Embodied Carbon Emissions of Aluminum-Containing Commodities in International Trade: China's Perspective

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Abstract

In recent years, global climate change has become an increasingly serious problem. Developing countries have assumed excessive responsibilities for carbon emissions under the principle of producer responsibility. A system that considers material flows to establish the responsibility for carbon emissions more accurately and fairly was proposed. In this study, the embodied carbon emissions (ECEs) of aluminum-containing commodities (ACC) in China's international trade from 2008 to 2017 were analyzed via material flow analysis. The carbon emission coefficients of China's imported and exported ACC were calculated and discussed. The main conclusions were as follows: (1)The annual imported and exported aluminum in ACC showed a fluctuating growth from 2008 to 2017. Overall, China imported a large amount of alumina and exports a large amount of aluminum-containing end products (ACEP) and semi-products (SP). (2) The imported and exported ECEs of ACC were mainly due to ACEP, which account for 57% and 68% of the imported and exported ECEs of ACC, respectively. (3) The ECEs of ACEP in international trade were mainly associated with vehicles, manufacturing equipment, and aircraft. (4) The share of exported and net exported ACC's ECEs in domestic carbon emissions (calculated using the principle of producer responsibility) also increased from 1.3 and 0.9% to 2.8 and 1.7%. In addition, a more accurate share of international carbon emission responsibility was discussed, and policy recommendations to reduce carbon emissions and actively respond to global climate change were provided.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the latest manuscript can be downloaded and accessed as a PDF.

