

Simulation study for influences of consumptions in major countries on air quality and human health in Asia through global supply chains

Satoru Chatani¹, Midori Kurogi², Yuta Fujii², Susumu Tohno², Keiichiro Kanemoto³, and Keisuke Nansai¹

¹National Institute for Environmental Studies, ²Kyoto University, ³Shinshu University

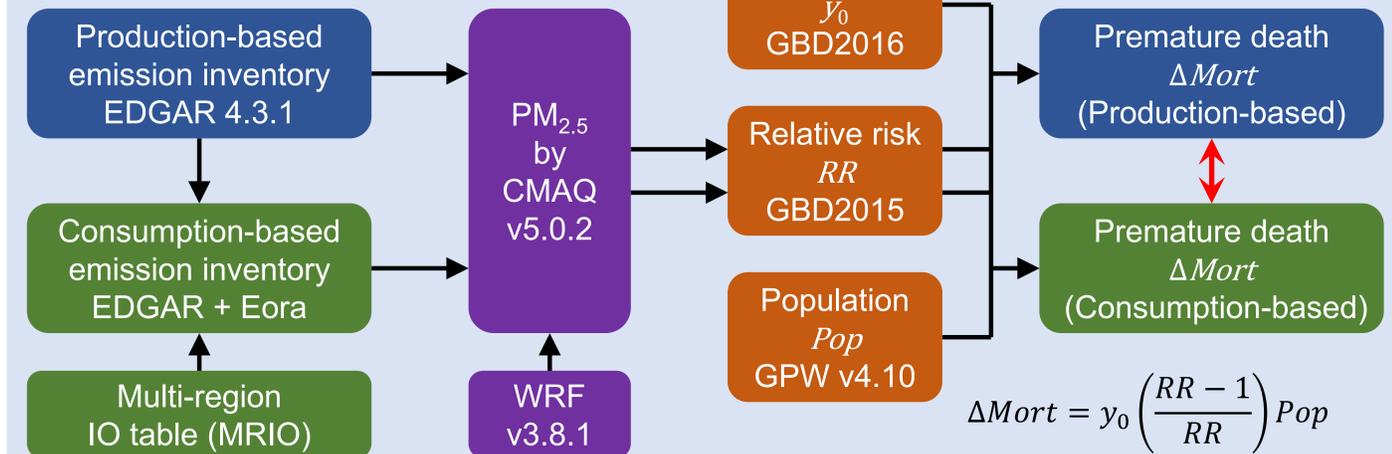


Introduction

- Economic activities induced by consumptions not only within one's own country but also in any other countries could cause ambient pollutant emissions through global supply chains.
- Developing countries in Asia, which are serving as the world's factories to export various products to countries in all over the world, are suffering from heavy air pollution partially attributed to consumptions in other countries.
- This study evaluated influences of consumptions in major countries on air quality and human health in Asia through global supply chains.

