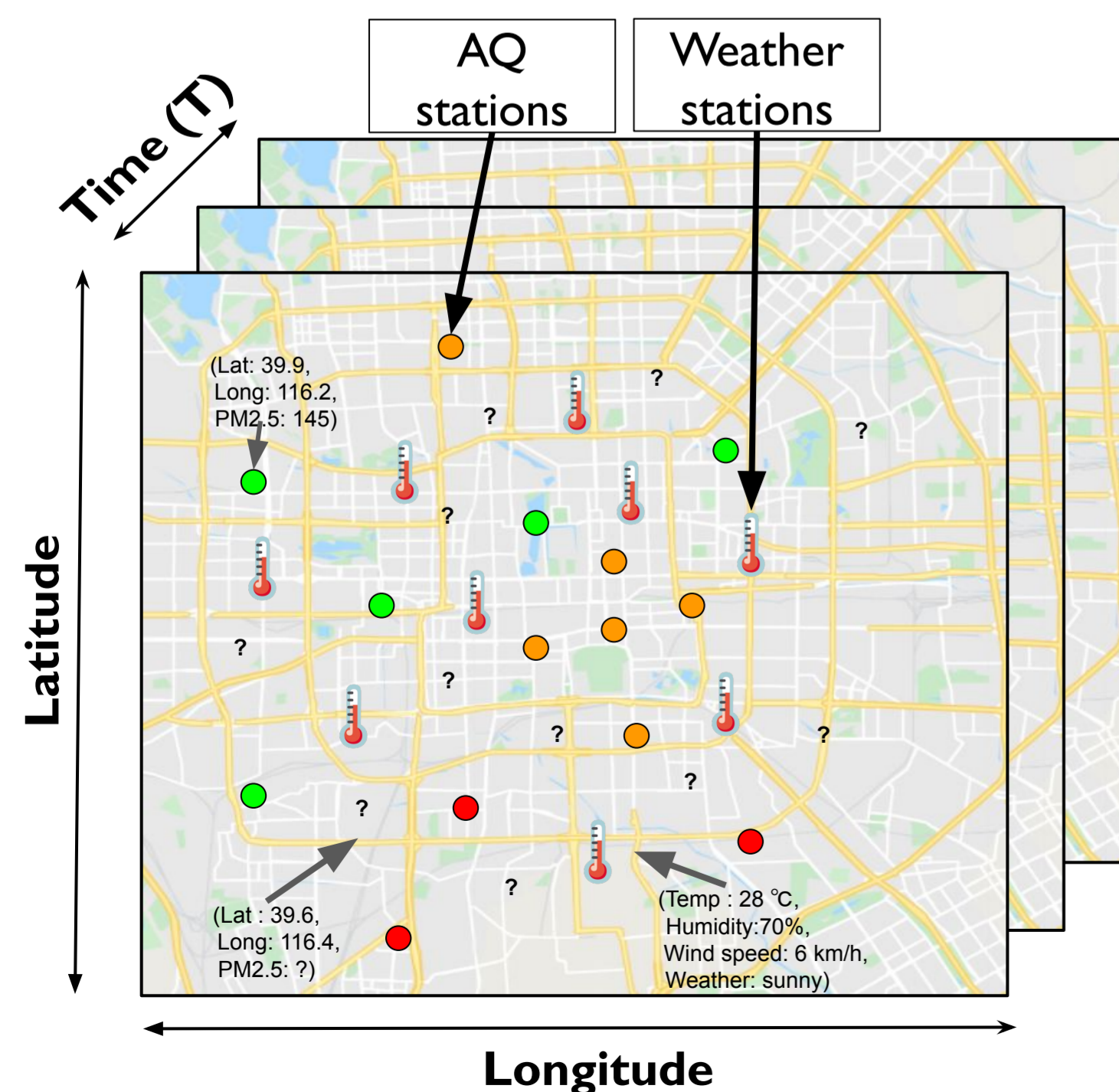


Accurate and Scalable Gaussian Processes for Fine-grained Air Quality Inference

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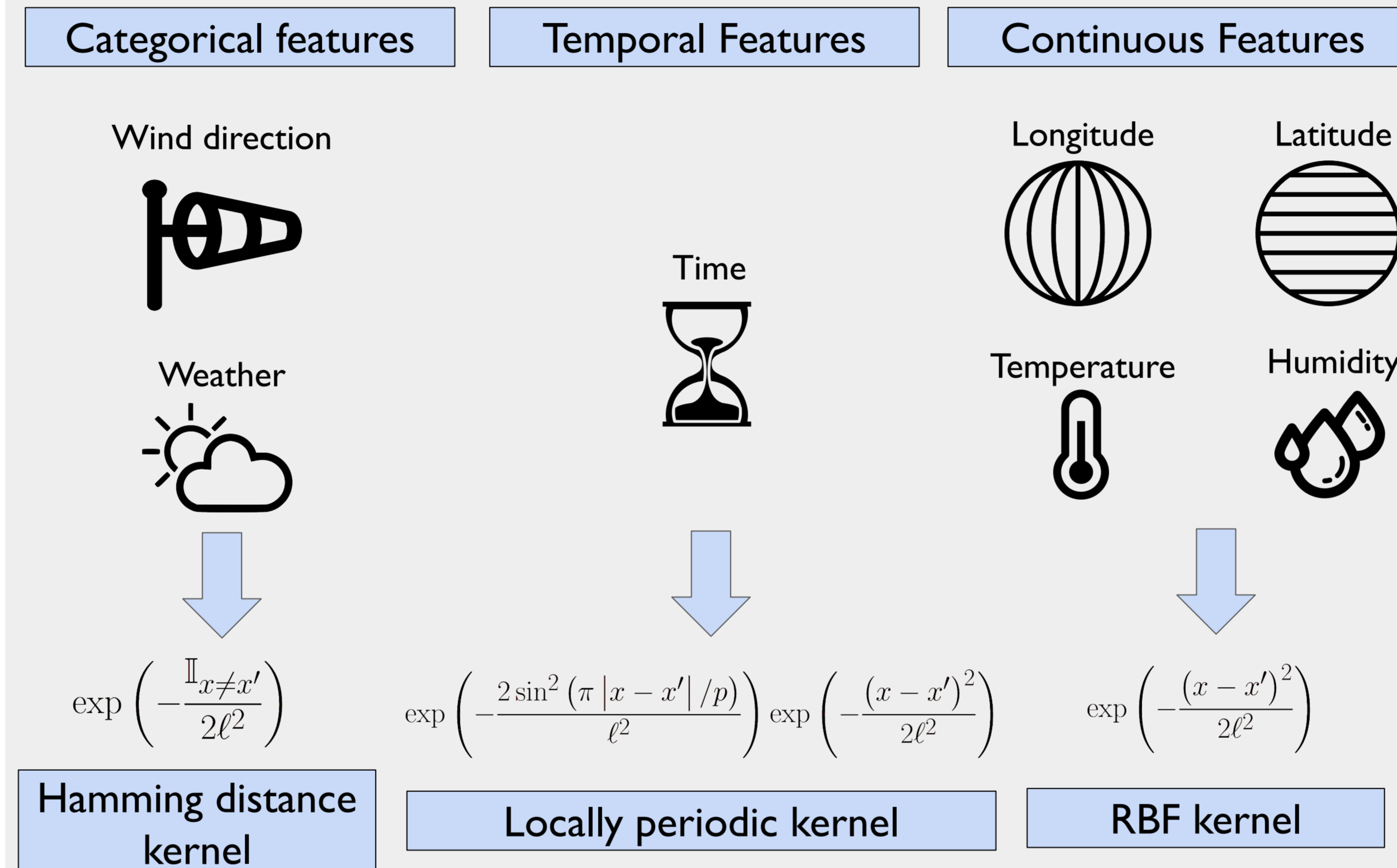
Overview

- Air pollution kills nearly 8 million people annually worldwide.
- Fine-grained monitoring can assist effective policy making.
- Countries across the world have sparse and non-uniform stations, especially developing countries have far less stations than required.
- Installation and maintenance of stations is costly, thus we propose a scalable Bayesian non-parametric model for air quality inference.

