

Shijun Ma

Master Degree

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Address: Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Shuangqing Road 18, Haidian District, Beijing, 100085, China

Education:

- 2018.09-Present: Master Degree - Industrial Ecology** GPA: 3.61 / 4
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
Main courses: Solid Waste Recycling and Management, GIS, Artificial Intelligence Techniques and Fuzzy Logic Concepts in Physical Geography, Geographical Information Science, Remote Sensing Intelligent Computing and Information Extraction, Spatial Analysis, R Language and Its Application in Ecology
- 2014.09-2018.06: Bachelor Degree - Urban forestry** GPA: 4.16 / 5
School of forestry, Beijing forestry University
Main Courses: Forestry Ecology, Remote Sensing and Geographic Information System for Forestry, Urban Ecology

Research Interest:

Urban Metabolism, Life cycle assessment, Solid Waste Management, Deep Learning, Data Innovation

Publications:

1. **Ma, S.**; Zhou, C.*; Chi, C.; Liu, Y.; Yang, G., Estimating Physical Composition of Municipal Solid Waste in China by Applying Artificial Neural Network Method. *Environmental Science & Technology* 2020, 54, (15), 9609-9617.

Introduction: In this study, the combination of hyperspherical transformation method and BP neural network methodology was applied to quantitative models between city-level PCMSW and its socioeconomic factors, including city size, per capita gross regional product, geographical location, gas coverage rate, and year. Based on this model, a municipal solid waste composition database at prefecture-level in different years was established.

2. Zhou C.*; **Ma S.**; Yu X.; Chen Z.; Liu J.; Yan L., A comparison study of bottom-up and top-down methods for analyzing the physical composition of municipal solid waste. *Journal of Industrial Ecology*, 2021. (the supervisor for the first author)

Introduction: In this work, two bottom-up and two top-down approaches were applied for analyzing the PCMSW (physical composition of municipal solid waste), namely, field investigation (FI), BP neural network (BPNN), material flow analysis (MFA), and inversion algorithm based on electricity generation of waste incinerator (IAEI). Wuhan City, China, was chosen as the studied case for analyzing and comparing the PCMSW results. There are different scenarios for using PCMSW datasets, such as designing disposal facility, formulating plan, and making decisions in MSW management, therefore, it calls for integration of top-down and bottom-up methods for better understanding the PCMSW.

3. **Ma, S.**; Zhou, C.*; Yang, G.; Zhao, Z., Liu, Y., Characteristics and Environmental Impacts of Materials Stored in Municipal Solid Waste Landfills: A Case Study of the Guangdong-Hong Kong-Macao Greater Bay Area. *Huanjing Kexue*, 2019, v.40(12), 405-415. (In Chinese with English abstract)

Introduction: In this work, we focused on the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), which has the highest urbanization rate and population density of all China. The generation, stock, physical components, and key elements of MSW (municipal solid waste) in eleven cities of the GBA (the Guangdong-Hong Kong-Macao Greater Bay Area) were analyzed based on both the scientific literature and statistical data. Overall, this study provides fundamental data that can be used to determine the environmental impacts of MSW landfills and implement the eco-environmental remediation of urban landfill sites in the GBA.

4. **Ma, S.**; Zhou, C.*; Yang, G., Typical pollutants in landfill leachate from a global perspective: occurrence, drivers and environmental impact (In Preparation)

Introduction: In this paper, an arithmetic mean value and standard deviation were applied to systematically summarize the typical pollutants in landfills by country type, climate zone and landfill age. Besides, by using data from published literature and reports, the correlation between typical leachate pollutants (COD, BOD₅, ammonia nitrogen, SO₄²⁻, Cl⁻, K⁺, Cd, Cr, Fe, Ni, Pb) and critical influencing factors (temperature, precipitation, landfill age and waste compositions) were detailed analyzed. Furthermore, impact of typical pollutants in landfills on surrounding groundwater, surface water and soil were assessed. This study provides policy implications for the treatment of regional typical leachate pollutants, and also offer valuable parameters for future research on the ecological environmental risks brought by leachate pollutants in national, regional and global landfill sites.

