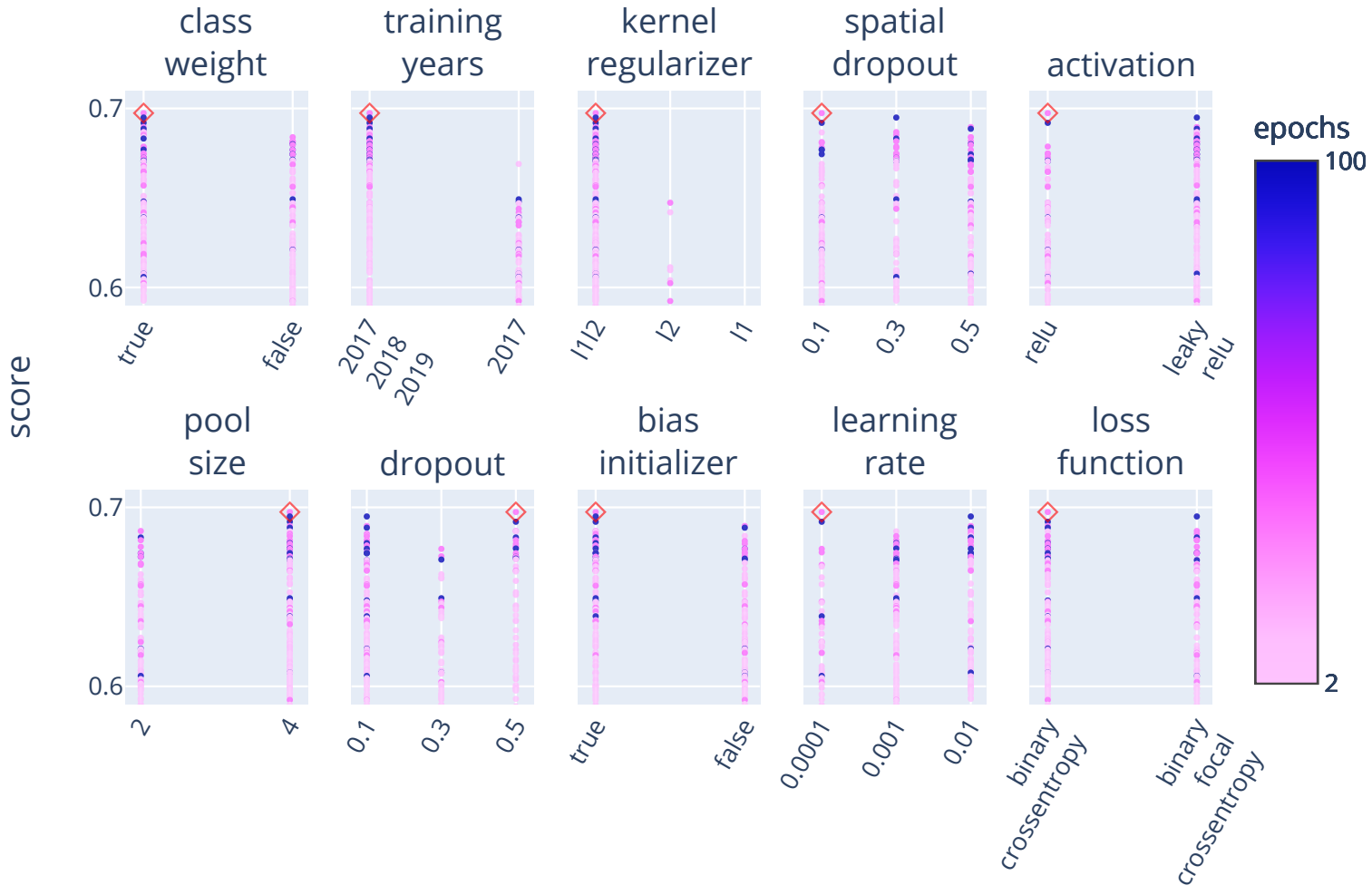
Soil and Elevation Data

- Integration of SoilGrids and elevation data
- Performance comparison with Sentinel-2 data
- Impact on model accuracy



Neural Network Configuration I

- Initial hyperparameter tuning
- Parameters and their impact
- Results from Hyperband trials

