IMPROVEMENTS IN THE POINT SOURCE EMISSIONS INVENTORY FOR GEORGIA

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Overview

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- Procedure
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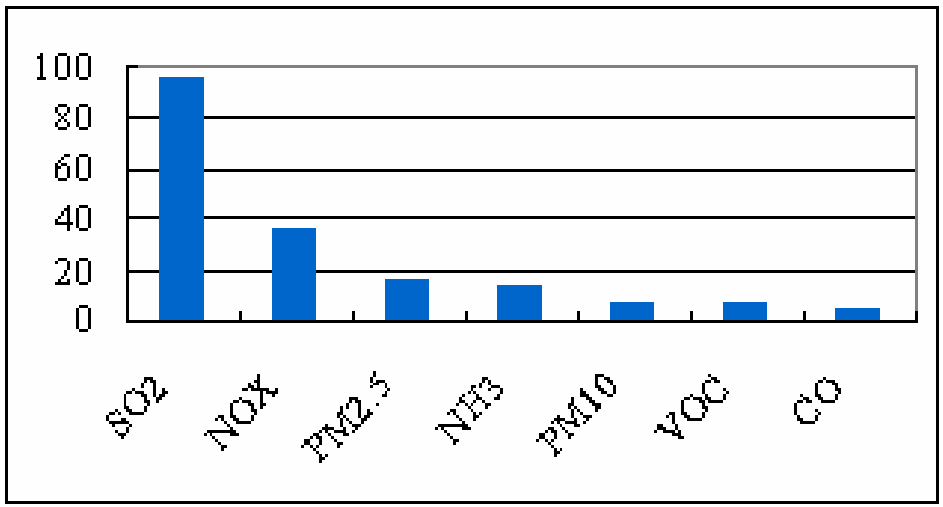
  - QA/QC
