

Shipping emission inventory development in Hong Kong

香港船舶排放清单发展

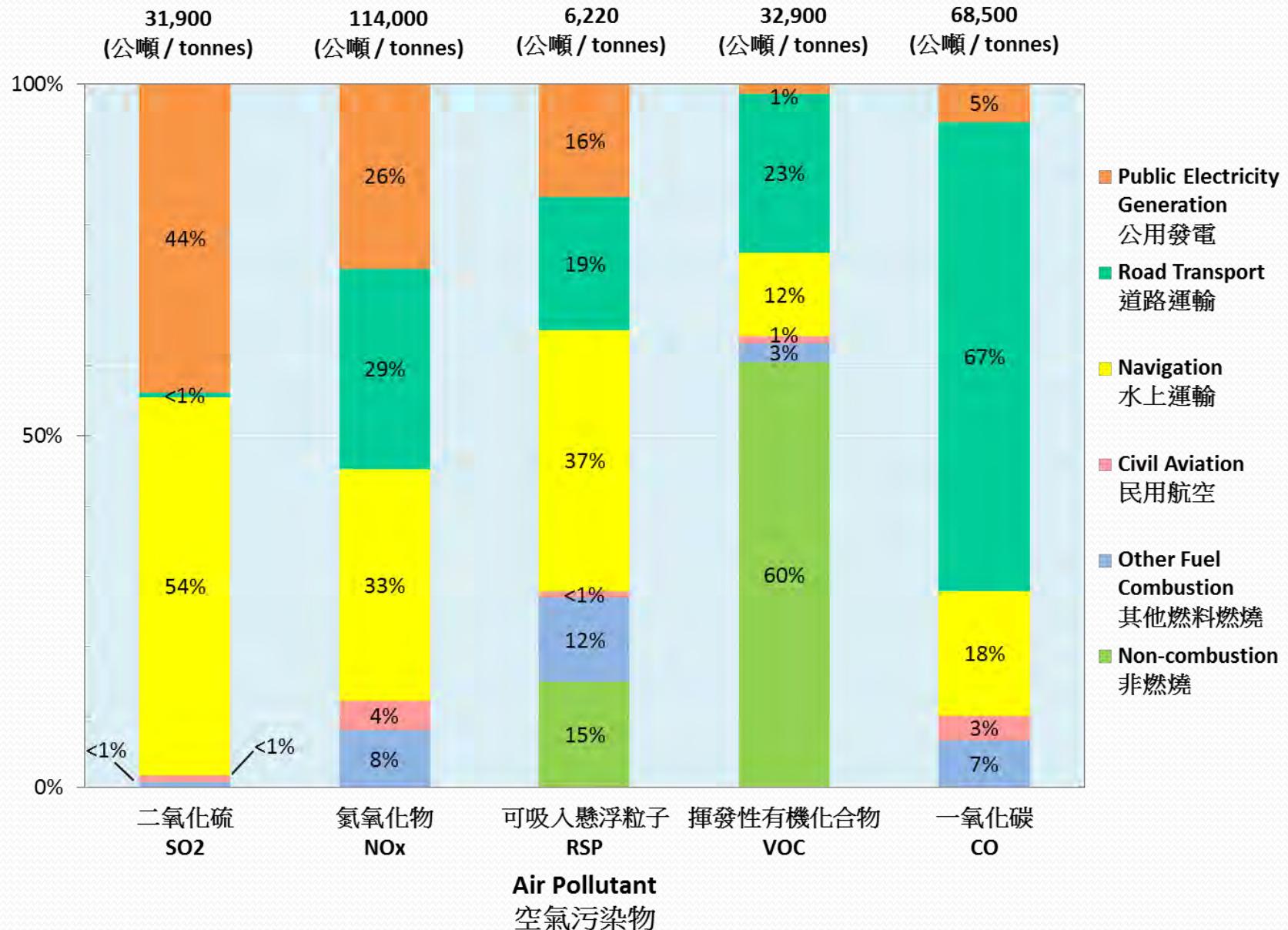
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2011 年排放清單

2011 Emission Inventory



Source 資料來源：HKEPD 香港環保署

Breakdown of 2011 Emission Inventory

按污染源划分2011年排放量

Pollution Sources	SO ₂	NOx	RSP
Public Electricity Generation	14,000	30,000	998
Road Transport	207	32,700	1,180
Navigation	17,200	37,700	2,310
Civil Aviation	304	4,770	58
Other Fuel Combustion	237	9,290	745
Non-combustion	N/A	N/A	934
Total Emission (Tonnes)	31,900	114,000	6,220