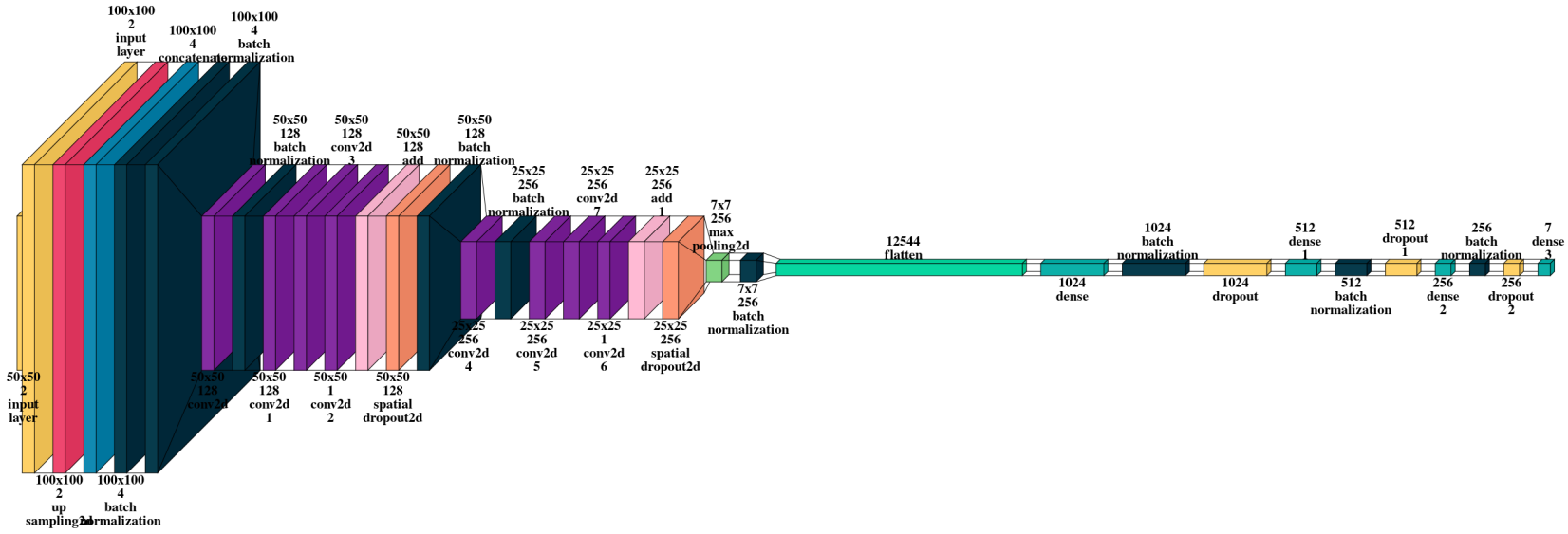


Neural Network Configuration II

- Follow-up hyperparameter tuning
- Optimization of layers and units
- Optimal configurations for performance

