

# MODELING THE AIR POLLUTION IN CHINA

## — BASED ON NONPARAMETRIC METHODS

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# MOTIVATION

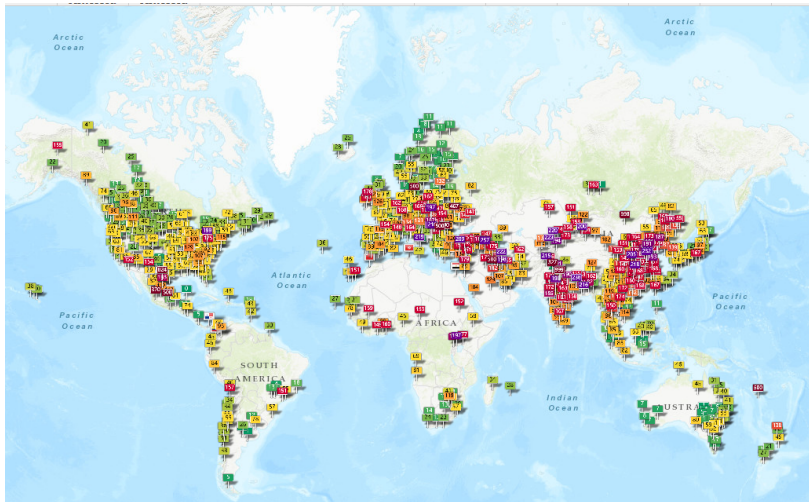


Figure: World map with AQI

# DATA

- Hourly city AQI from the National Environmental Monitoring Center (CNEMC).
- City location data.

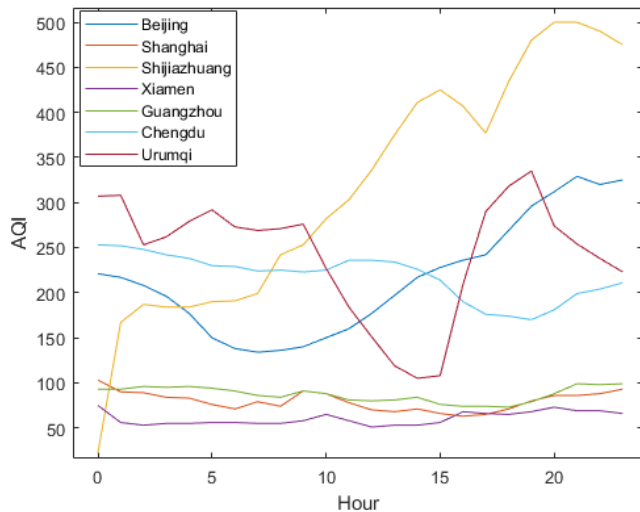


Figure: AQI of seven representative cities in China.



# CITY LOCATION

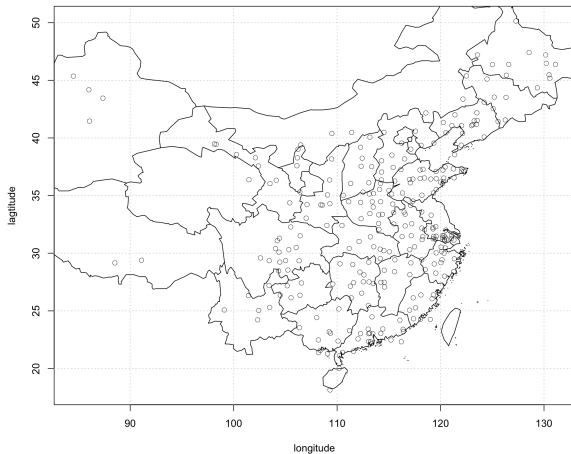


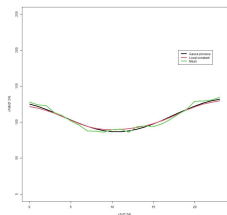
Figure: City location

- $$\begin{bmatrix} y \\ f(x^*) \end{bmatrix} \sim \mathcal{N}\left(0, \begin{bmatrix} k(x, x) + \sigma_n^2 I & k(x, x^*) \\ k(x^*, x) & k(x^*, x^*) \end{bmatrix}\right)$$

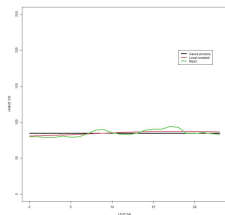
, where  $k(x, x') = \sigma_f^2 \exp\left(-(x - x')^2 / (2l^2)\right)$

$$\hat{\theta} = \arg \max_{\theta} \log p(y \mid t, \theta) = -\frac{1}{2} y^T K_y(\theta)^{-1} y - \frac{1}{2} \log |K_y(\theta)| - \frac{n}{2} \log 2\pi$$

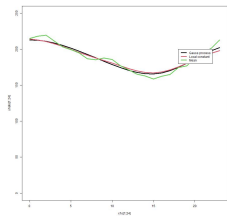
# RESULT: HOURLY TREND



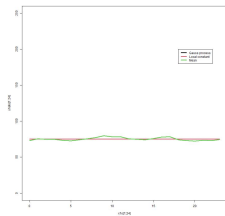
(a) Beijing Winter



(b) Beijing Summer



(c) Shijiazhuang Winter

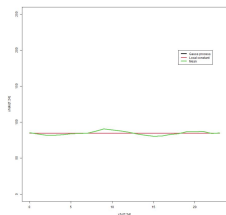


(d) Shijiazhuang Summer

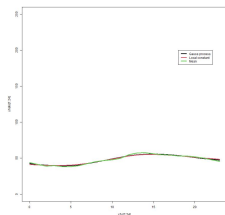
Figure: AQI hourly trend: Northern cities



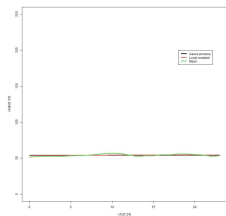
## RESULT: HOURLY TREND



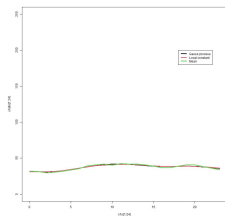
(a) Shanghai Winter



(b) Shanghai Summer



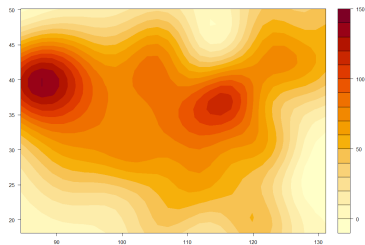
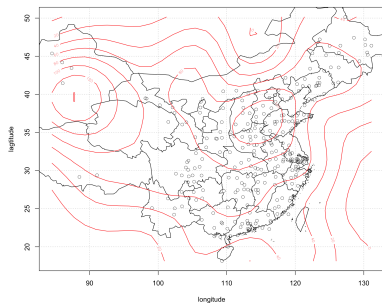
(c) Xiamen Winter



(d) Xiamen Summer

Figure: AQI hourly trend: Southern cities

# RESULT: SPATIAL DISTRIBUTION



– Thanks –