Study on Marine Vessels Emission Inventory

香港船舶排放清单研究

Tender Reference AS 08-068

**Study on
Marine Vessels Emission Inventory**
Final Report

submitted to

The Environmental Protection Department
The HKSAR Government

by

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for and on behalf of

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February 2012



- ship emission inventory
for Hong Kong

香港船舶排放清单

- 2007 as base year

2007年为基础年

- activity-based approach

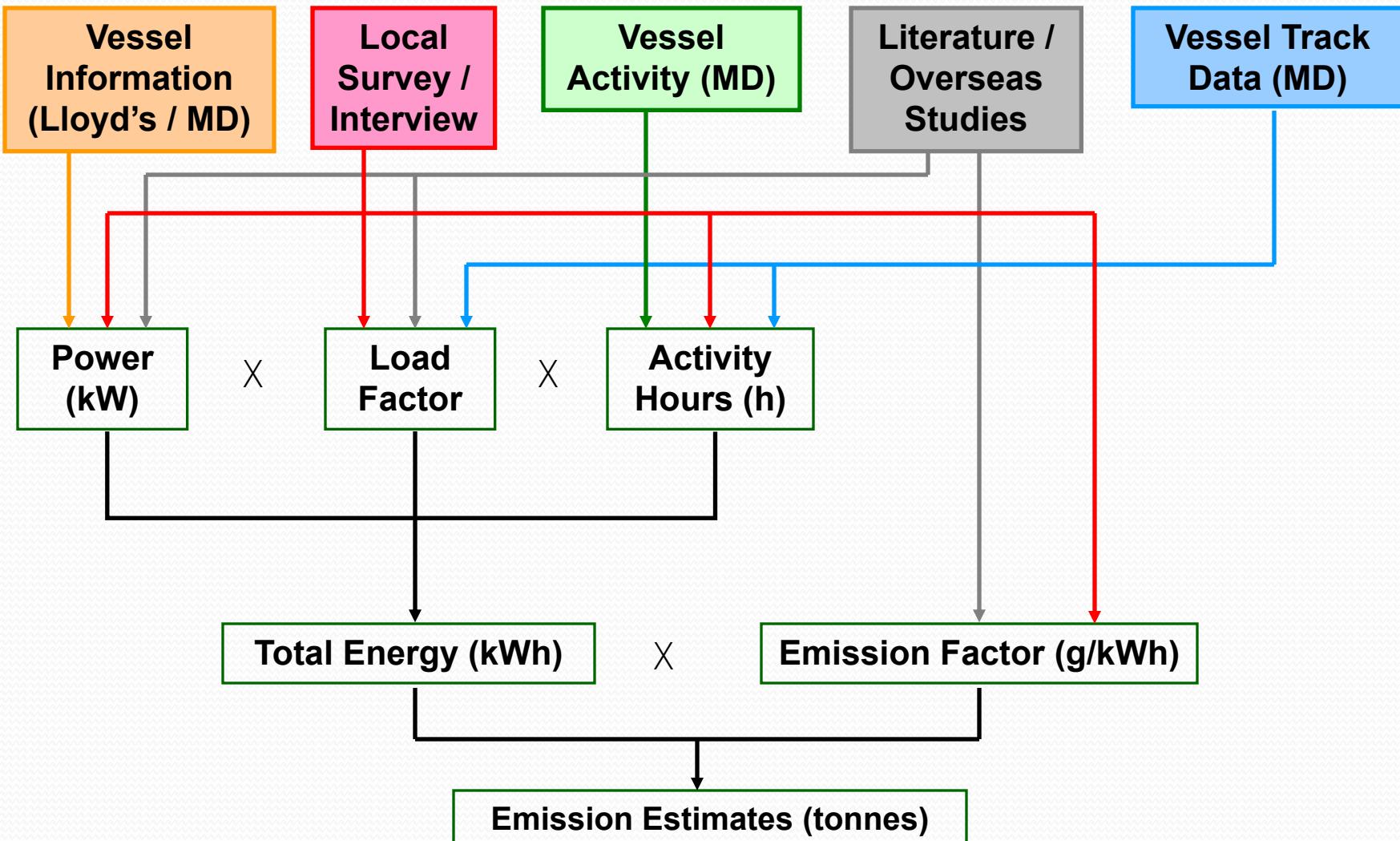
以动力法计算排放

- use of AIS data

使用船舶航行卫星监测信
息（自动识别系统）

Emissions estimation flow chart

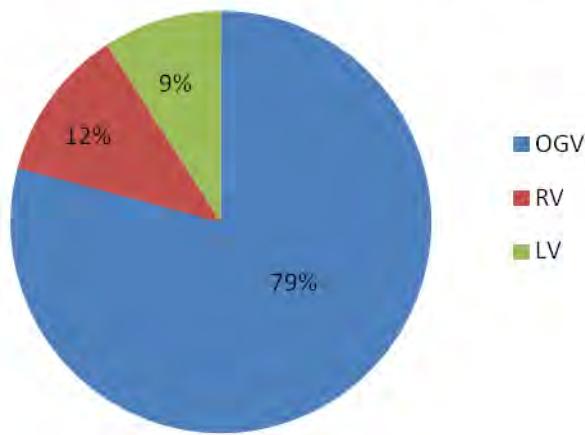
排放计算流程表



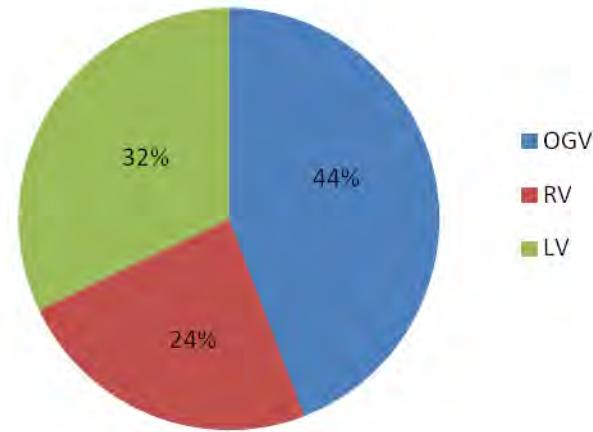
Ship emissions by main vessel type

按主要船舶类别划分的排放占有率

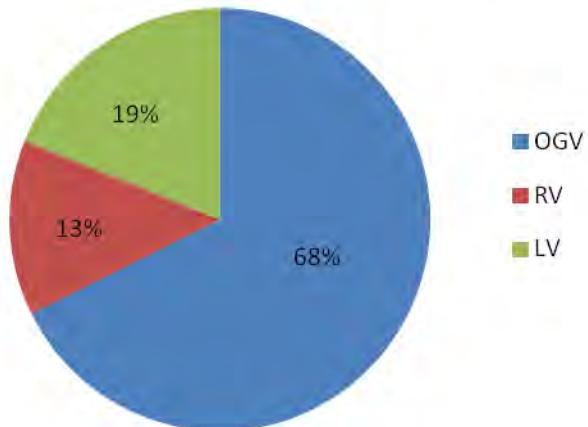
Total SO₂ Emission, 2007



Total NO_x Emission, 2007



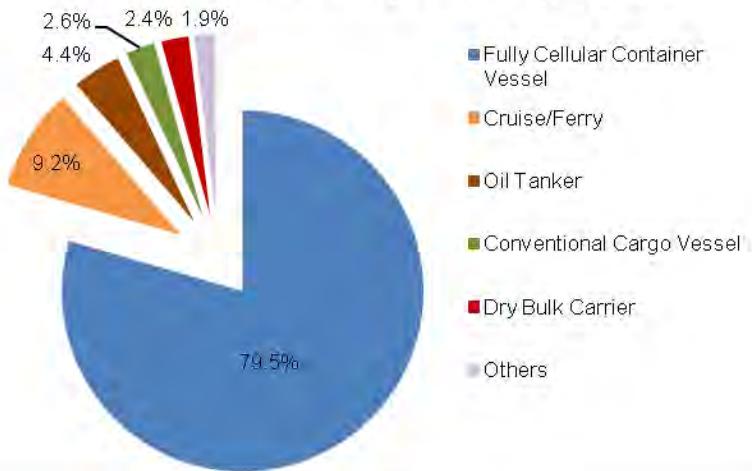
Total PM₁₀ Emission, 2007



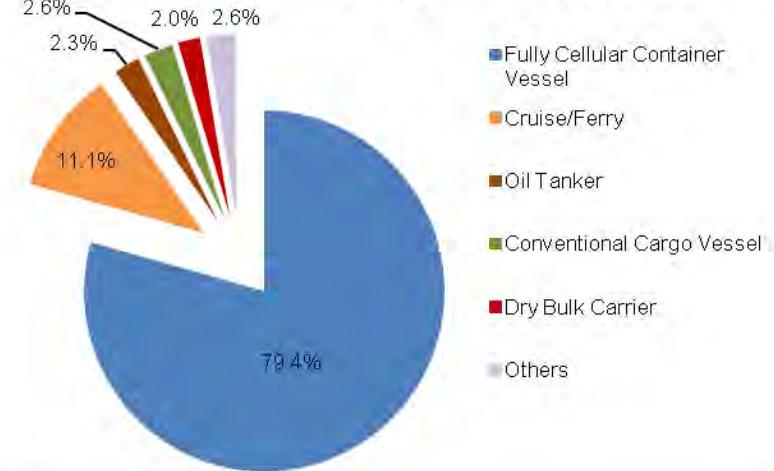
OGV emissions by vessel type

按船舶类别划分的远洋船排放占有率

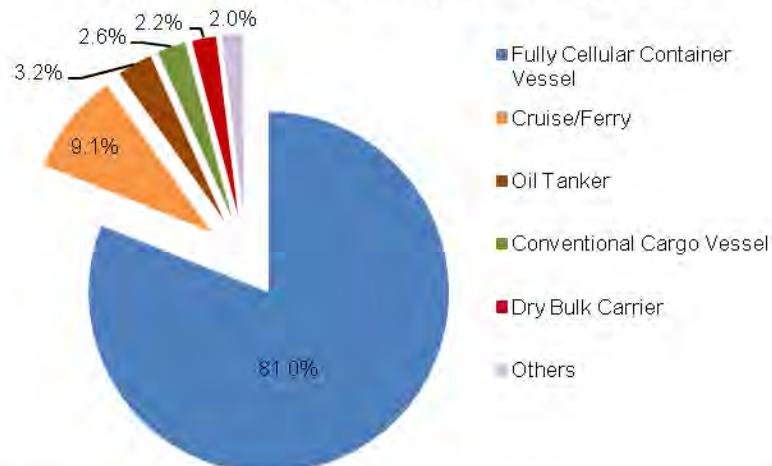
OGV SO₂ Emission by Vessel Type (%)



OGV NO_x Emission by Vessel Type (%)