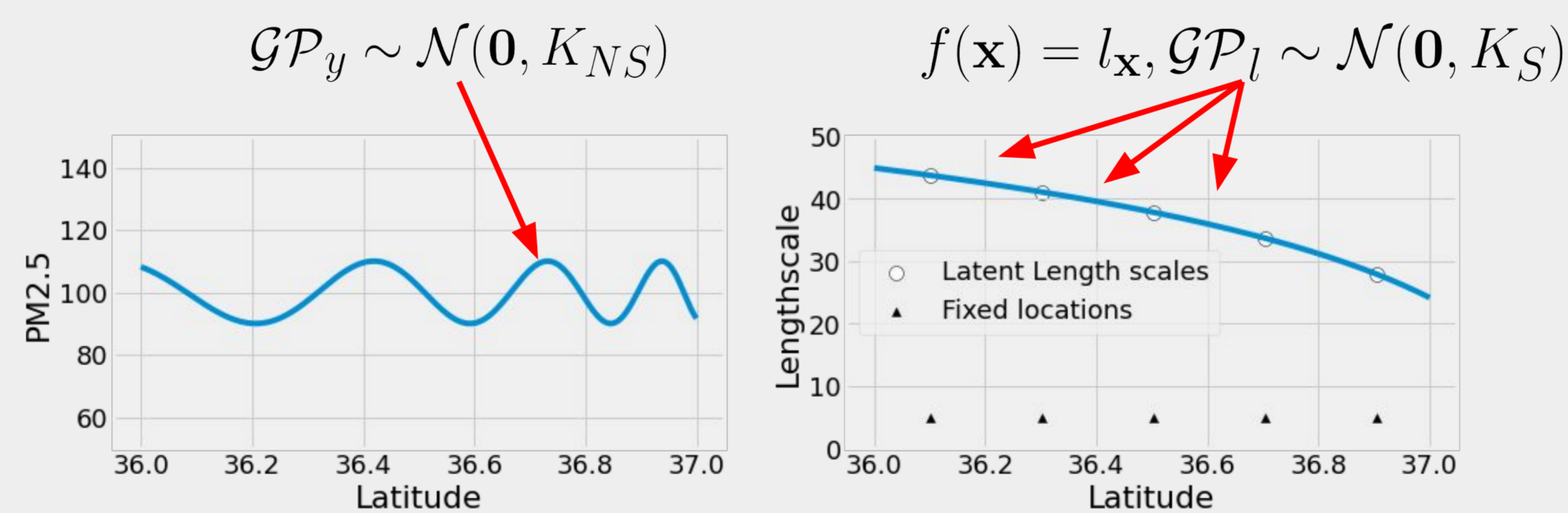


Approach: Gaussian processes

Domain inspired kernels



Non-stationary Model



Scalability

We use [batch training](#) for our models

m = batch size	Full Training	Batch Training
Time	$O(n^3)$	$O(m^3)$
Space	$O(n^2)$	$O(nm^2)$

Baselines

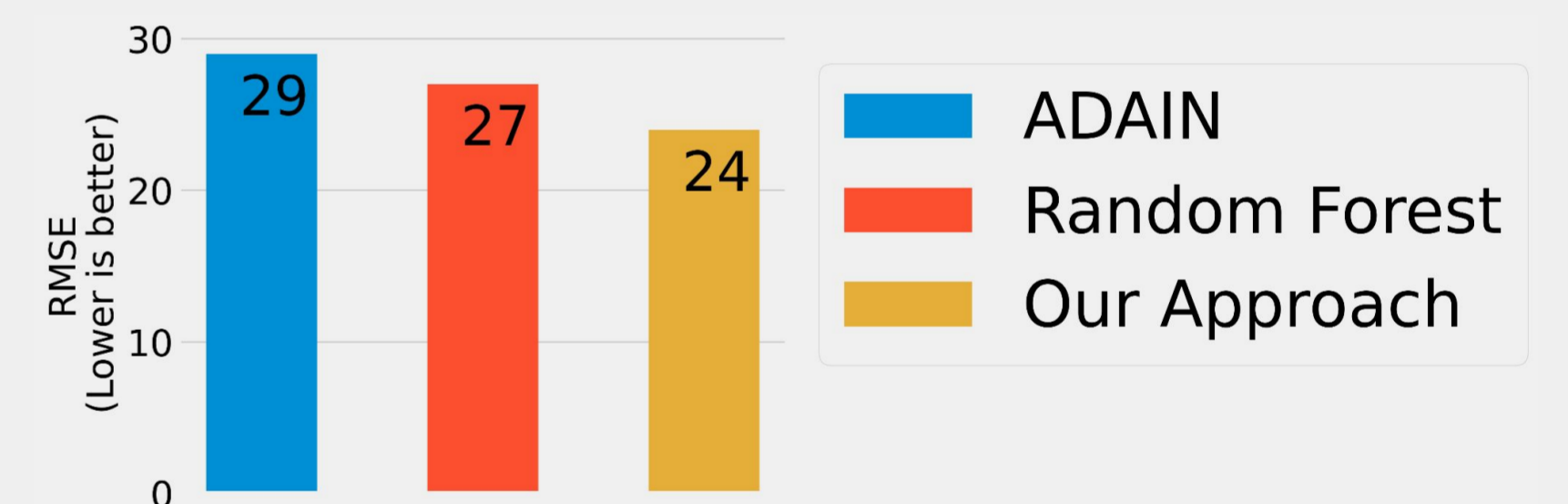
- [Attentional Deep AQI Network](#) (ADAIN), AAAI 2018
- Random Forest