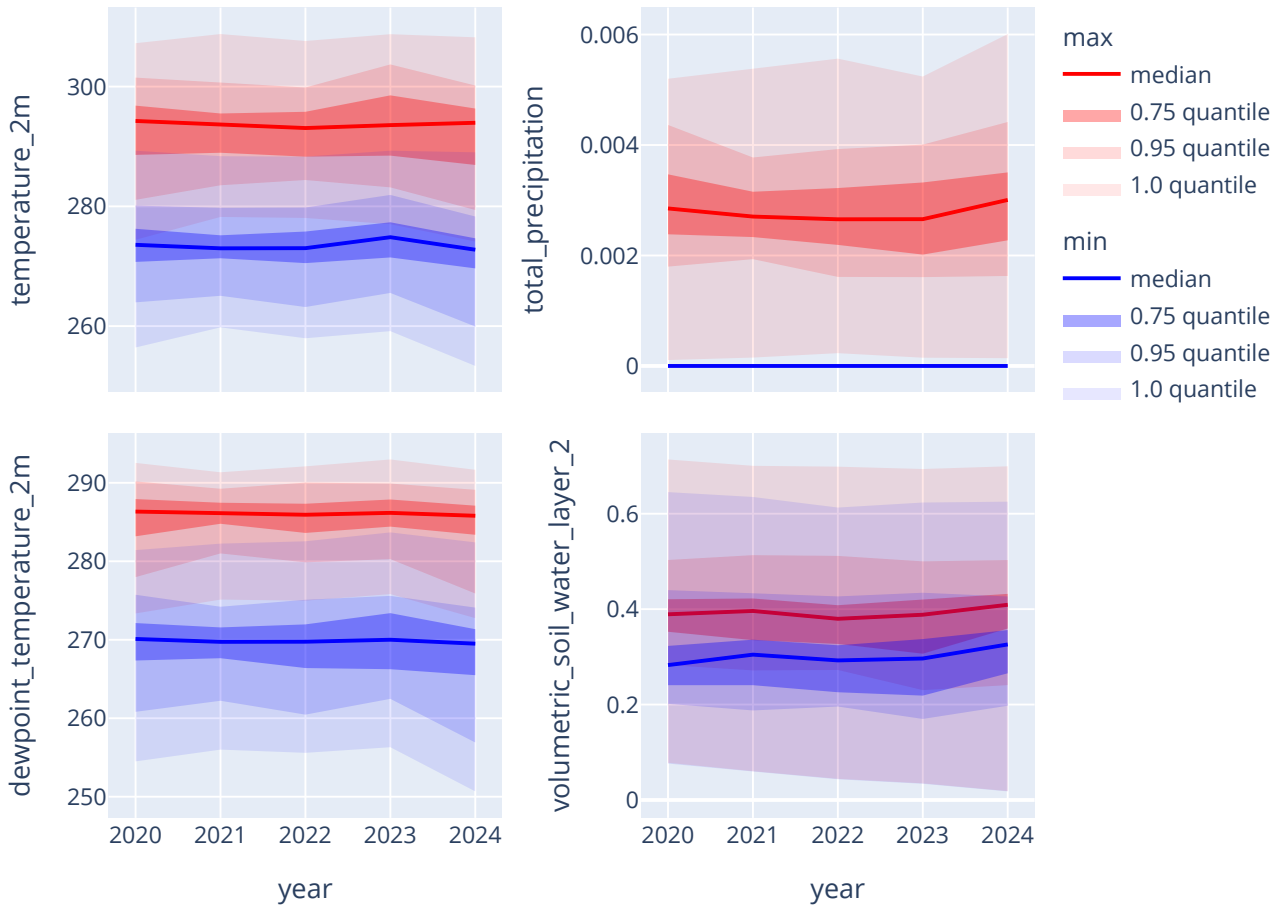
Model Architecture

- Overview of model layers
- Convolutional and fully-connected layers
- Use of residual connections



Dataset Exploration

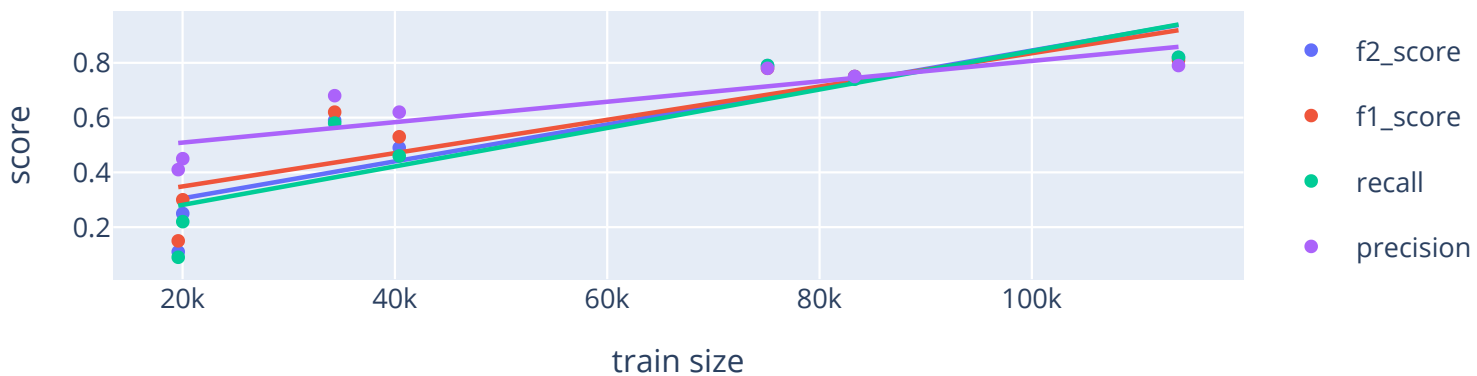
- Description and significance of ERA5 data
- Variables considered: temperature, precipitation, soil moisture
- Summary of selected variables



