

Emission Inventory in China

Xiulian HU Hongwei YANG

ERI-AIM Project Team, China

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Major Contents

1. Present methodology in 1999 and its output analysis
2. Improved methodology for 2000 and its primary output analysis

1. Methodology used in 1999 and its output analysis

1.1 Objectives:

- Developing SO₂ emission maps at county level by utilizing GIS*

1.2 Methodology and steps:

- Investigate and identify emission sources*
- Investigate, collect, process and identify activity level data*
- Identify emission factors*
- Calculate SO₂ emissions at different levels*
- Develop SO₂ emission maps by GIS*

Classification of emission sources

(1) Point Sources (1995)

	<i>Number</i>	<i>Production(%)</i>
• <i>Thermal Power Plant</i>	<i>150</i>	<i>68</i>
• <i>Cement Plant</i>	<i>73</i>	<i>11</i>
• <i>Non-ferrous Metal Plant</i>	<i>12</i>	<i>58</i>
• <i>Sulfate Acid Plant</i>	<i>55</i>	<i>56</i>
• <i>Iron and Steel Plant</i>	<i>89</i>	<i>90</i>

(2) Area sources

	<i>Number</i>
• <i>County-level</i>	<i>2135</i>
• <i>City-level</i>	<i>442</i>
• <i>Provincial-level</i>	<i>31</i>

Identification of activity levels

Fuel type: coal, coke, fuel oil, oil products, natural gas and others

- *Sulfur content*
- *Conversion rate of sulfur*
- *Point sources: processes, scales, fuel types, productions, de-sulfurization technologies and geographic locations*
- *Area sources: energy consumption by provinces and cities, GDP and its consist, population, per capita energy consumption, etc.*

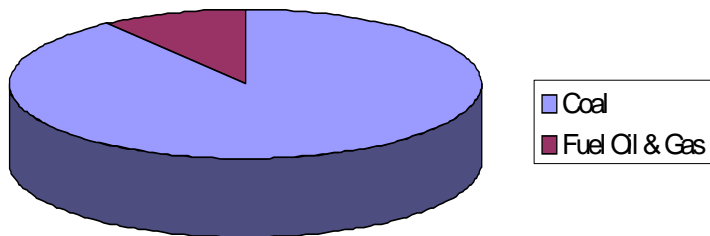
Emission factors

- *Factors of unit production:*
 - *process, scale and technology level*
- *Factors of unit energy consumption:*
 - *sulfur contents of fuels by different sources*
- *Average emission factors:*
 - *provincial, sectoral, technology*

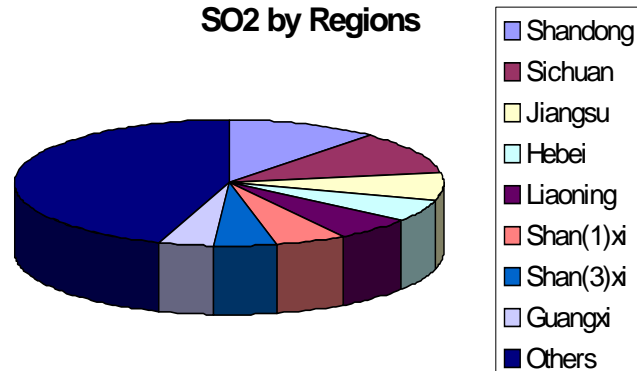
Calculation of SO₂ emission

- 1. Calculate national total emissions*
- 2. Calculate emissions from point sources*
- 3. Calculate emissions from area sources at provincial level*
- 4. Dis-aggregate provincial area emissions into county level*