- Results
  - Errors in new survey
  - Errors in EPA NEI 1999
- Conclusion
- Further Studies

Background

- Point sources significantly contribute to total emissions



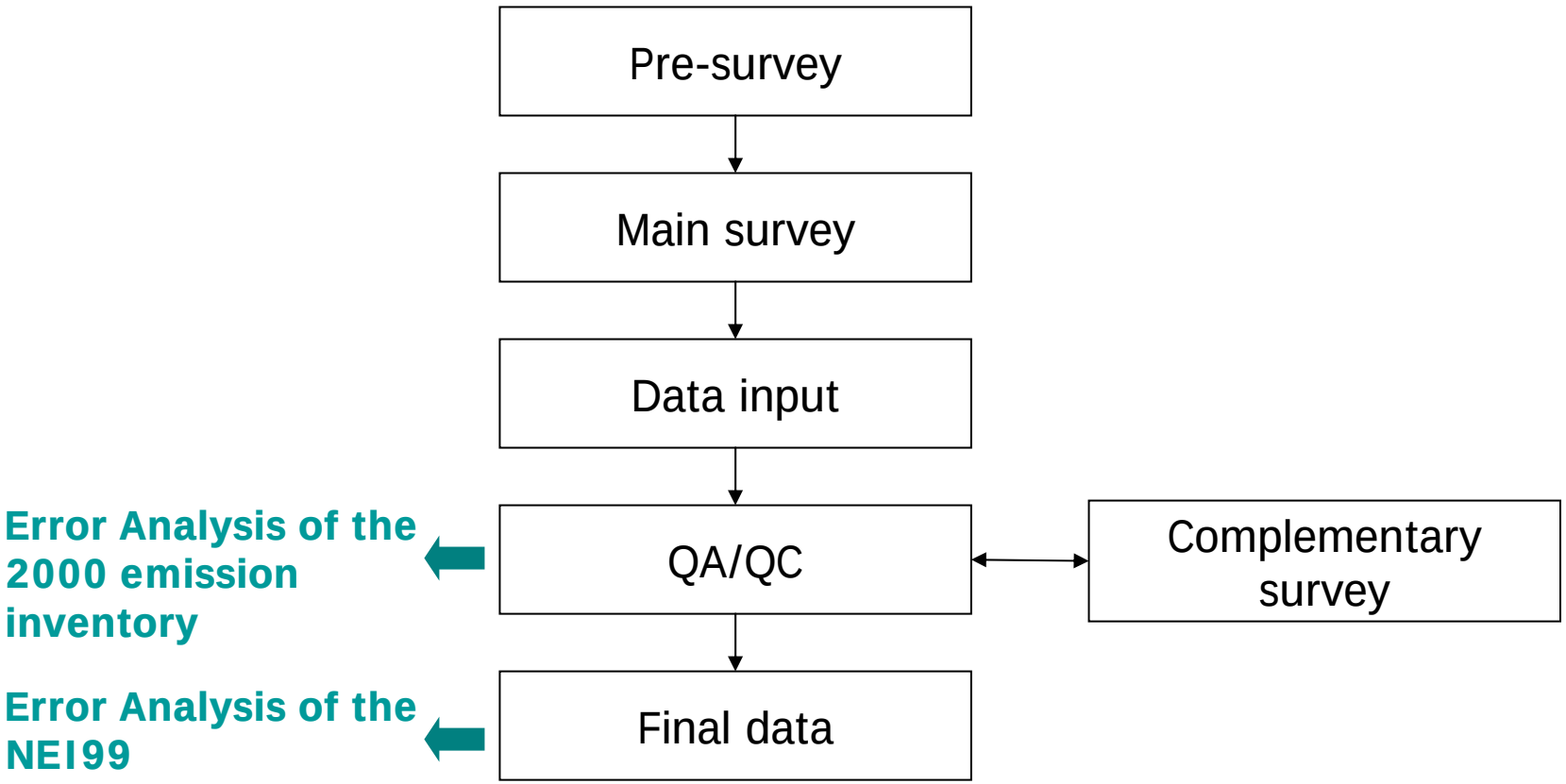
Contribution(%) of point sources to total emissions in the state of Georgia, 1999