Class Analysis and Validation

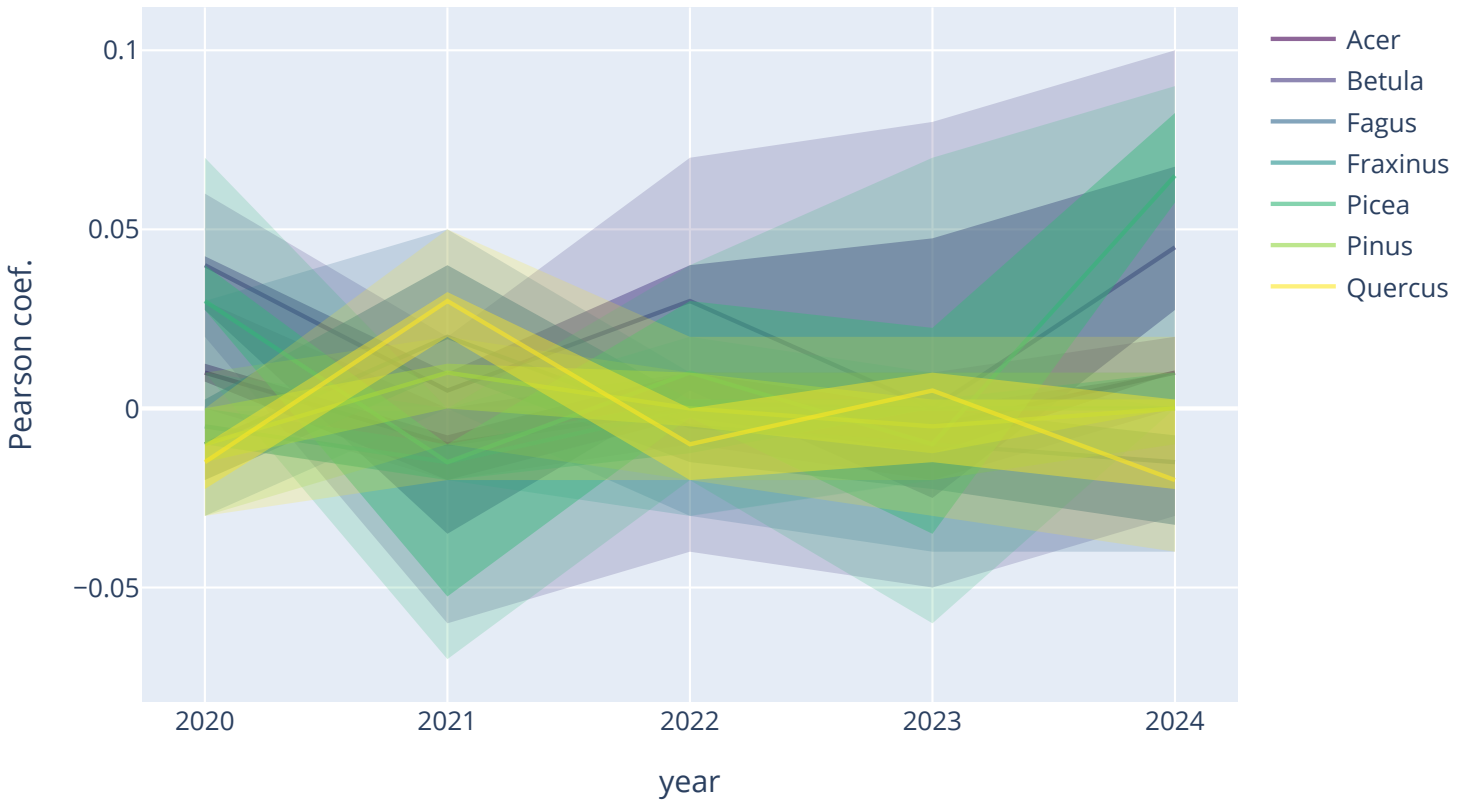
- Classification performance varies across tree genera.
- Genera with fewer training samples exhibit poorer performance.
- Positive correlation between the number of training samples and accuracy.

genus	f2_score	f1_score	recall	precision	eval_count	train_count
Pinus	0.82	0.81	0.82	0.79	4982	113811
Picea	0.79	0.78	0.79	0.78	3389	75100
Quercus	0.75	0.75	0.74	0.75	3681	83306
Fagus	0.59	0.62	0.58	0.68	1528	34325
Betula	0.49	0.53	0.46	0.62	1840	40407
Fraxinus	0.25	0.3	0.22	0.45	872	20016
Acer	0.11	0.15	0.09	0.41	866	19588