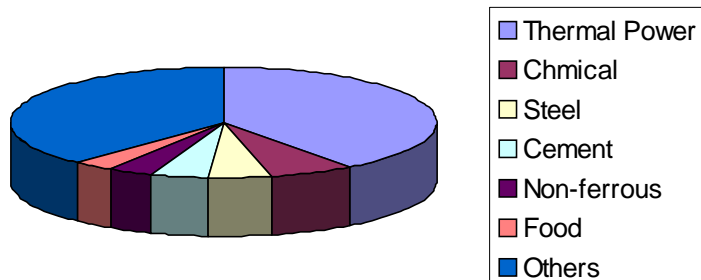
SO2 by Fuels



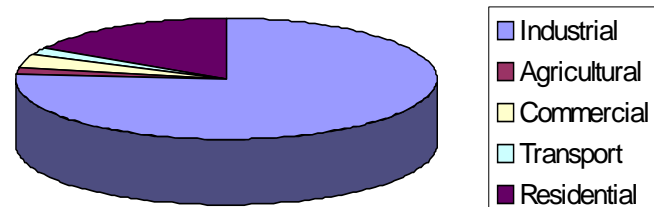
SO2 by Regions



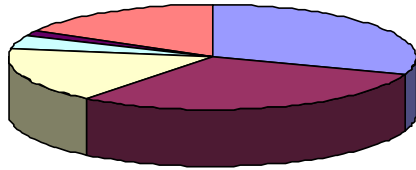
SO2 by Sectors



SO2 by Industries

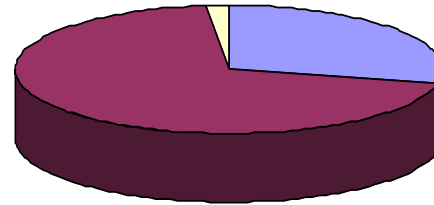


SO2 by Facilities



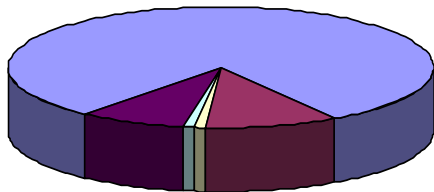
- Thermal Power Boilers
- Industrial Boilers
- Kilns
- Other Facilities
- Steam Engines
- Residential Ovens

SO2 by Source Types



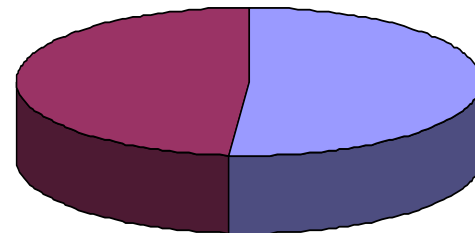
- Point Sources
- Area Sources
- Line Sources