- Precision of the NEI (National Emission Inventory) has been doubted
  - Structural errors (e.g., incorrect projection factor)
  - Mistakes (e.g., miscalculation, typo, and omitted data)

Objectives

- Develop a more accurate emission inventory (2000 emission inventory) for non-EGU point sources
- Quantify the amount of random errors in the 2000 emission inventory
- Quantify errors in the NEI 1999 by comparing with the 2000 emission inventory

Procedure(1) - Overview



Procedure(2)-3 Types of Surveys

- Pre-survey
  - To screen plants that emit more than 25tons per year
  - Plants in the Title V Permit List; Toxic database; Georgia Manufacturer's database; and NEI99
- Main survey
  - Survey for plants with emission larger than 25 ton/year
  - Detailed information for emission estimates
- Complementary survey
  - To confirm corrections or to gather omitted data identified by QA/QC

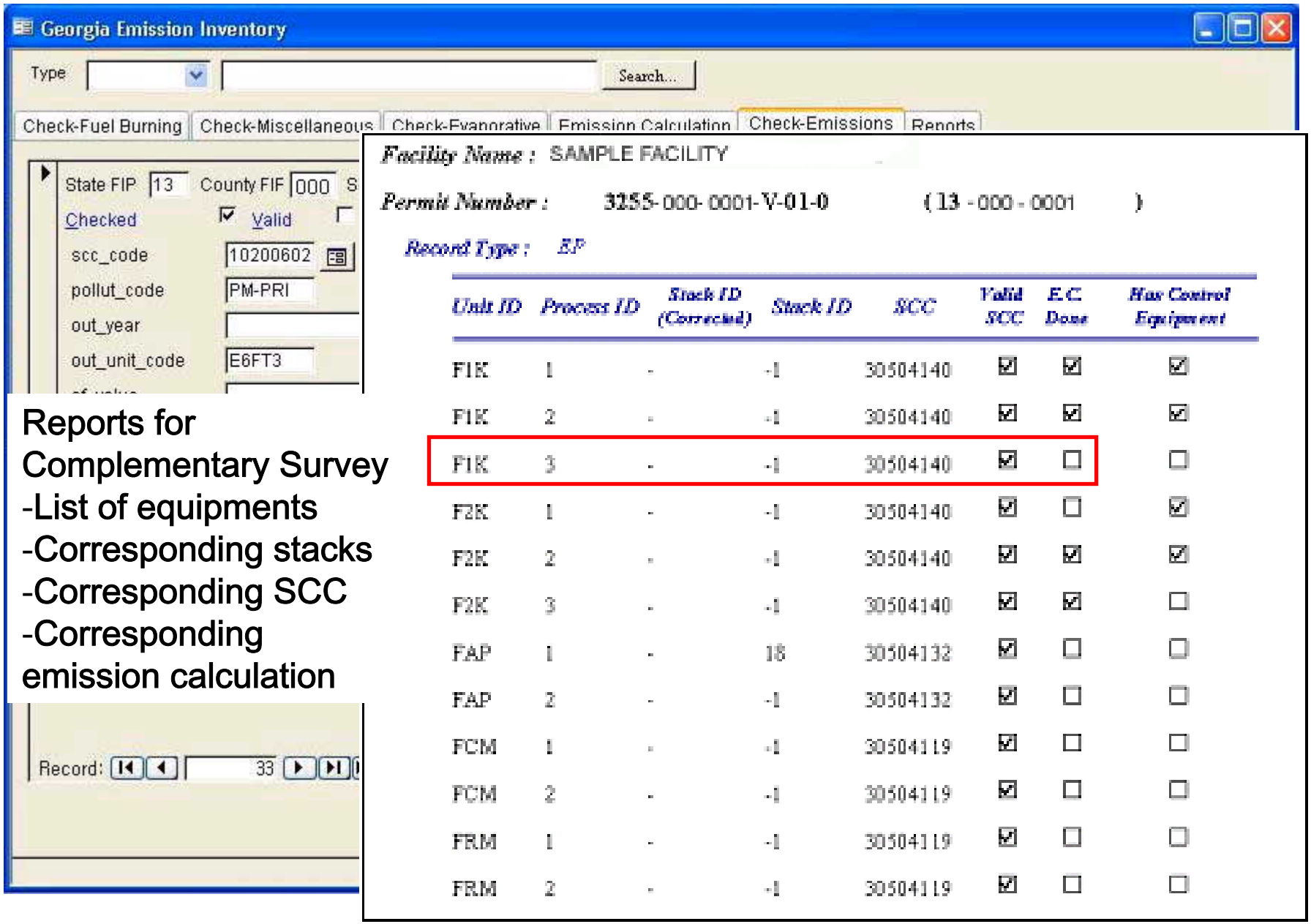
Survey Responses

- Responses to the main and the complementary surveys

	Number of forms sent to companies	Replies (%)
Pre-survey	1300	300 (23%)
Main survey	100/300	79 (79 %)
Complementary survey	54	30 (55%)