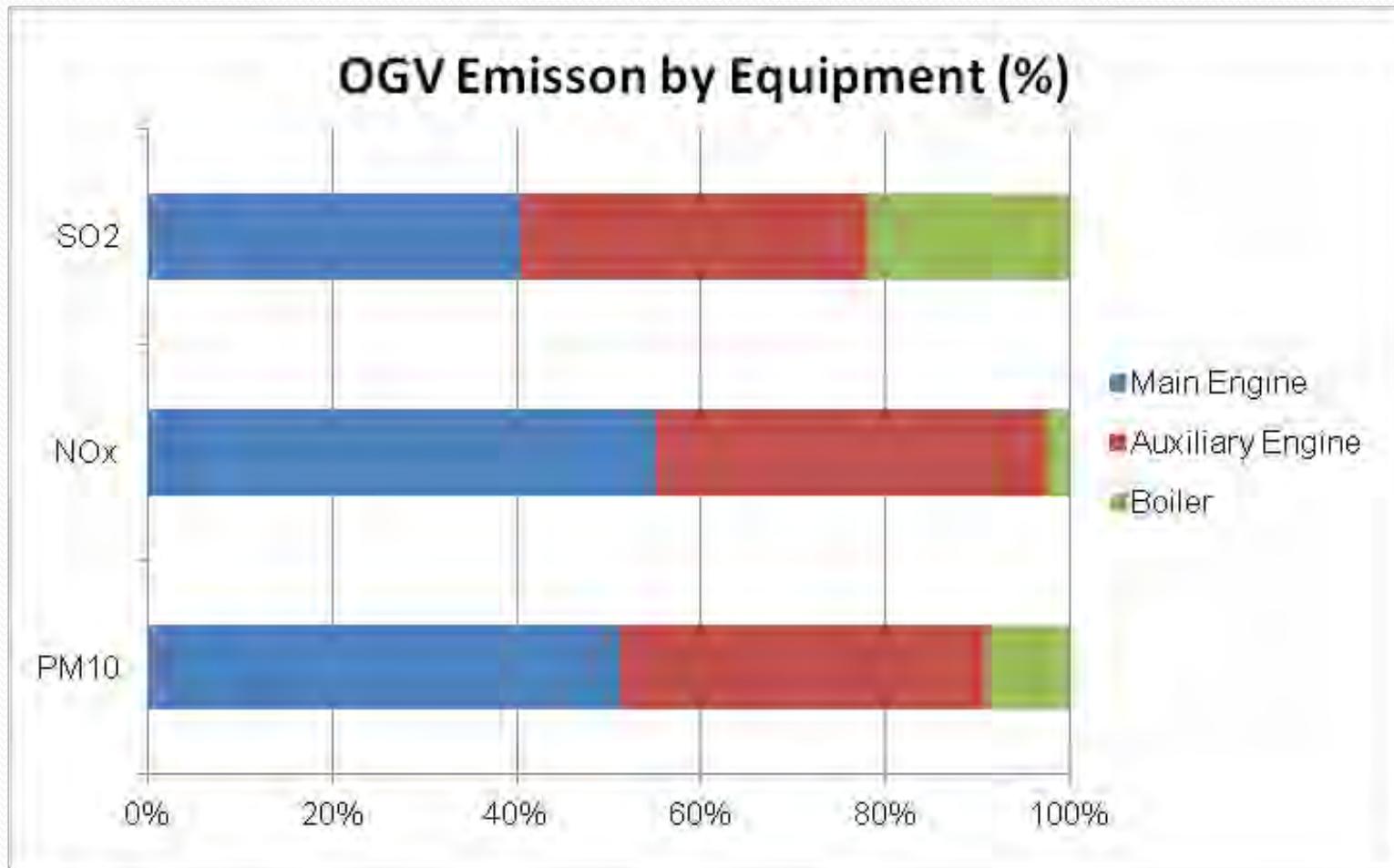


OGV PM₁₀ Emission by Vessel Type (%)