Share of Point Sources



- Thermal Power
- Iron and Steel
- Cement
- Sulfuric Acid
- Non-ferrous

Share of Area Sources



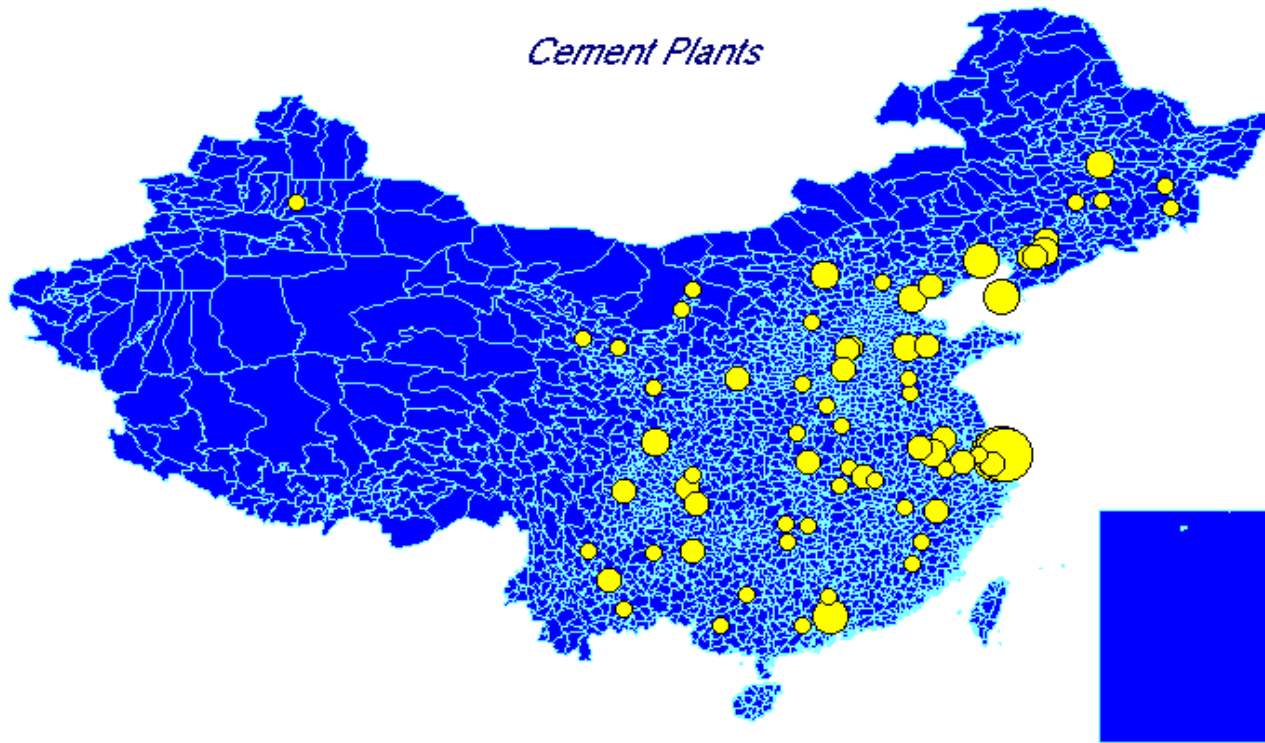
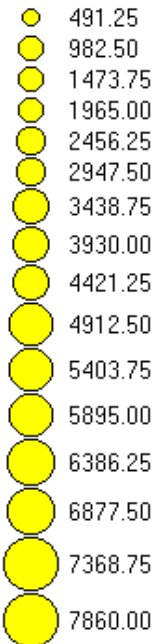
- County
- City

