Dear Editor(s),

We would like to submit the enclosed manuscript entitled “Predicting sludge generation pattern and carbon reduction potential under Shared Socioeconomic Pathways” which we would like to be considered for publication in “[Resources, Conservation, and Recycling](http://www.sciencedirect.com/science/journal/09213449)” as a research article.

Urban wastewater treatment is a major energy-consuming sector, accounting for about 3% of global power consumption and 1.75% of greenhouse gas (GHG) emissions. China has the world’s second-largest wastewater capacity and the fifth-largest GHG emissions from wastewater treatment. Sludge management accounts for a large share of operation cost, energy consumption, and environmental emission in wastewater treatment, and become a challenge for urban sustainability. There is thus an increasing need to explore the future trends of sludge generation and its potential GHG emissions. While China’s sludge treatment has attracted extensive attention, few studies have so far attempted to predict the future growth of sludge and associated GHG emissions in China.

To fill this gap, we combined the global framework of Shared Socioeconomic Pathways and China's characteristics to predict future sludge generation and associated GHG emissions at the provincial level. Due to the high level of regional diversity within China, incorporating regional-specific parameters will improve model accuracy and inform regional sludge planning. We used GeoDetector to explore sludge driving factors based on stratified spatial heterogeneity. A machine learning model was built to fit the nonlinear trends of sludge growth. Our findings show that as regional sludge generation and rates of increase vary, differentiated strategies can help reduce GHG emissions. Our work presents a new perspective on the sludge generation pattern in China, which will help to rationally plan sludge treatment capacity and provide a scientific basis for the construction of zero-waste cities.

The authors have read many papers on the subject of sludge management and carbon emissions projections and the research was inspired by previous papers in this journal. We believe this manuscript will be of particular interest to general readers of [Resources, Conservation and Recycling](http://www.sciencedirect.com/science/journal/09213449).

This manuscript has not been published and is not under consideration for publication elsewhere. The authors have read the manuscript and have approved this submission.

Yours faithfully

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