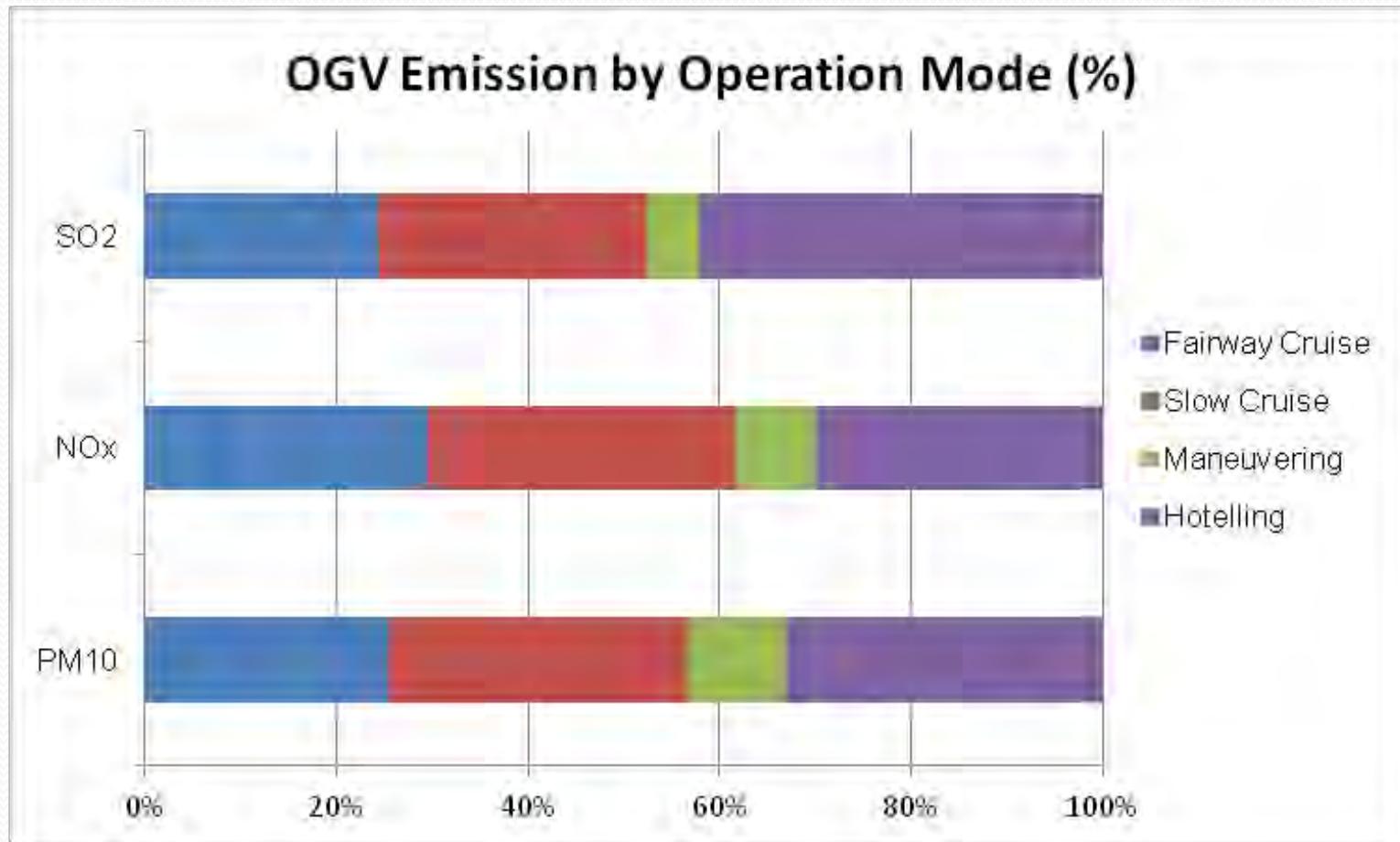
OGV emissions by equipment

按船舶装置划分的远洋船排放占有率



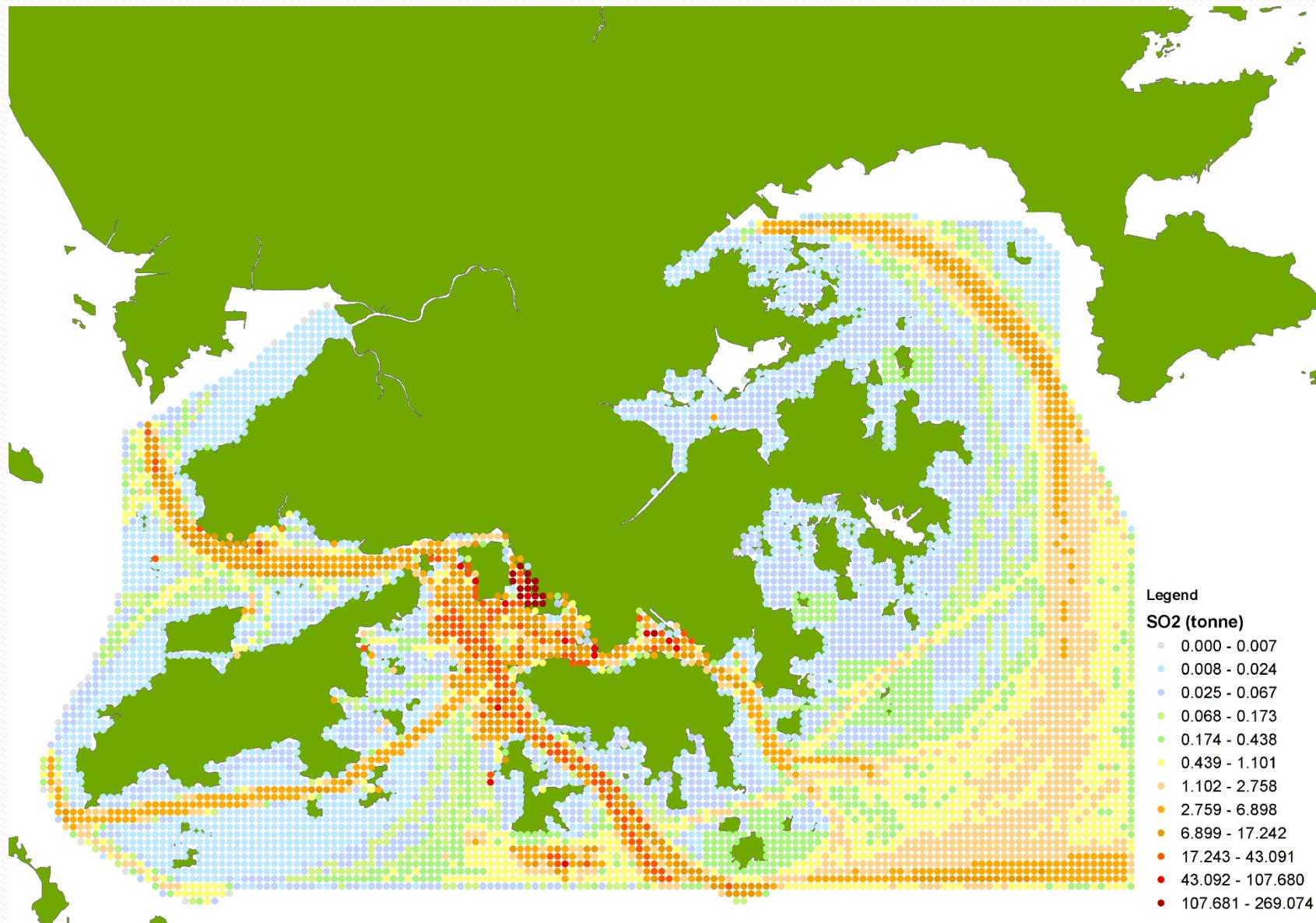