5. **Ma, S.**; Peng, T.; Yu, Y.; Liu, Y.*; Li, C.; Wang, J.; Effect of Plant Hormones and Magnetic Field on Rooting of Soft Cuttings for *Catalpa bungei*. *Journal of North-East Forestry University* 2020, 48, (6), 21-24. (In Chinese with English abstract)

6. Zhou, C.*; Yang, G.; **Ma, S.**; Liu, Y.; Zhao, Z., The impact of the COVID-19 pandemic on waste-to-energy and waste-to-material industry in China. *Renewable and Sustainable Energy Reviews* 2021, 139, 110693.

7. Pan, J.; Ding, N.; Lu, B.; **Ma, S.**; Yang, J.*, Patterns change and determinants of urban nitrogen metabolism in Chinese megacities. *Journal of Cleaner Production* 2020, 264.

8. Yang, G.; Zhou, C.*; Wang, W.; **Ma, S.**; Liu, H.; Liu, Y.; Zhao, Z., Recycling sustainability of waste paper industry in Beijing City: An analysis based on value chain and GIS model. *Waste Management* 2020, 106, 62-70.

9. Sun, C.; Feng, X. *; Fu, B.; **Ma, S.**; Aridity-driven desertification and its future risks: an analysis combing attribute thresholds and biome shifts (under revision in *Global Change Biology*)

10. Zhao, C.; Gao, B.; **Ma, S.**; Wang, L.; Cui, S.*; Comparative Life Cycle Assessment of Food Waste Disposal Approaches on Energy, Water, and Environment (In Preparation)

11. Yang, G.; Zhou, C.*; **Ma, S.**; Liu, Y.; Zhang L.; Yang, J.; Rethinking of waste recycling: evolution, description, and trade-off (in preparation)

Participation in Conference:

2020 International Conference on Resource Sustainability

November 2020

Presentation: Typical pollutants in landfill leachate from a global perspective: occurrence, drivers and environmental impact

2019 Symposium on Urban Mining and Waste Management

May 2020

Presentation: Estimating Physical Composition of Municipal Solid Waste in China by Applying Artificial Neural Network Method

Professional Experience:

NSFC General Projects (4187010867): Multidimensional features, future trends and managing measures of the material stocks in municipal solid waste landfills

Contribution: Data collection and processing, Development of the material flow model for material stock in landfill, Report writing

National Key R&D Program of China (No. 2018YFC1903601): Development of multi-source database of solid waste recycling technologies and research on multidimensional performance evaluation method

Contribution: Data collection and processing, Establishment of municipal solid waste composition database at prefecture-level in China

WWF No Plastic in Nature (No. 10004399): Generating characteristics and flowing pattern of plastic waste in the Middle-Lower Yangtze Area

Contribution: Field investigation, Data collection and processing, Development of the model estimating generating characteristics and flowing pattern of plastic waste in the Middle-Lower Yangtze River, Report writing

WWF Plastic Footprint Assessment and Pollution Control Countermeasures of Typical Plastic Packaging Consumer Enterprises: Anta plastic Footprint Assessment

Contribution: Field investigation, Data collection and processing, Life cycle assessment of plastic packaging of Anta clothing, Report writing

WWF Evaluation and Demonstration of Plastic Waste Recycling System in Typical Urban Parks

Contribution: Field investigation, Data collection and processing, Evaluation of plastic bottle recycling system in typical urban parks, Report writing

Study on Evaluation and Optimization of Ecological Environment Carrying Capacity of Livestock Breeding Industry in Danzhou

Contribution: Graphical visualization, Determination of location of livestock breeding plant by using ArcGIS

Technical Skills:

R, Python, Microsoft Office, SigmaPlot, GaBi, ArcGIS, Origin, AutoCAD, Photoshop, SPSS

Honors and Awards:

2021.02 First Prize Scholarship, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

2020.09 China National Scholarship, the People's Republic of China

2020.02 First Prize Scholarship, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

2020.02 Merit student, Chinese Academy of Sciences

2017.09 First Prize Scholarship, Beijing Forestry University

2017.09 Zhongziantian Scholarship, Zhongziantian Ecological Environment Technology Co., Ltd

2016.09 Second Prize Scholarship, Beijing Forestry University

2016.09 National Endeavor Scholarship, the People's Republic of China

2015.09 Second Prize Scholarship, Beijing Forestry University

2015.09 National Endeavor Scholarship, the People's Republic of China