Procedure (3) – QA/QC Program

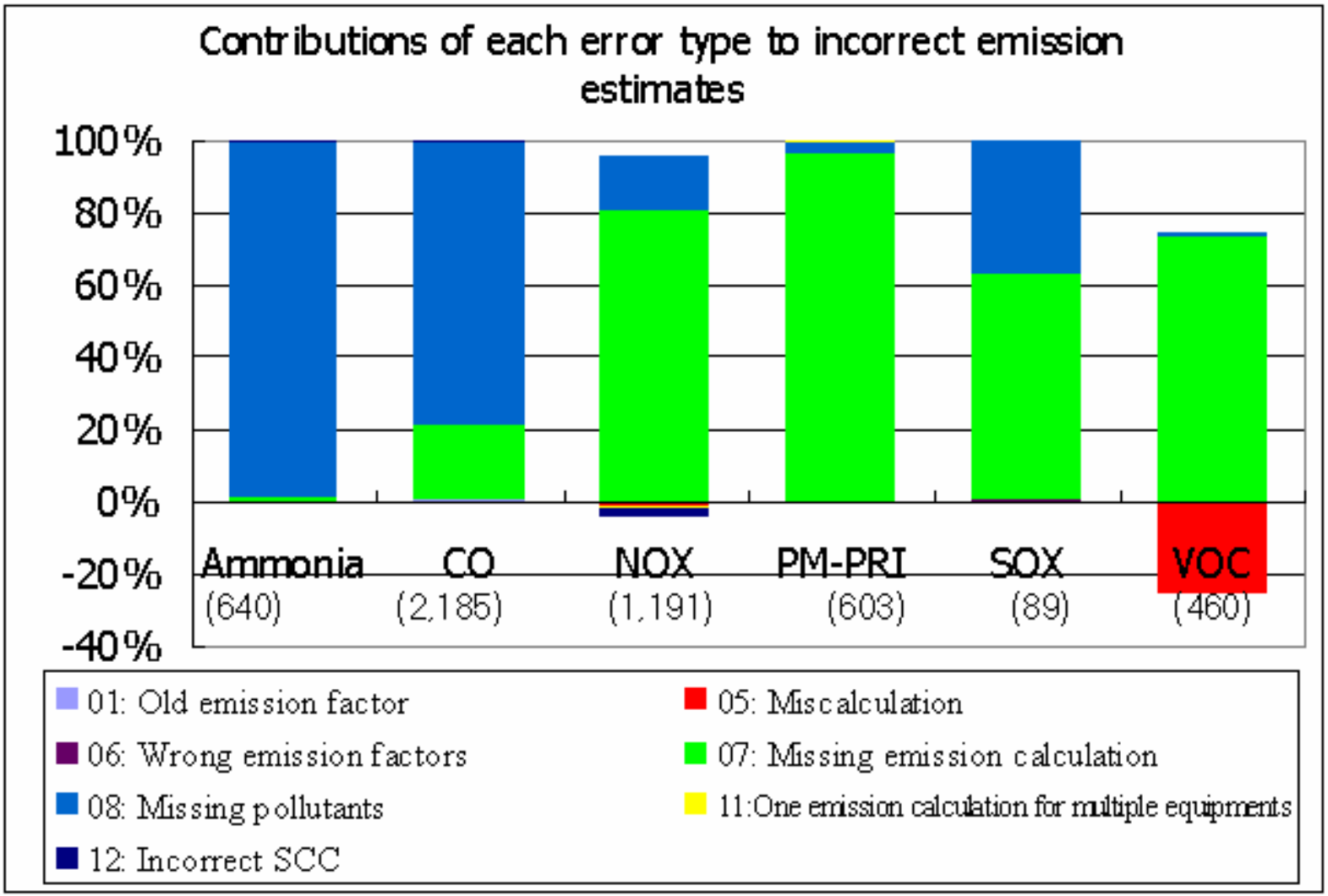
Components	Main functions
Fuel burning process	• Calculate total BTU using fuel consumptions • Check SCC
Evaporative Process	• Calculate VOC emissions based on material balance method
Missing emission calculation	• **Add emission estimates** for emission processes which don't have reported emission calculation • Calculate emissions using emission factors in FIRE version 6.23
Reported emission calculation	• Check emission calculation records one by one • Check **miscalculation, emission factor values, units, etc.** • Assign error code and error description if needed
Reports	• Check relations between tables • **Create reports for complimentary survey**