Inventory by GIS Maps

SO2 LPS, China, 1995

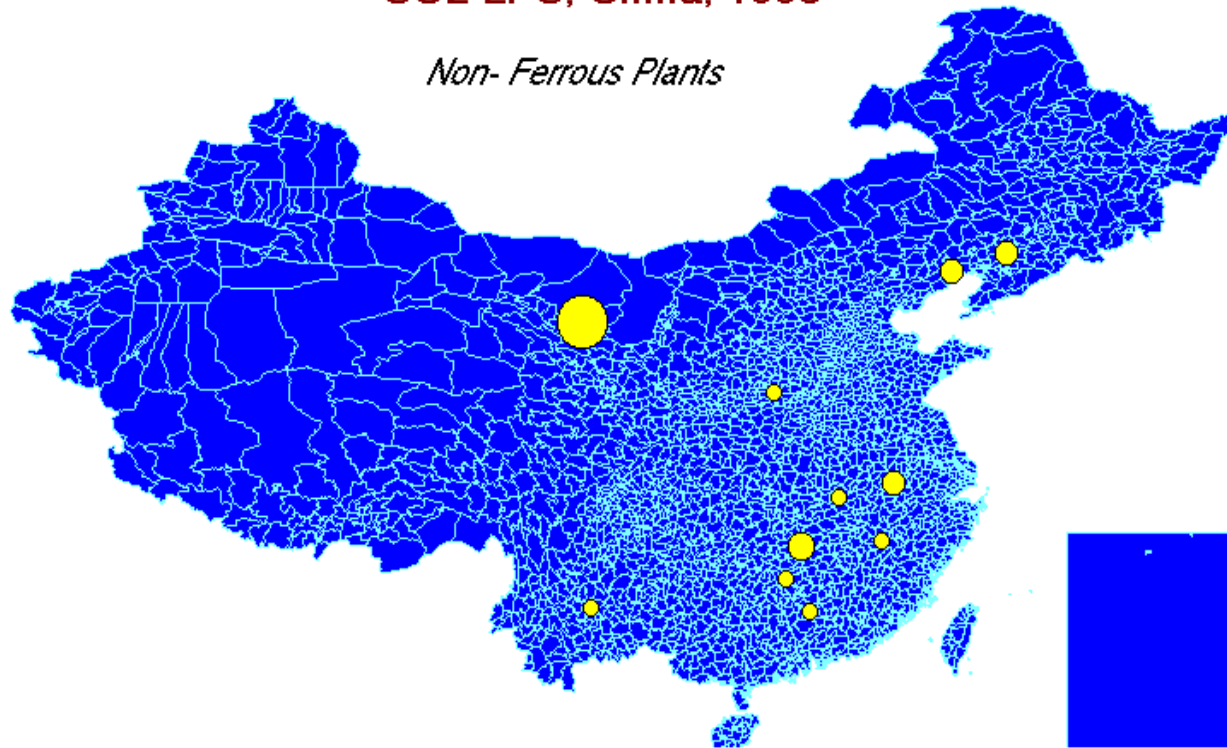
Cement Plants

(ton SO2)