Datasets

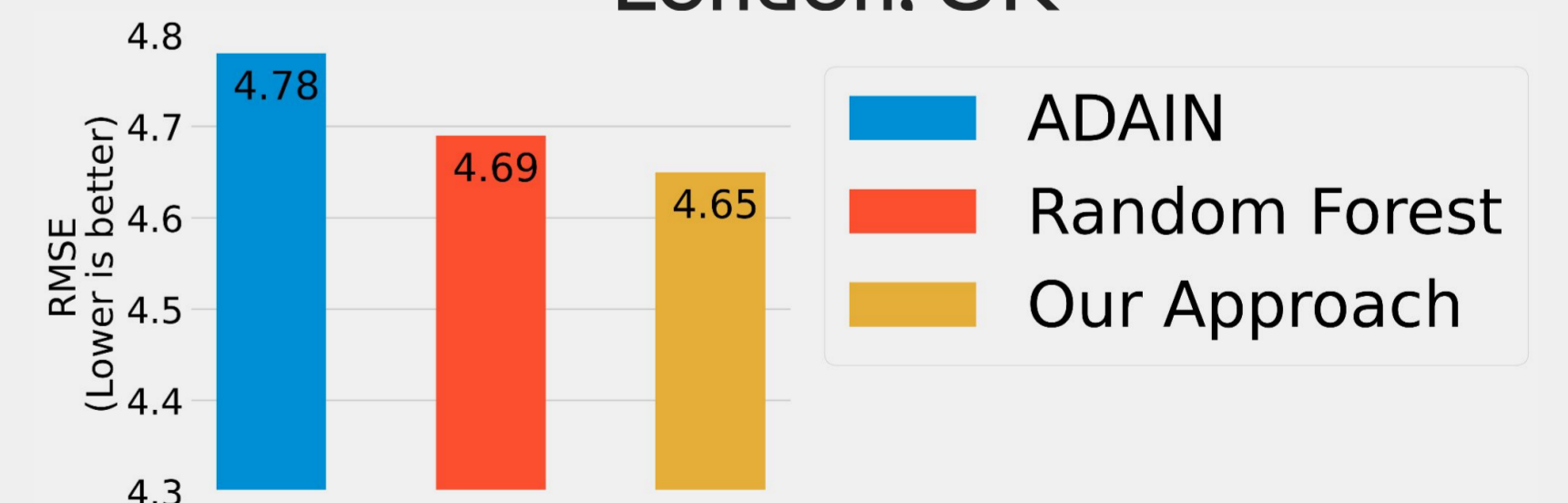
- Beijing, China (36 stations, Mar-2015)
- London, UK (24 stations, May-2017)

Results & Insights

Beijing, China



London, UK



- Our results improve 17% over the state-of-the-art (ADAIN).
- Our model efficiently captures the uncertainty present in the dataset.

GitHub: github.com/patel-zeel/AAAI22