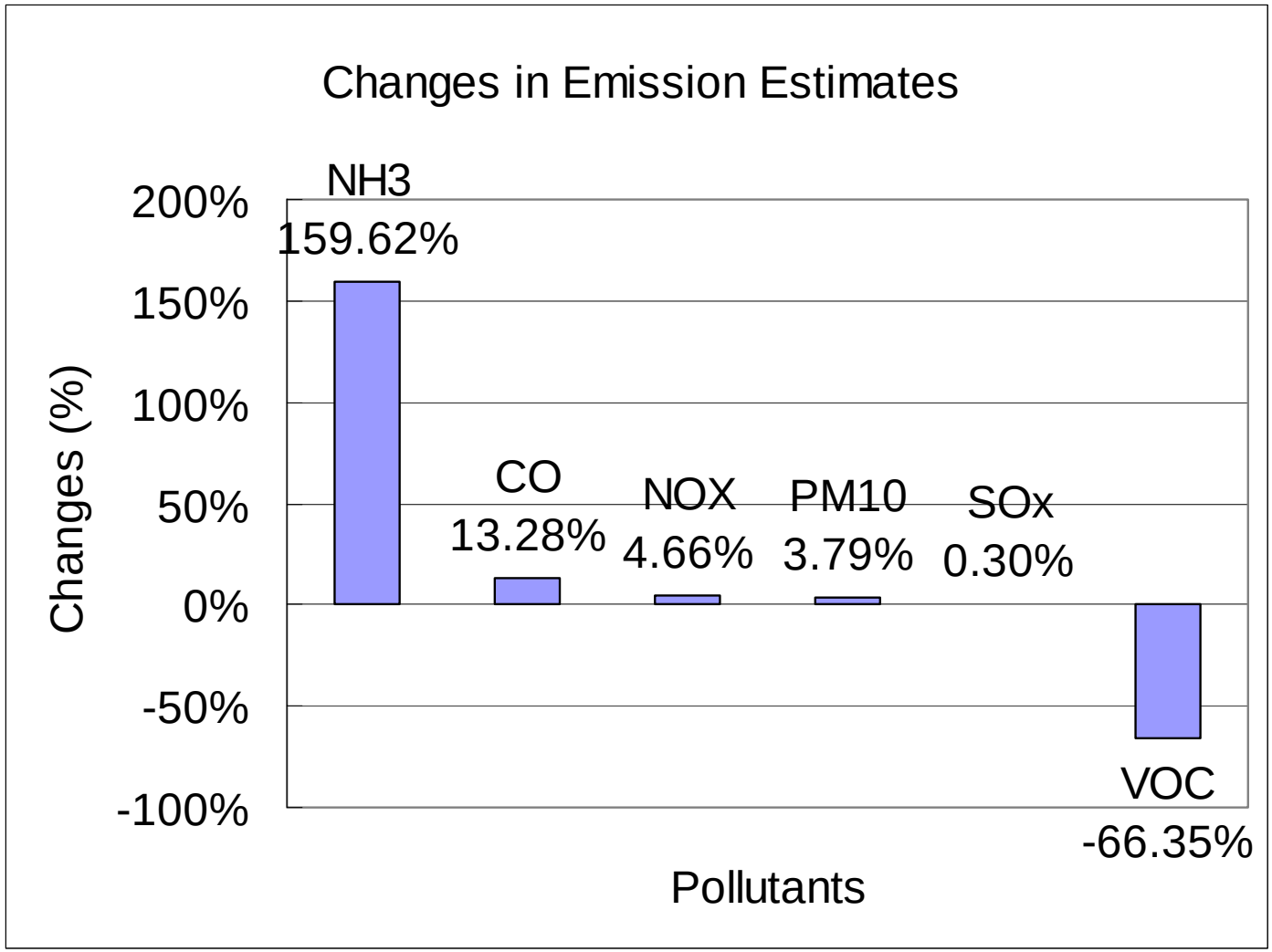
Reports for Complementary Survey
-List of equipments
-Corresponding stacks
-Corresponding SCC
-Corresponding emission calculation

	Error Types	Counts (%)
Not Errors	No error	2,227 (54.5%)
	Emission estimate is calculated using evaporative processes information by material balance	651 (16.0%)
		71.0%
Errors	**Revoked emission factors are used**	**236 (5.8%)**
	Units of emission factors don't match with units of activity	21 (0.5%)
	Units of yearly throughput is wrong	
	Typo in survey form	13 (0.3%)
	Miscalculation in emission estimates	18 (0.4%)
	Value of emission factor is wrong	12 (0.3%)
	Emission process doesn't have corresponding emission estimates	**376 (9.2%)**
	Emission process have corresponding emission estimates, but some pollutants are missing	**325 (7.9%)**
	Typo or omission during data entering	
	Emissions from more than two emission processes are reported as one record	144 (3.6%)
	Wrong SCC is assigned to emission process	61 (1.5%)

QA/QC Results – Contributions of Error Categories



QA/QC Results - Changes in Emissions



Procedure (4) – Comparison with NEI99

- Assumption
  - Emission estimates in the 2000 emission inventory are correct
  - Changes in emissions between 1999 and 2000 are small