OGV emissions by operation mode

按船舶运行工况划分的远洋船排放占有率



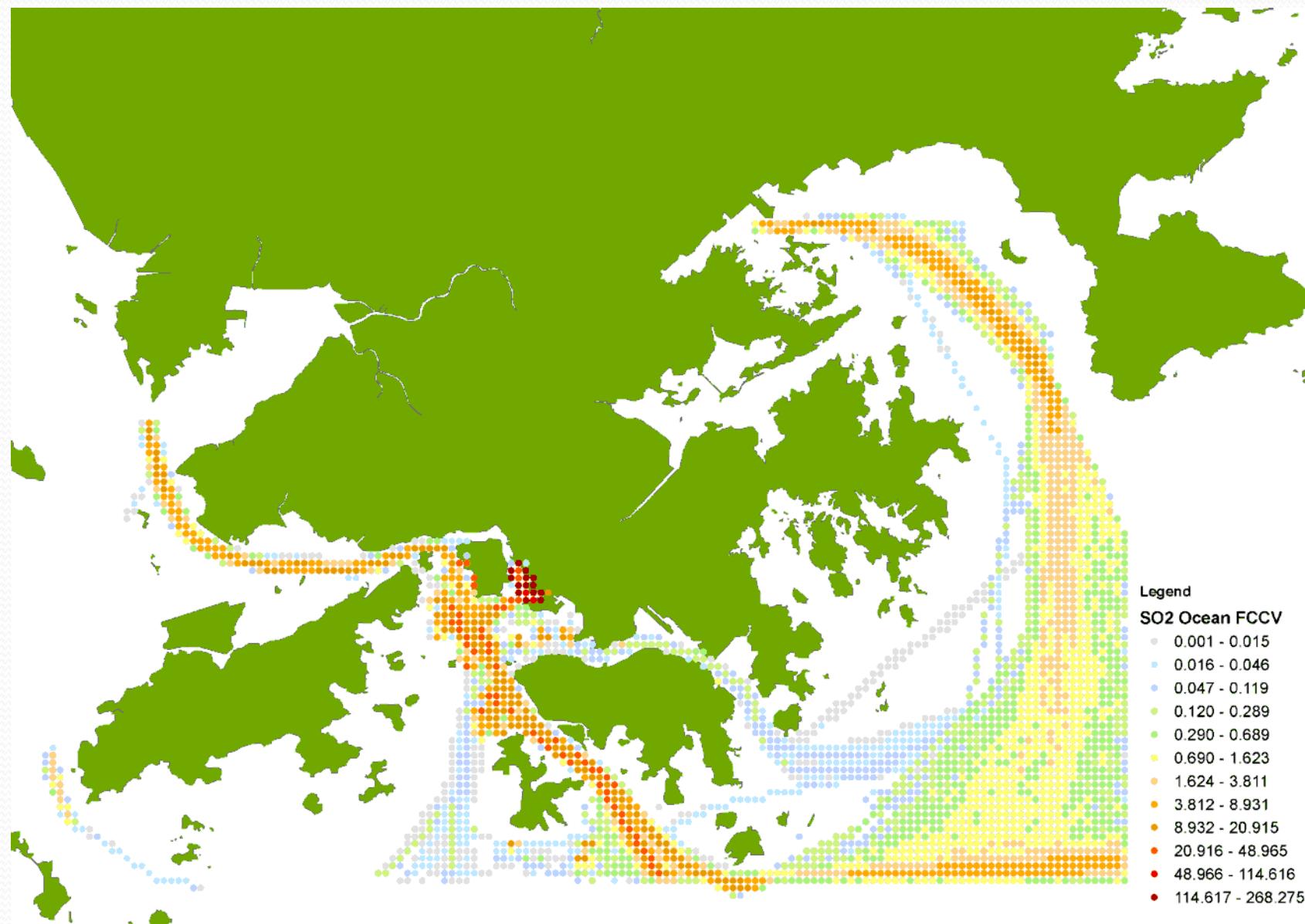
Spatial distribution of ship emissions 2007

