

GENHACK CHALLENGE: THE UHI EFFECT

Focus: Quantitative
metrics to capture and
analyze discrepancies
between datasets



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Sentinel VS Weather Stations

1.43 °C

MAE

1.52 °C

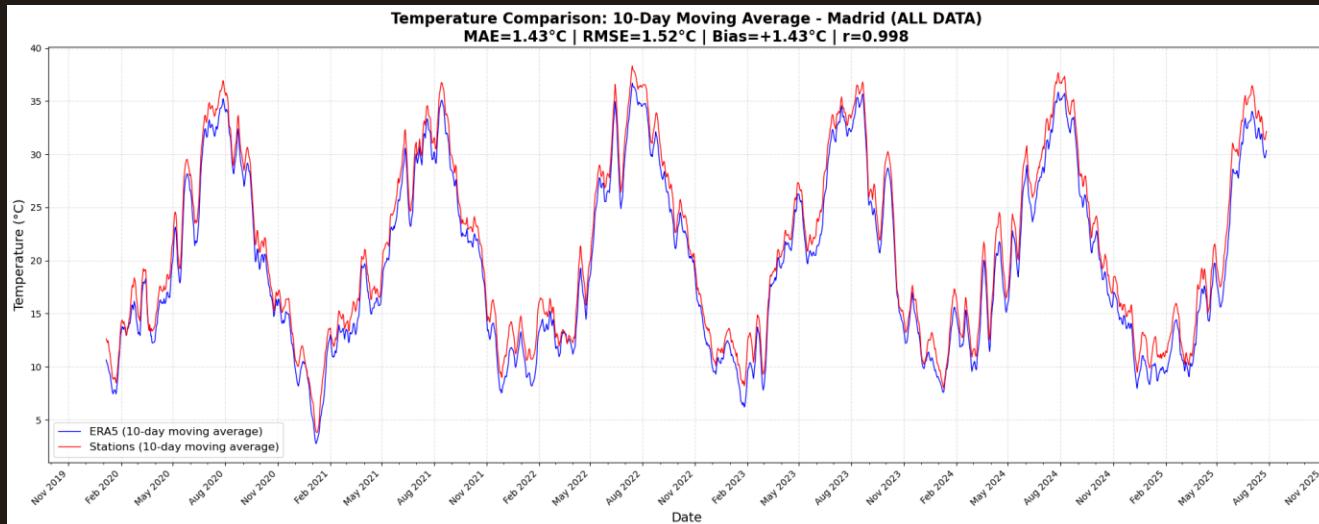
RMSE

+1.43 °C

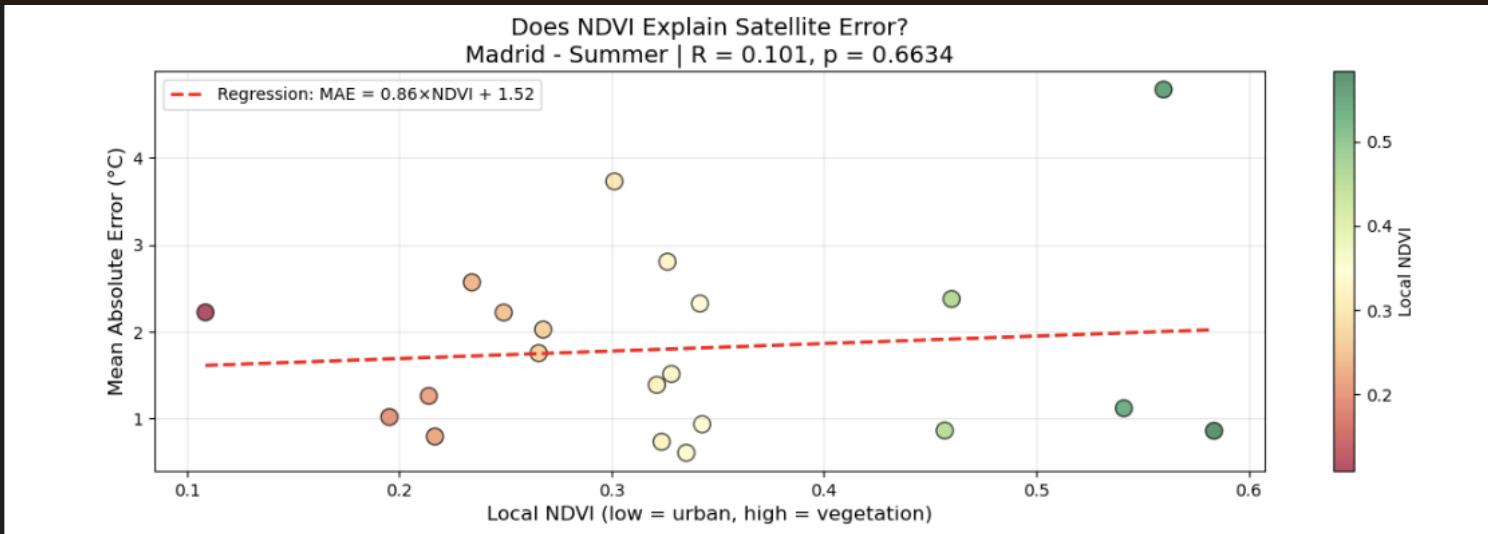
Bias

0,998

Correlation



Data Cleaning: The Altitude Effect & Outlier Removal



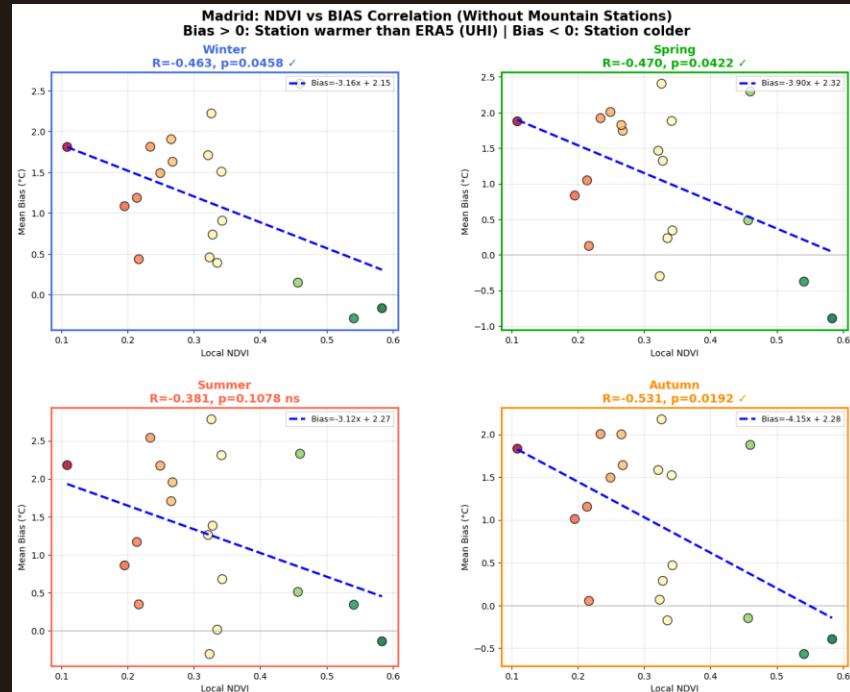