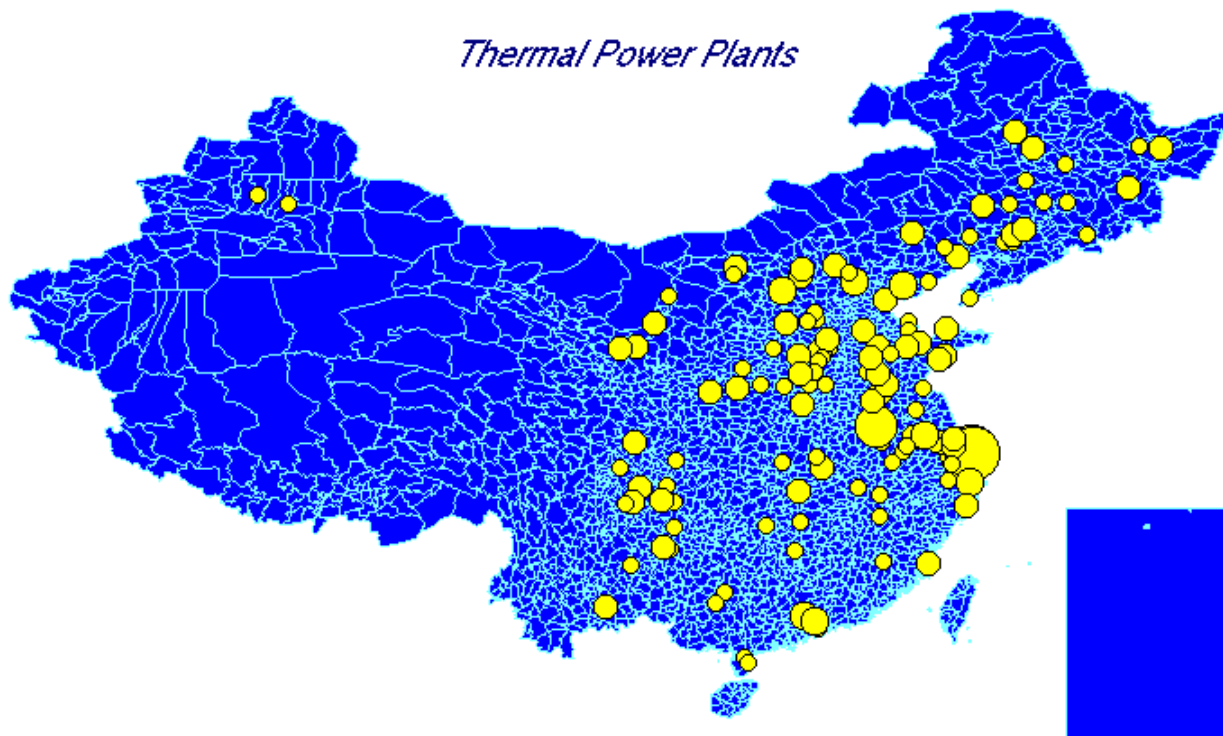
SO2 LPS, China, 1995

Non-Ferrous Plants



SO2 LPS, China, 1995

Thermal Power Plants

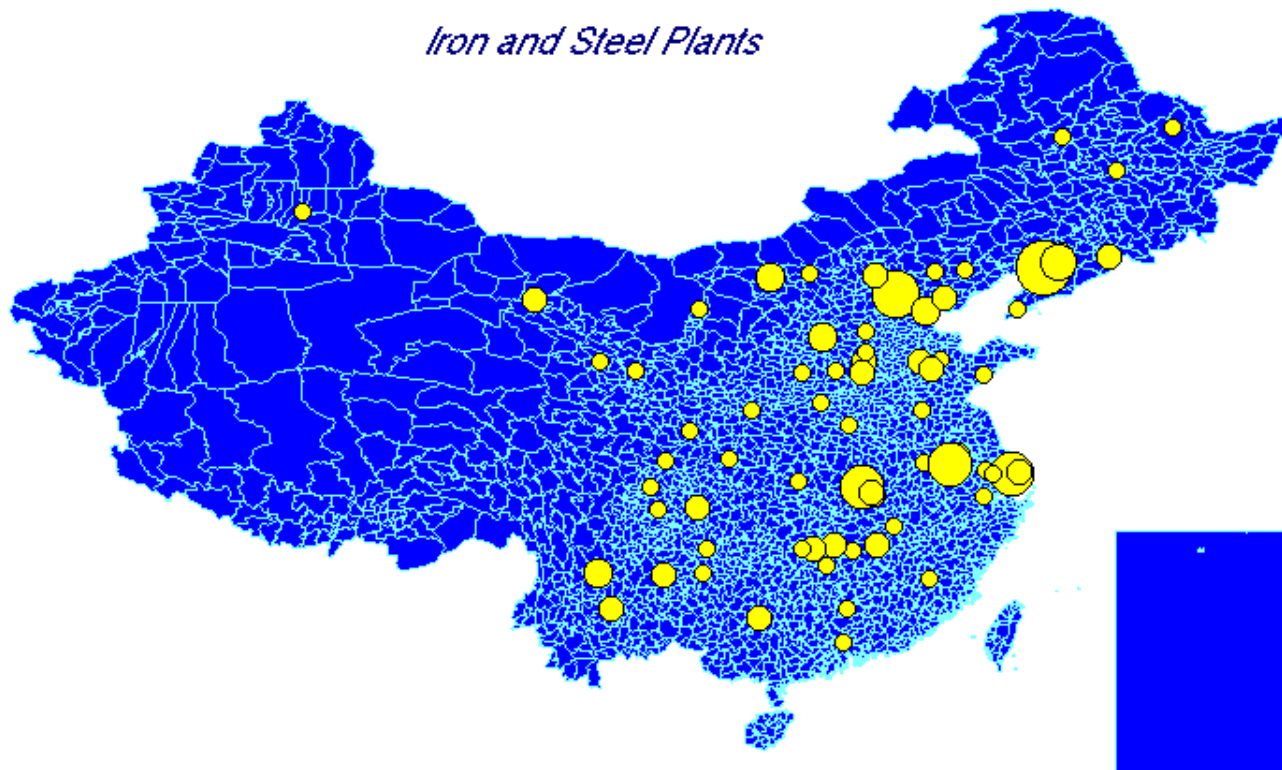


(ton SO₂)

- 24737.50
- 49475.00
- 74212.50
- 98950.00
- 123687.50
- 148425.00
- 173162.50
- 197900.00
- 222637.50
- 247375.00
- 272112.50
- 296850.00
- 321587.50
- 346325.00
- 371062.50
- 395800.00