2007年船舶排放的空间分布



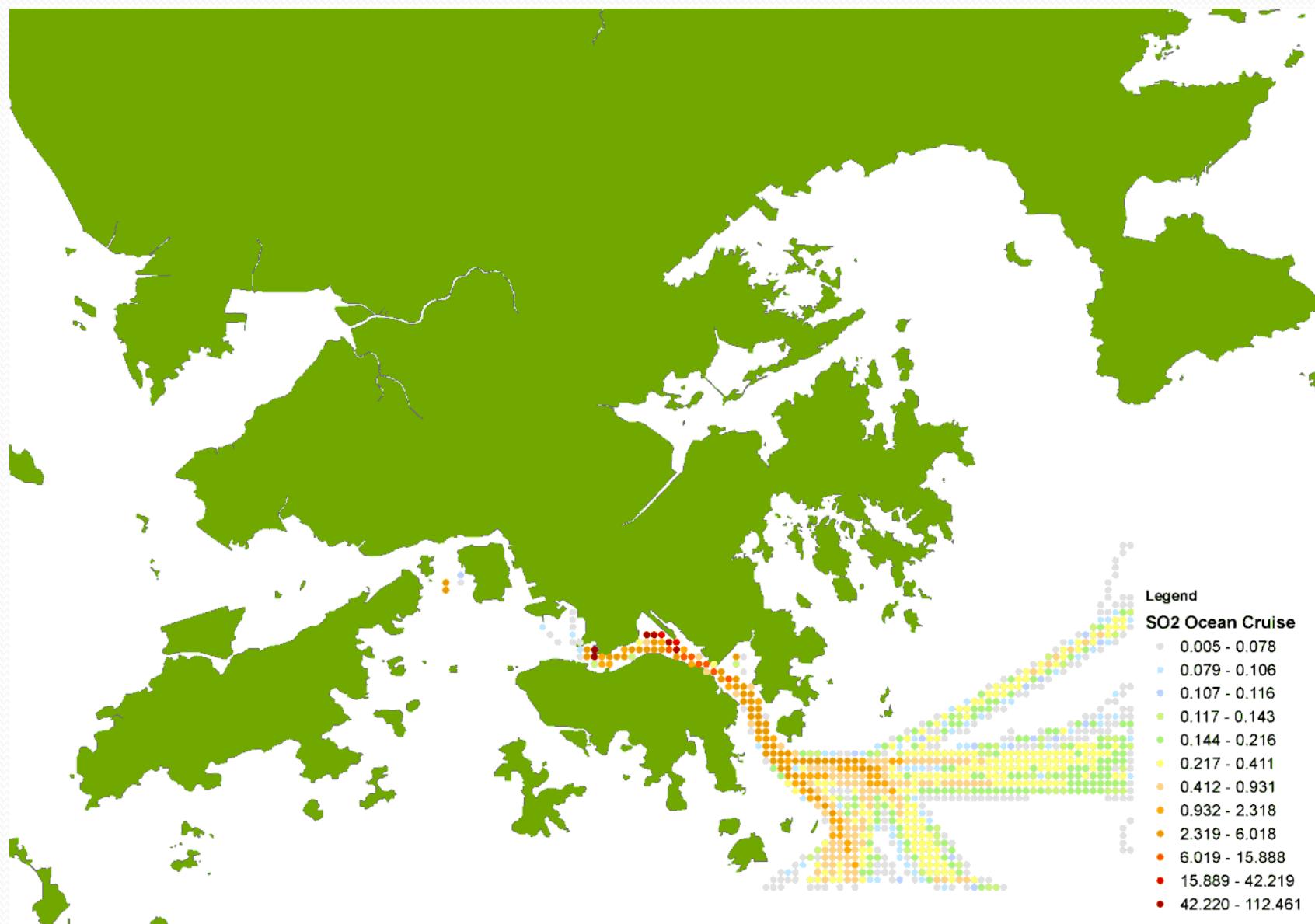
Spatial distribution of containership emissions

