Monitoring The Development Of Land Heatwaves Using Spatiotemporal Models

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This study introduces an approach for land heatwave forecasting, using spatiotemporal machine learning models trained with ERA5 reanalysis data. We focused on key environmental variables like soil moisture, vegetation, and meteorological factors for modelling. The study utilized linear regression as a base model, augmented by more complex algorithms such as Random Forest (RF), XGBoost, and Graph Neural Networks (GNN). We defined heatwaves using temperature data from 1970-2000, and the training phase involved data from 2000 to 2020, focusing on predictive accuracy for 2021-2023. This methodology enabled a detailed exploration of heatwave trends and dynamics over an extended period. Finally, we used explainable AI methods to further deepen our understanding of the complex interplay between environmental variables and heatwave occurrences.