Identified two significant outliers ($\text{MAE} > 3.5^{\circ}\text{C}$) corresponding to the Rascafría (1159m) and Alpedrete (924m) stations.

These represent high-altitude, mountainous locations rather than the urban topography of Madrid.

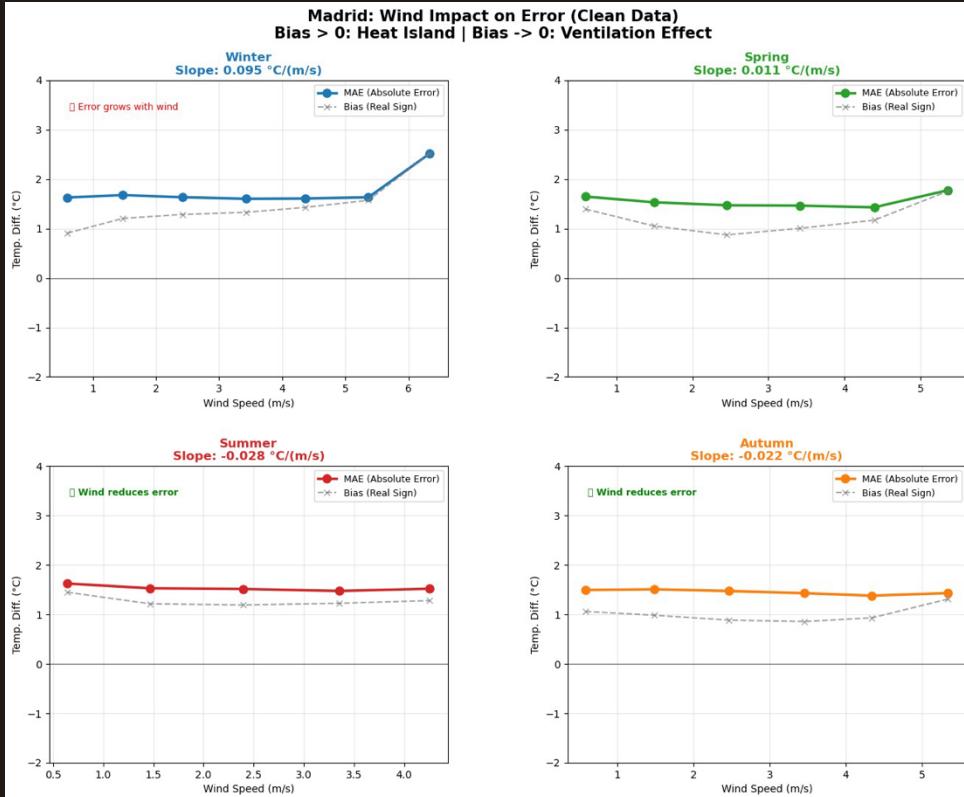
High elevation introduces complex orographic effects (such as adiabatic cooling and mountain winds) that the ERA5 9km grid resolution cannot accurately capture

