High Temporal And Spatial Resolution Chinese Power Plant Emission Inventory, 2014

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Introduction

- The control of air pollution from power plants in China has become one of the most concerned issues by public in China. Meantime the current emission inventories used in the air quality simulations are subject to many quality problems, such as unclear industrial quantity, low spatial resolution, unrepresentative temporal profile, etc.,
- A highly resolved temporal and spatial emission inventory of power plants in china is developed with the use of best available domestic emission data based on the continuous emission monitoring systems (CEMS) data, environmental impact assessment (EIA) reports, environmental statistic data.
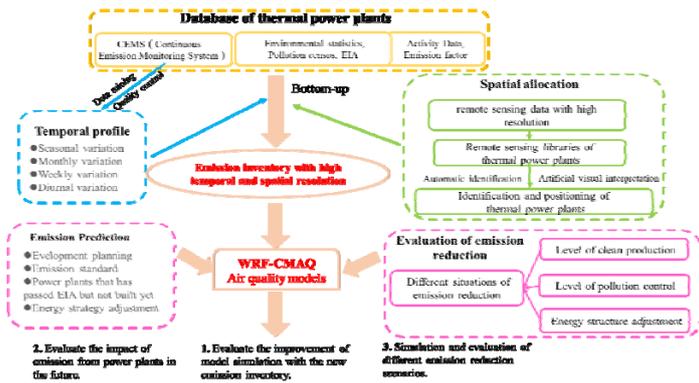
Method

Results: High Temporal Resolution

Fig 1. Diurnal variation (left) and monthly variation (right) of power plants

Fig 2. Diurnal variation (left) and monthly variation (right) of thermal power plants

Results: High Spatial Resolution

Fig 3. Location of all the power plants in china, 2014

- **Location of all power plants**
① There are more than 3200 power plants
② Most power plants concentrated in the eastern part of China.
③ Shandong, Jiangsu and Zhejiang have more power plants than other Provinces

Results: Emissions compliance

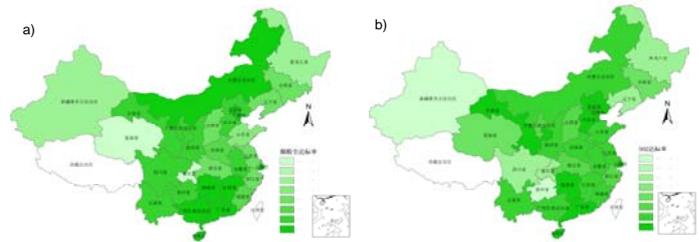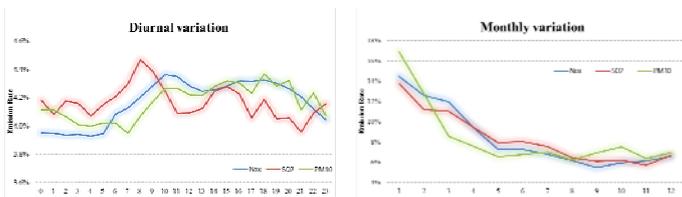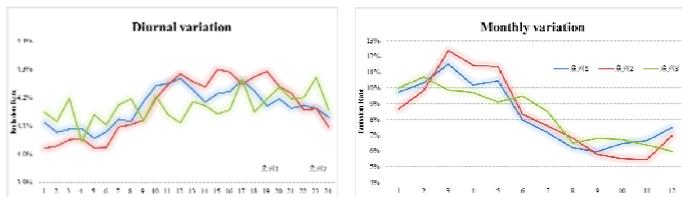Fig 4. Average Emissions compliance of different provinces, 2014 a) PM_{10}、 b)SO_2.

- **Average concentration of each stacks**
Firstly, we calculated the average concentration of each stacks with the hourly data from CEMS.

- **Average Emissions compliance of all stacks**
Secondly, we compare all these data with the New Emission standard. The results show that the emission standard-reaching rates of PM_{10}, SO_2, and NOx were 89.3%, 95.1% and 81.5%, and during the first half year they were 95.4%, 98.0%, 97.5%, while 82.3%, 91.5%, 63.4% in the second half. That's because of the executing of GB13223-2011.

- **Potential of Emission Reduction**
Finally, we calculated the potential of emission reduction by assuming that all the stacks that discharge beyond standards can match the standard concentration with More efficient pollution control technology.

Summary

- For normal power plants, monthly emission peaked in January and declined from February to October, then the rates became stable; For thermal power plants, the emissions increased from December to March (the following year), and declined from April to September. Then tend to be stable from September to November. This monthly variation shows a great correlation with the supplying central heating in the north of China in winter.

- The east part of China has the most power plants, and Shandong, Jiangsu and Zhejiang have more stacks than other province.