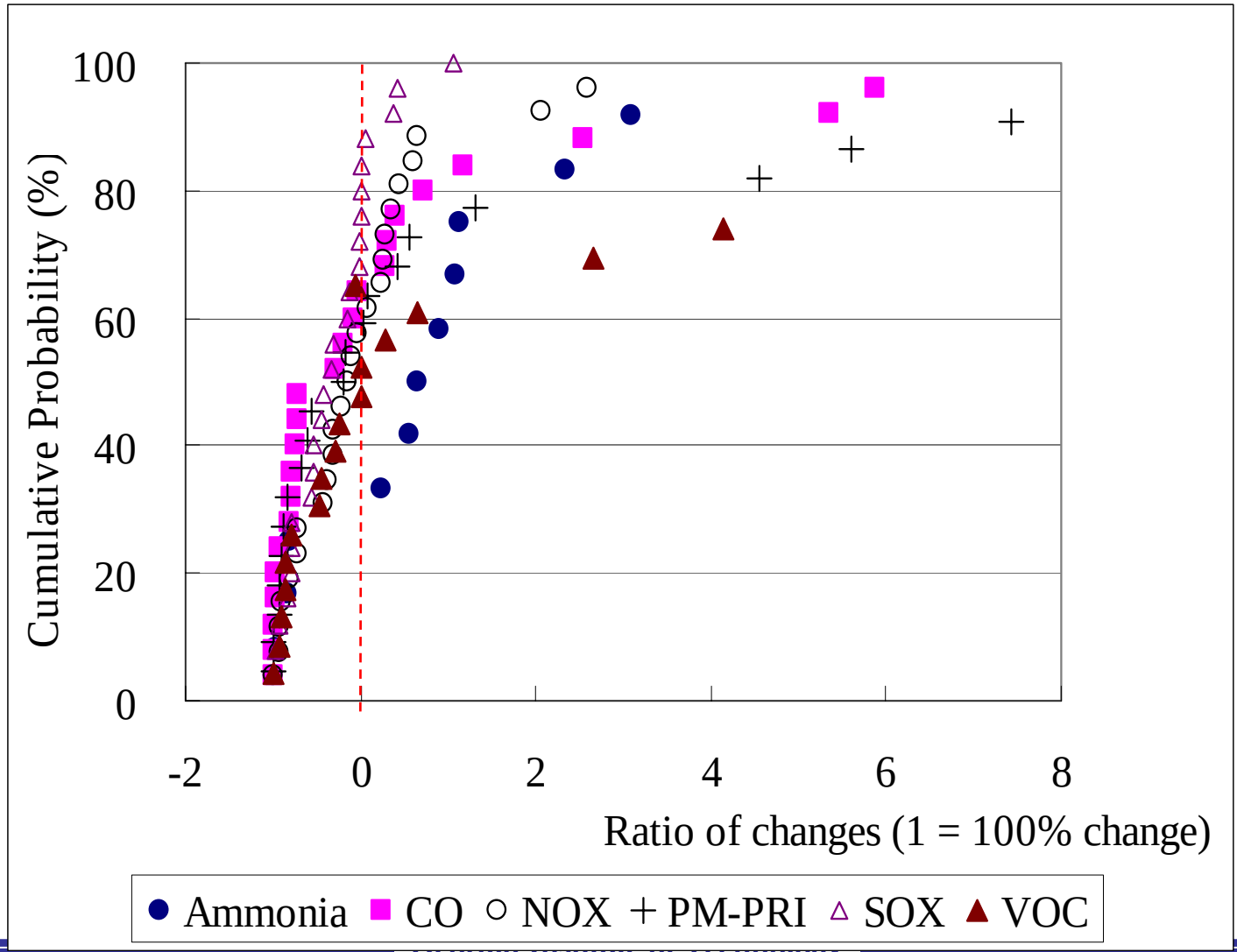
- There are 30 common companies in the 2000 emission inventory and NEI99