2007年集装箱船排放的空间分布



Spatial distribution of cruise ship emissions

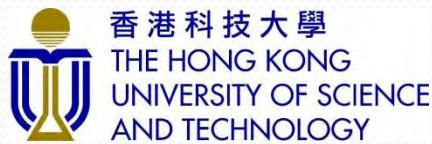
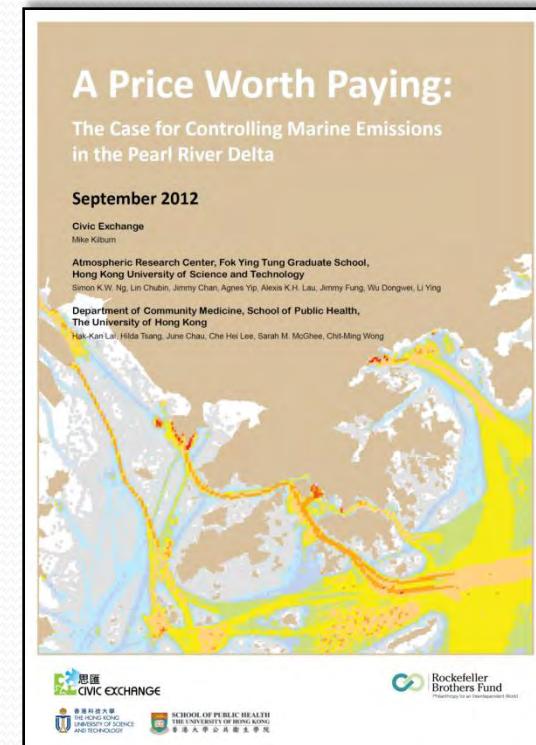
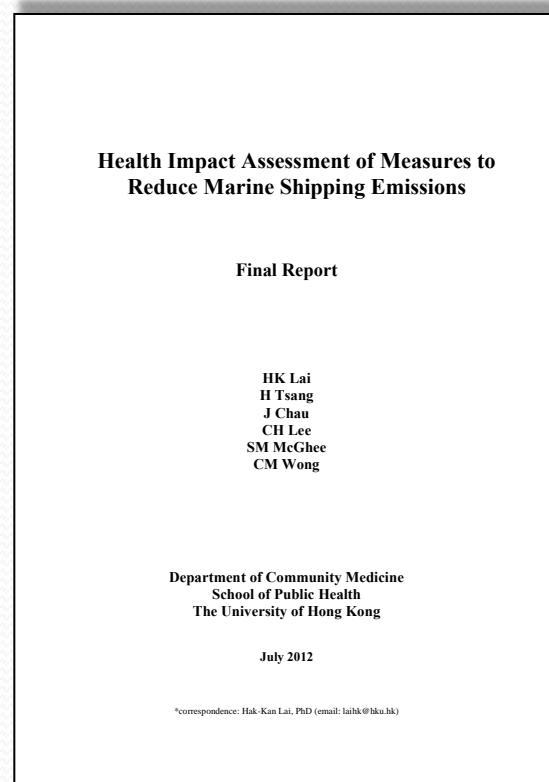
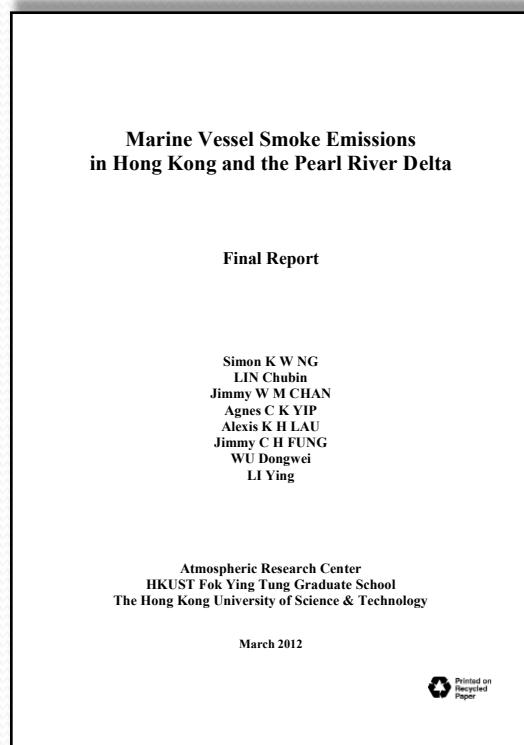
2007年邮轮排放的空间分布



Contribution of the Study 排放清单研究的贡献

- Better understanding of **marine fuel** used by vessels through local surveys and interviews
通过本地调查，更了解船用燃料的质量
- **Boiler emission** was included for OGVs in the new estimation
计算包括了锅炉的排放
- Improvement in **time-in-mode and load factor estimation**, by tapping into Marine Department's database
使用海事处的数据，改善对各工时及负载率的估算
- Improvement of **main engine power data** from Lloyd's Data (OGVs) or MD's archive (RVs)
以劳氏登记册及海事处的存档，改善主发动机信息的质量