Does the NDVI influence the Bias?

	Bias	R
Winter	1.13 °C	-0.463
Spring	1.06 °C	-0.470
Summer	1.27 °C	-0.381
Autumn	0.94 °C	-0.531



Ventilation Effect



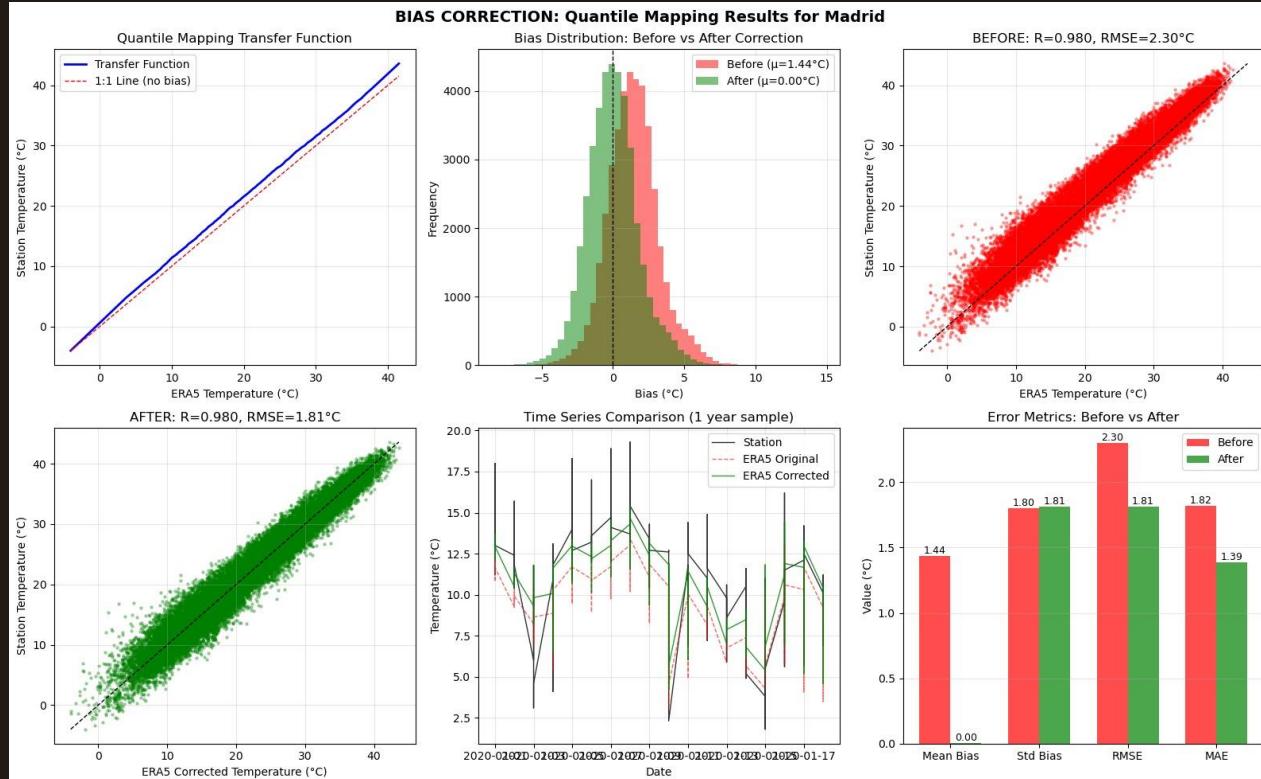
Does the Wind influence the Temperature difference from the difference dataset?

Since the slope is almost zero for all the seasons we can conclude that there's no correlation between the Wind and the error.

How to use the different dataset together

Using the bias-corrected ERA5 temperatures when merging on the date index

with station data, both datasets align on an unbiased, comparable temperature baseline.



Thanks!

Do you have any questions?

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