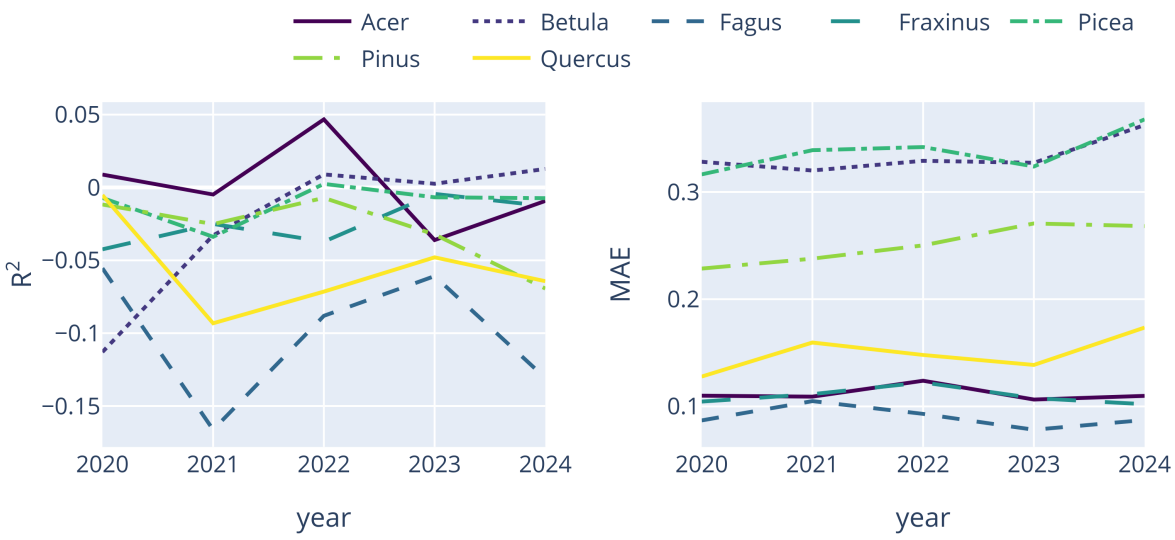
Change Map Correlations

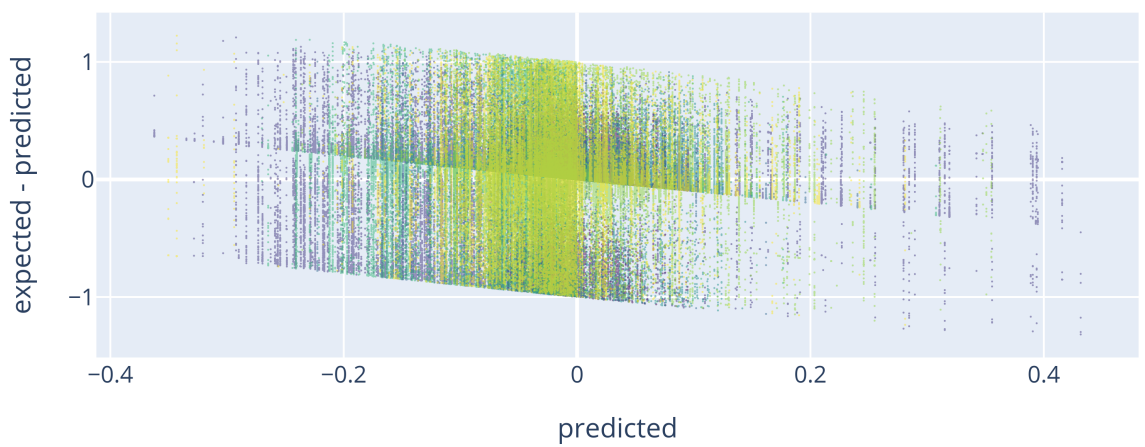
- Correlation between tree genus changes and meteorological differences
- Short-term vs. long-term impacts of climate change



Relationship Modeling

- Regression model to analyze climate-tree genus relationships
- Metrics: R^2 and MAE
- Model performance and results





Summary and Conclusions

- Key findings from classification and climate data analysis
- Model performance and limitations
- Implications and future research directions