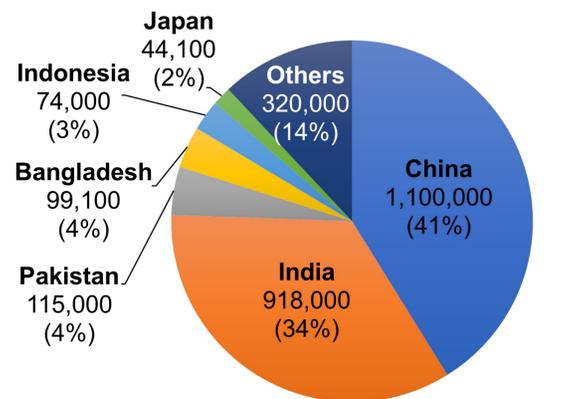


Methodology

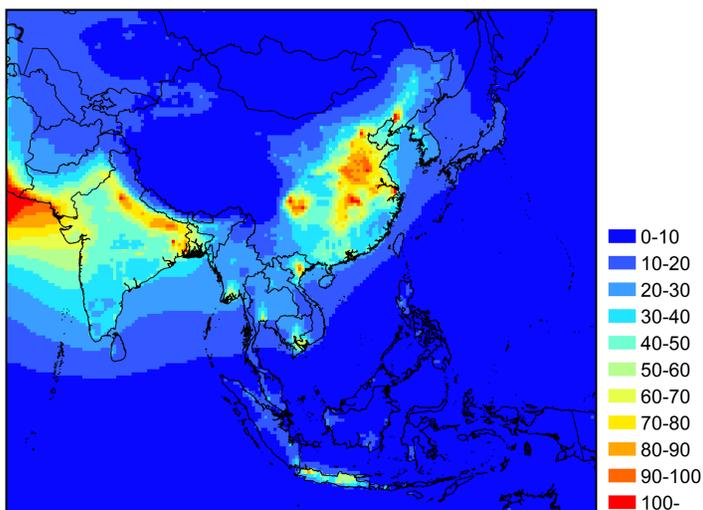


Results

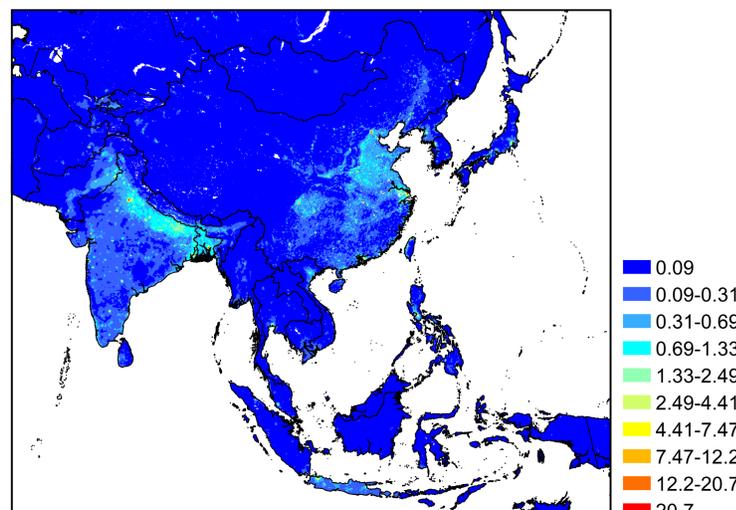
- High annual PM_{2.5} concentrations were simulated by CMAQ around urban areas in China, India, and Indonesia for year 2010.
- Premature deaths caused by PM_{2.5} were estimated to be 2,670,000 within the target domain. Those in China and India were dominant.



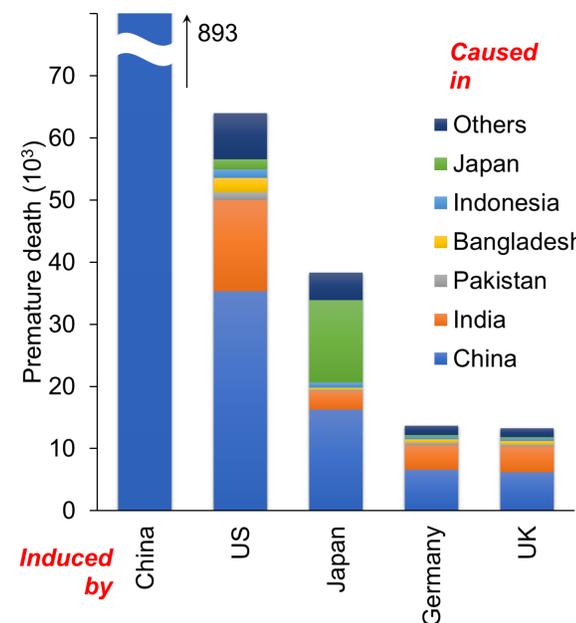
Fractions of premature death caused by PM_{2.5} in Asia



Annual PM_{2.5} (µg/m³)



Premature death (/km²)

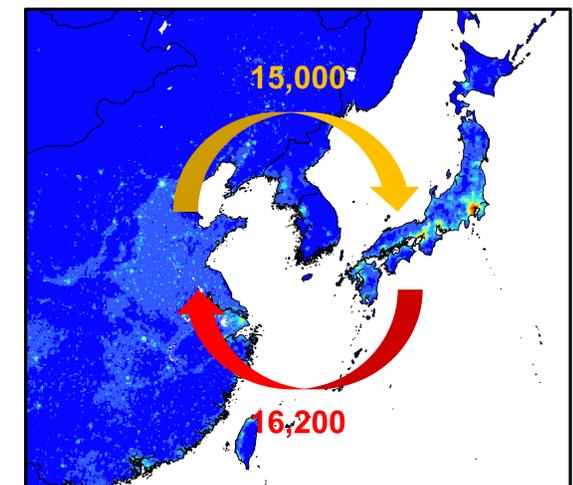


Premature death induced by major countries and caused in Asia

Implications

- It is important to understand multilateral relationships induced through global supply chains for sustainable development in Asia to be realized by all the responsible countries concerned.

- Consumptions in major countries not only within Asia but also out of Asia could induce premature death caused by PM_{2.5} through global supply chains.
- US would induce the highest premature deaths in Asia, and particularly in China and India, among countries out of Asia.
- Japan would induce comparable premature deaths in China through global supply chains with those in Japan caused by China mainly due to transboundary transport of pollutants.



Premature death induced by consumptions in Japan

Acknowledgement

This work was supported by JSPS KAKENHI Grant Number JP16H01797.