Comparison Results – Changes in Emissions

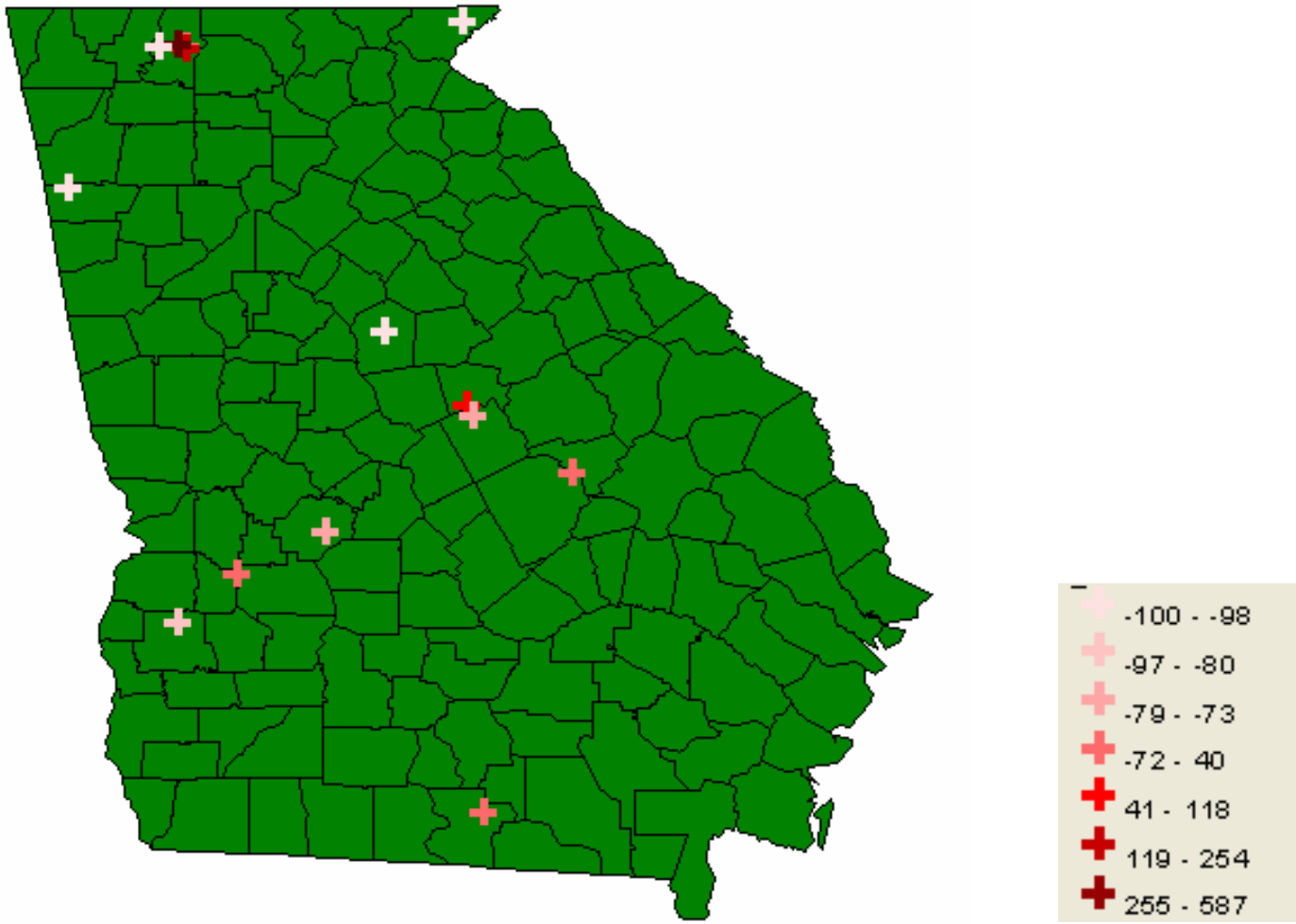
(Emissions: Tons/year)

	CO	NH_3	NO_X	PM_{10}	SO_2	VOC
2000 EI	15,304	439	18,460	3,470	18,265	6,680
NEI99	54,840	48	11,343	6,928	27,362	3,659
Changes (2000 EI – NEI99)	-39,536	392	7,177	-3,492	-9,097	3,021
Percent Changes (2000 EI – NEI99)	**-72%**	**816%**	**63%**	**-50%**	**-33%**	**82%**

Comparison Results – Change in Emissions of Each of Companies



Comparison Results - Changes in CO Emissions (%)



Conclusion

- Improvements
  - Surveyed representative point source information for 2000
  - Corrected errors in new survey and in NEI99
- Errors in new survey
  - The biggest error is resulted from missing emission estimates
  - Typo doubled VOC emission estimates
  - Checking missing emission estimates can improve the accuracy of emission estimates
- Errors in NEI99
  - Projected emission estimates are significantly different from the surveyed values

Further Studies

- Analyze sensitivity of ambient pollutant concentration to errors in emissions using air quality modeling
- Identify a better projection factor
  - It's hard to implement survey for all point sources every three years
  - Survey a representative index (for example, a amount of products, or a number of employees) annually and use it as a projecting factor

Acknowledgement

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