SO2 LPS, China, 1995

Iron and Steel Plants

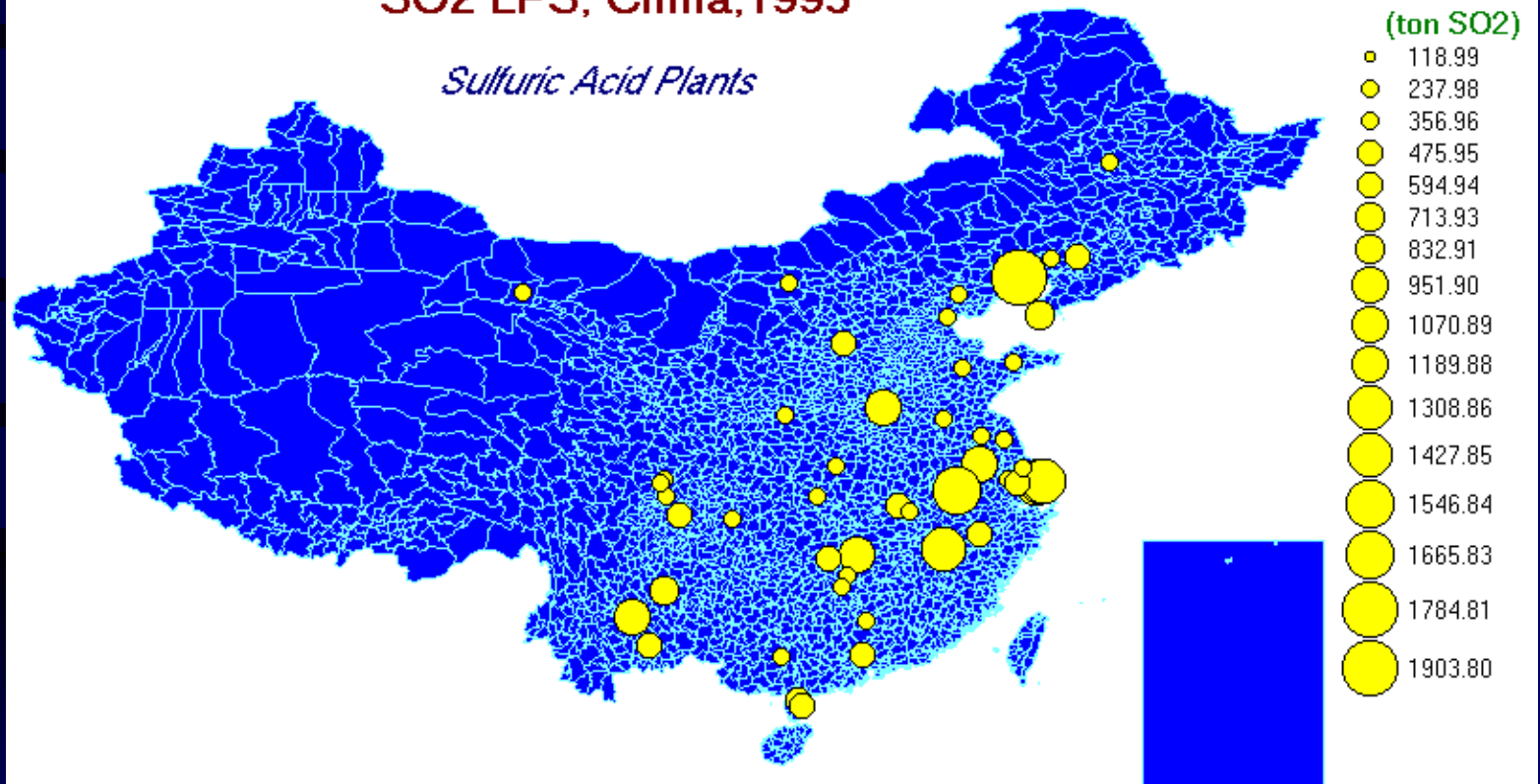


(ton SO2)

