

## 5.028 Shipping emissions in international trade between China and America.

Early Career Scientist

Presenting Author:

**Zhihang Meng**, State Key Joint Laboratory of ESPC, School of Environment, Tsinghua University, Beijing 100084, China, [mzh16@mails.tsinghua.edu.cn](mailto:mzh16@mails.tsinghua.edu.cn)

Co-Authors:

**Zhaofeng Lv**, State Key Joint Laboratory of ESPC, School of Environment, Tsinghua University, Beijing 100084, China

**Xinxin Jin**, State Key Joint Laboratory of ESPC, School of Environment, Tsinghua University, Beijing 100084, China

**Huan Liu**, State Key Joint Laboratory of ESPC, School of Environment, Tsinghua University, Beijing 100084, China

Abstract:

China and America are major trading nations with top 3 total volume of trade in the world. In 2016, Canada, Mexico and China are the three biggest trade partner of America and only China has no land connection with America, Which means most of cargo will be transported by vessels, resulting severe shipping emissions.

To estimate the shipping emissions in trade between China and America, a ship routes identification model was established based on Automatic Identification System (AIS) data in 2016.

We identified 1318 vessels with 2451 vessel calls in the export from China to America, and 1214 vessels with 2078 vessel calls in the import from America to China in 2016. The total deadweight ton (DWT) from China to America were 185 and 154 million tons from America to China. The total tonnage of cargo trading between China and America were used to verify the identification results, which was about 67% of the DWT of identified vessels.

The emissions of the identified vessels were calculated. The vessel emissions of PM, NO<sub>x</sub>, SO<sub>x</sub> and CO<sub>2</sub> were 23.9, 268.6, 188.3, 13791.8 kt in the export from China to America and 17.0, 183.9, 133.8, 9298.1 kt in the import from America to China in 2016. In both import and export from China to America, about 80% of the vessel emissions were from container ships and about 15% were from bulk carriers.

A link of trade cargos and vessel fleets was established and the trade cargos were distributed into 22 sections based on Harmonized Commodity Description and Coding System code (HS-code). In the export to America, Electrical machinery and equipment and parts contributed the most emissions which was 25%, in the import from America, Vegetable products contributed the most emissions which was 47.49%.