PRD ship emissions study 珠三角船舶污染研究



SCHOOL OF PUBLIC HEALTH
THE UNIVERSITY OF HONG KONG
香港大學公共衛生學院



Emission inventory
排放清单

Dispersion
扩散

Health impact
健康影响

Policy recommendation
政策建议

Study Scope 研究内容

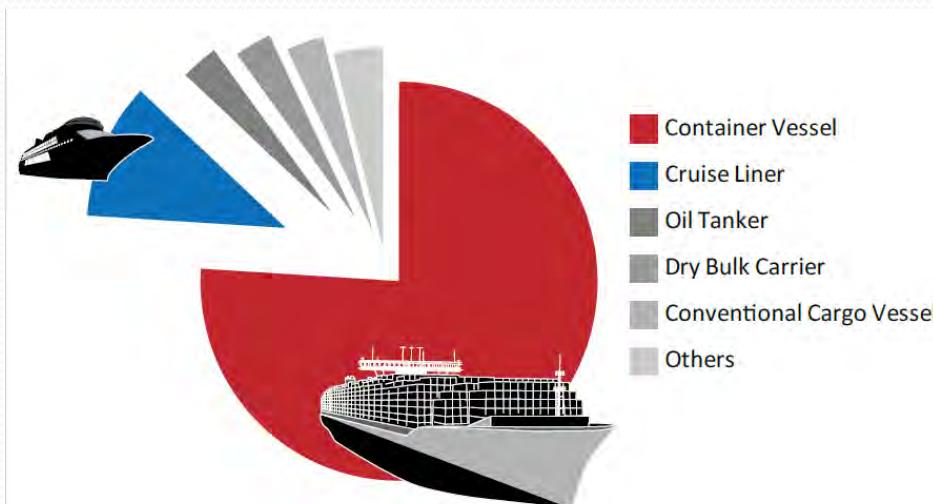
- study area 研究地域范围：
 - Hong Kong 香港, Inner PRD 珠三角内圈, Outer PRD 珠三角外圈
- 2008 as base year 以2008年为基础年
- activity-based approach 以动力法计算排放
- use of AIS data 使用船舶航行卫星监测信息（自动识别系统）
- assessment of 4 different emissions control scenarios
评估4个减排方案

2008 OGV emissions inventory

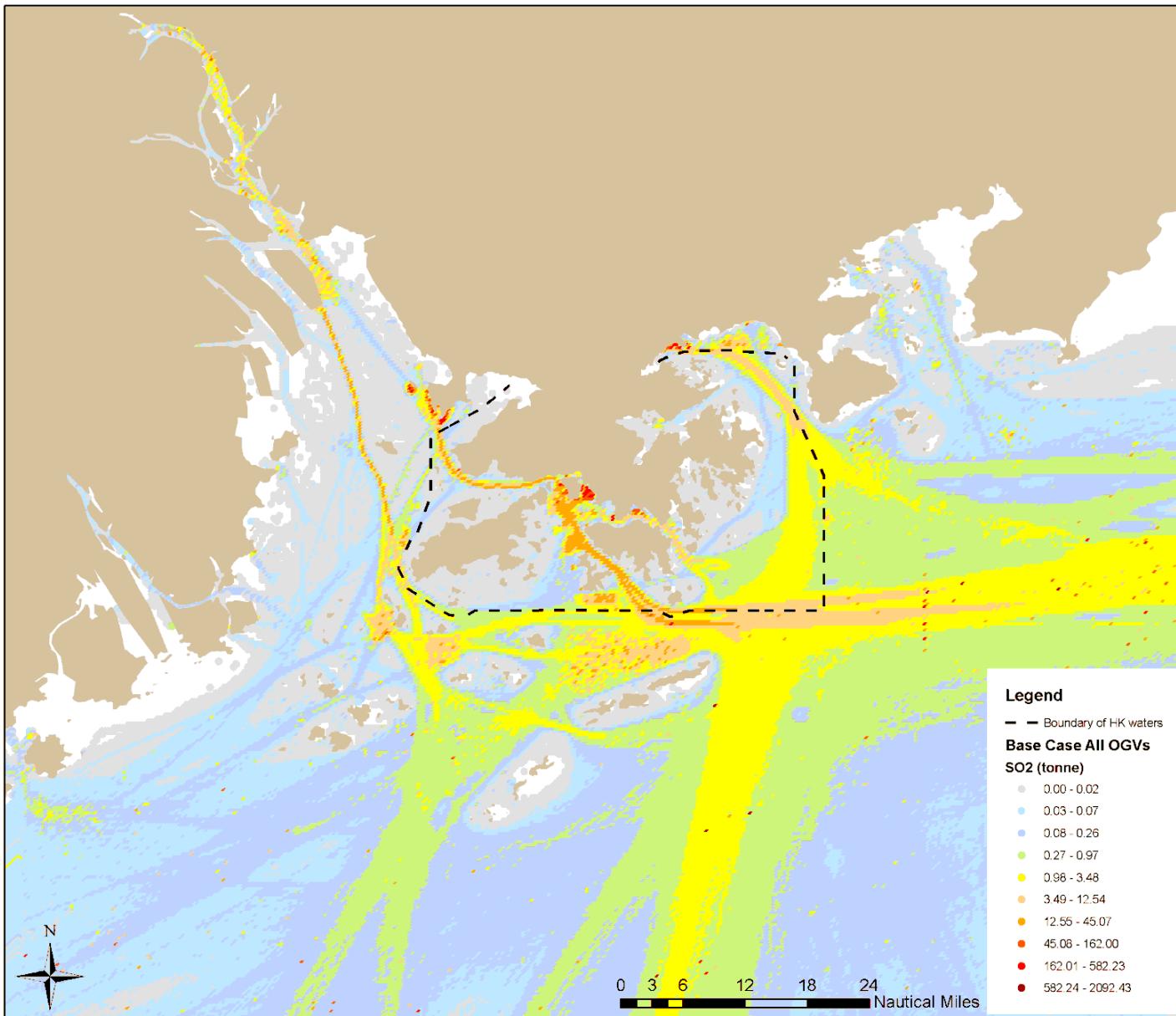
2008年远洋船排放清单

(tonne 噸)

	SO ₂	NO _x	PM ₁₀	PM _{2.5}	VOC	CO
Within Hong Kong waters	16,489.3	17,900.7	1,870.3	1,720.7	753.6	1,749.1
Outside Hong Kong waters but within 100 nm from Hong Kong	125,430.4	163,412.4	14,563.0	13,397.9	5,808.4	14,914.3
Total	141,919.7	181,313.1	16,433.2	15,118.6	6,562.0	16,663.4



Spatial distribution (baseline) 基线空间分布



Recommendations 改善建议

- Improve OGV emissions estimation

优化远洋船舶排放估算

- Improve RV/LV emissions estimation

优化内河船/本地船舶排放估算

- Compile Guangdong/PRD vessels emission inventory

建立广东/珠三角船舶排放清单