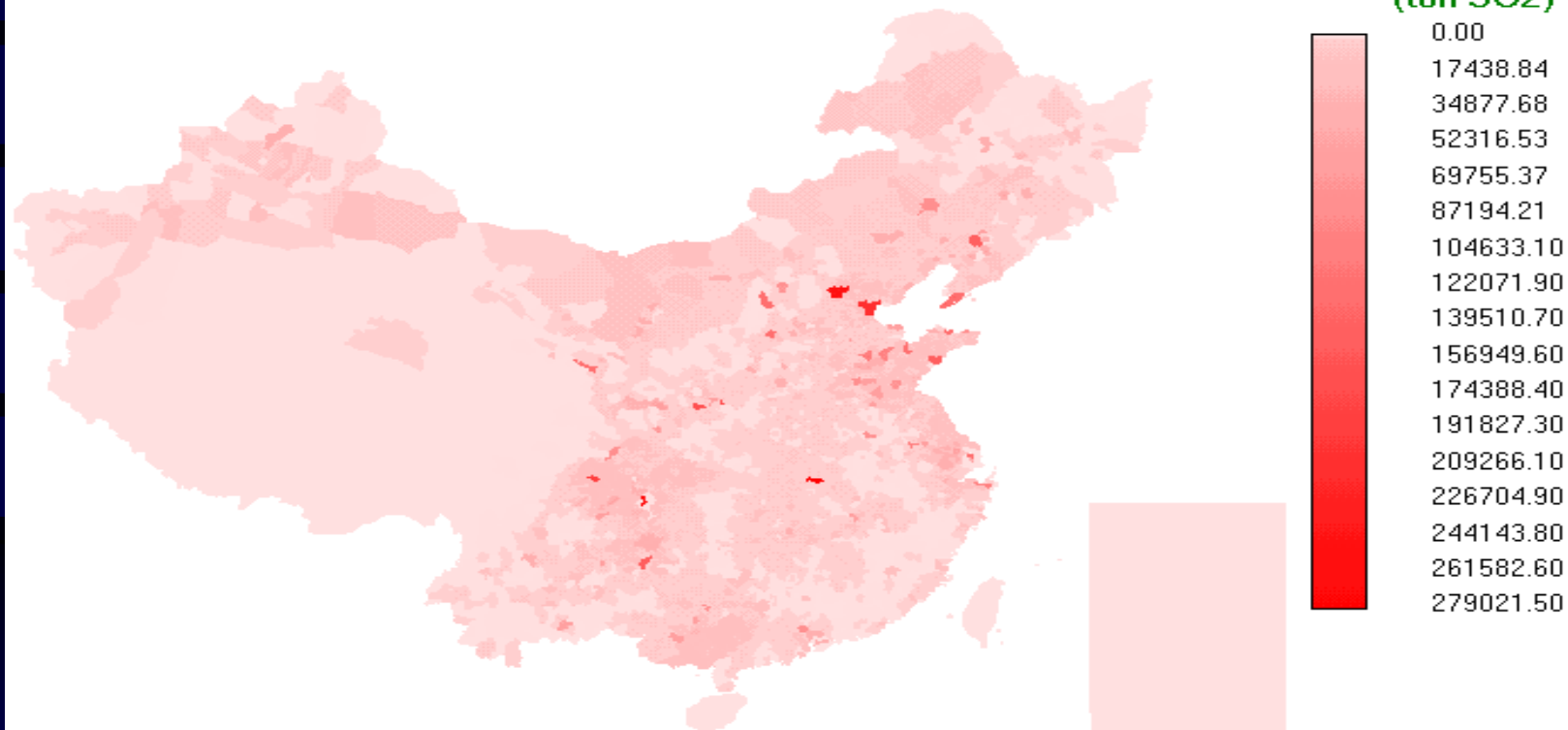


SO2 LPS, China, 1995

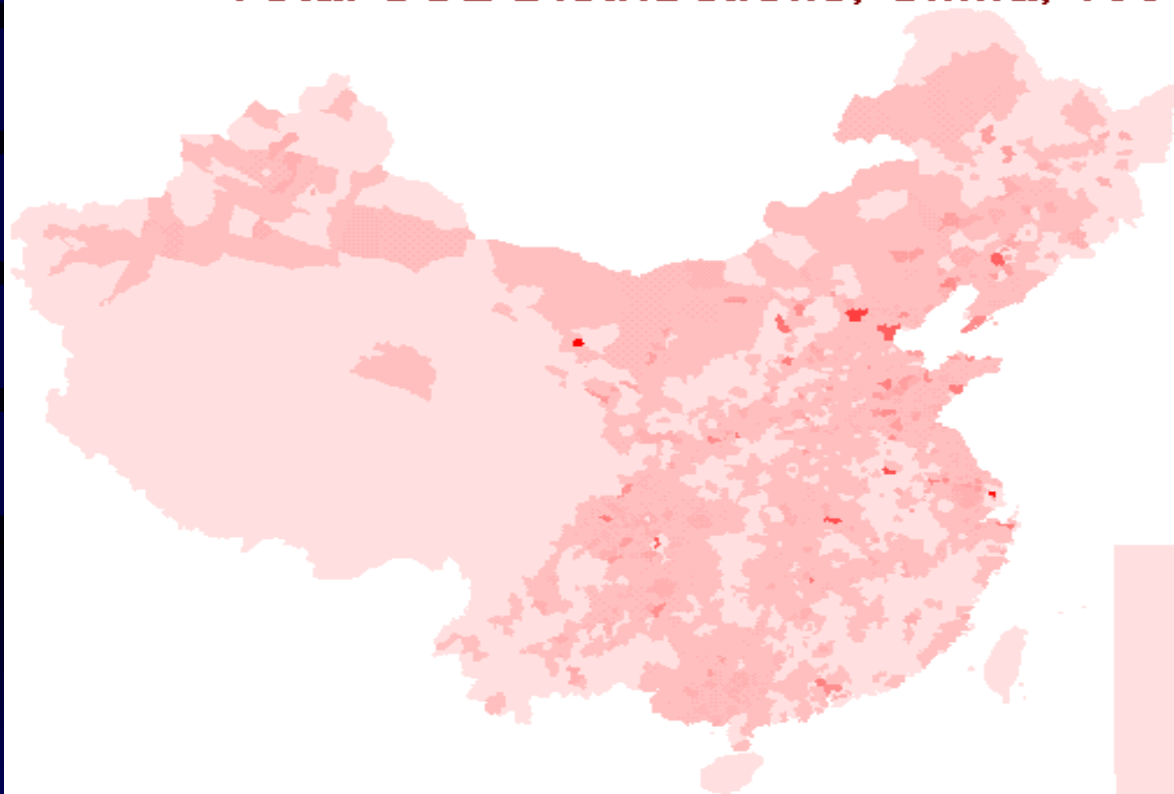
Sulfuric Acid Plants



SO2 Area Source Distributions, China, 1995



Total SO2 Distributions, China, 1995



(ton SO2)

- 0.00
- 39674.29
- 79348.59
- 119022.90
- 158697.20
- 198371.50
- 238045.80
- 277720.10
- 317394.30
- 357068.60
- 396742.90
- 436417.20
- 476091.50
- 515765.80
- 555440.10
- 595114.40
- 634788.70

Problems:

1. Huge amount of data to be collected and processed

2. Uncertainties:

- Methodology to disaggregate area source emissions to be improved

- Limitation to the application of present results

Methodology Improvement

1. Objectives:

- To support GIS*
- To support the assessment of SO₂ control by integrated models*
- To support regional environmental management*
- To support the technology transfer for pollution control*
- To support the establishment of clean production mechanism*

2. Classification to emission sources

- *Emission volumes and geographical issues*
- *Increase the number of point sources*

