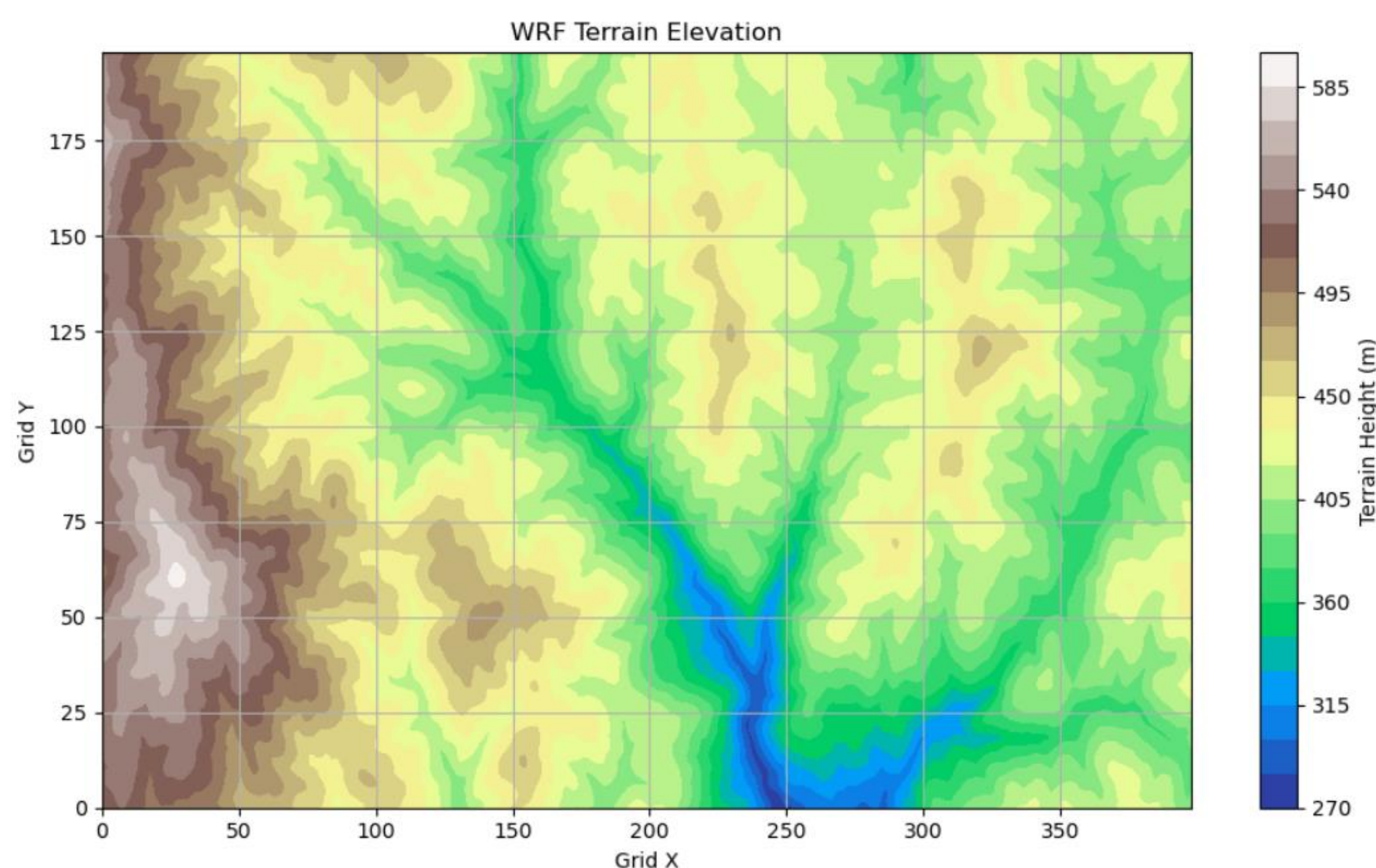


# Numerical Site Calibration: WRF-LES for High-Resolution Wind Flow Simulations

## WRF-LES: Solution to Replace Site Calibrations

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## Methods

Parameter	Value
Domain size	4km x 2km
Grid spacing	10m
Vertical levels	200
Input data	ERA5 reanalysis
Inflow wind speeds	4m/s to 16m/s

## Summary

Power performance testing requires accurate wind speed measurements at hub height. In complex terrain, costly and impractical site calibrations are used to correct wind speeds. Numerical site calibration (NSC) has been a long-sought alternative, but success depends on model fidelity. The Weather Research and Forecasting model's Large-Eddy Simulation capability (WRF-LES) offers a solution.

## Why WRF-LES?

- High resolution for more representative turbine-mast differences.
- Resolves atmospheric turbulence and complex wind flows.
- Reliable regard for terrain effects
- Delivers trusted accuracy, reducing uncertainty while lowering costs.

Delivery of a meter-scale LES which is robust and computationally feasible is made possible by consideration of ERA5 reanalysis data representative of atmospheric conditions at the test site while focusing on wind direction sectors used in testing.



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## References:

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