Figures

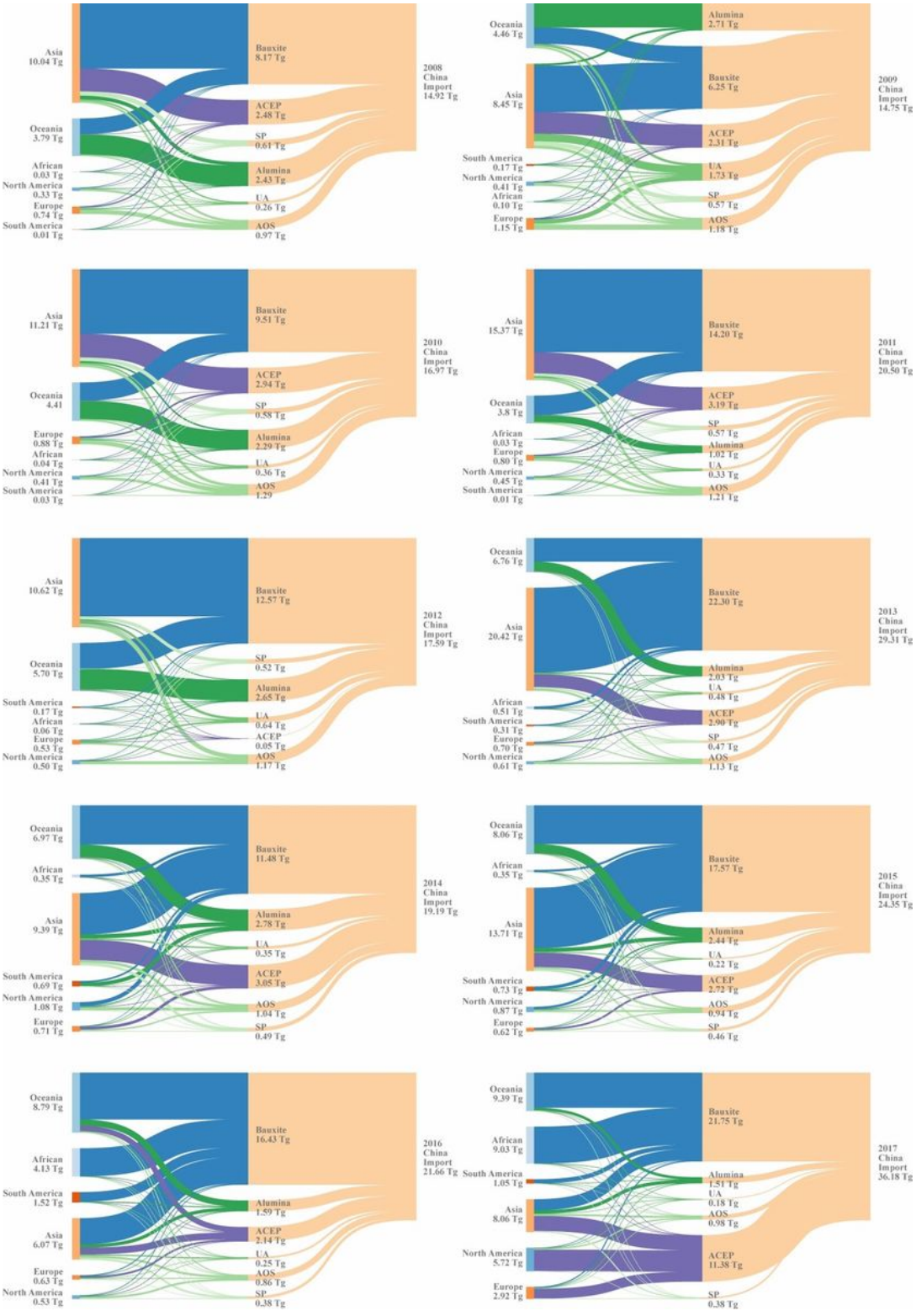

Figure 1

Aluminum material flows of China's imports from 2008 to 2017.

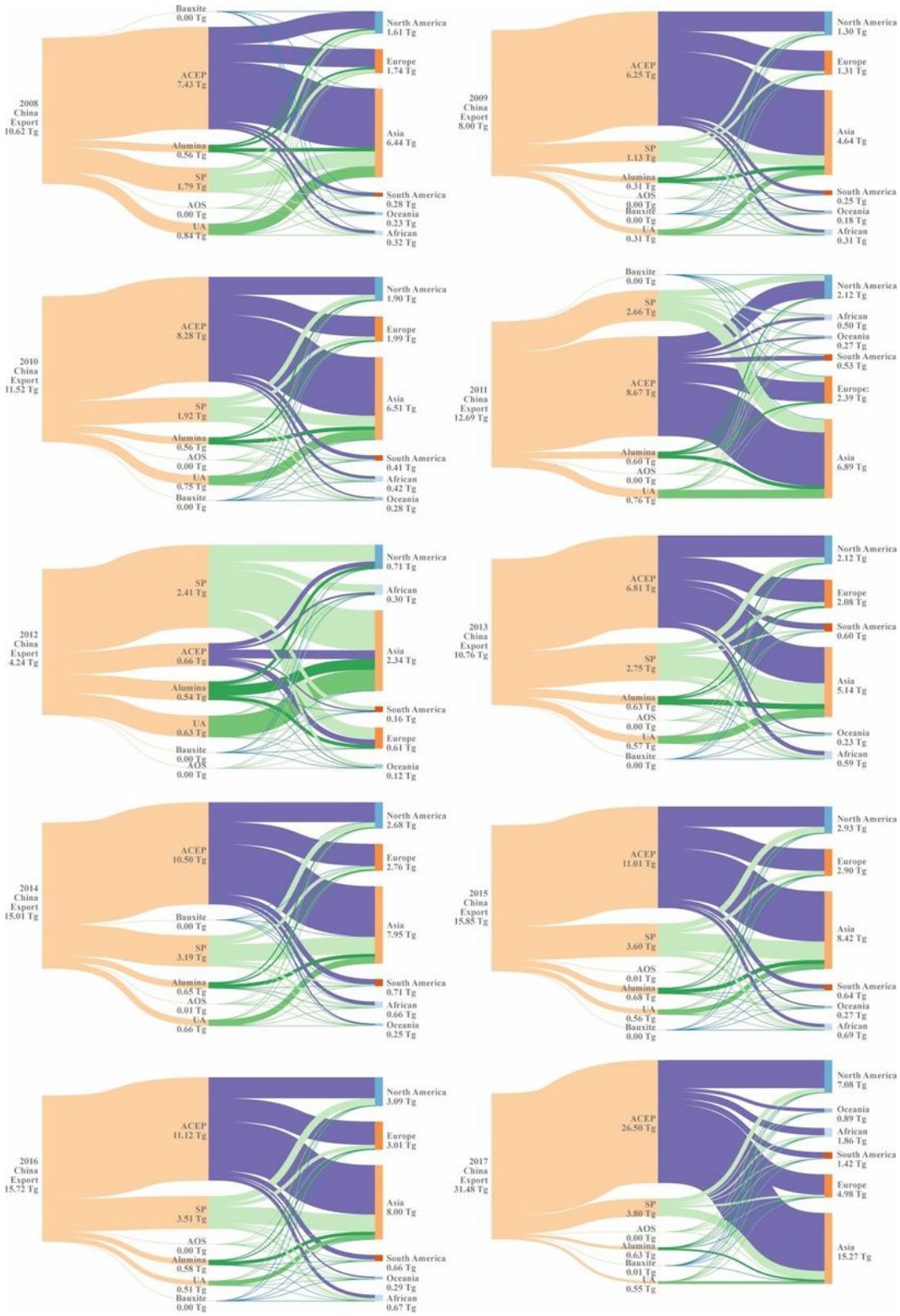

Figure 2

Aluminum material flows of China's exports from 2008 to 2017.

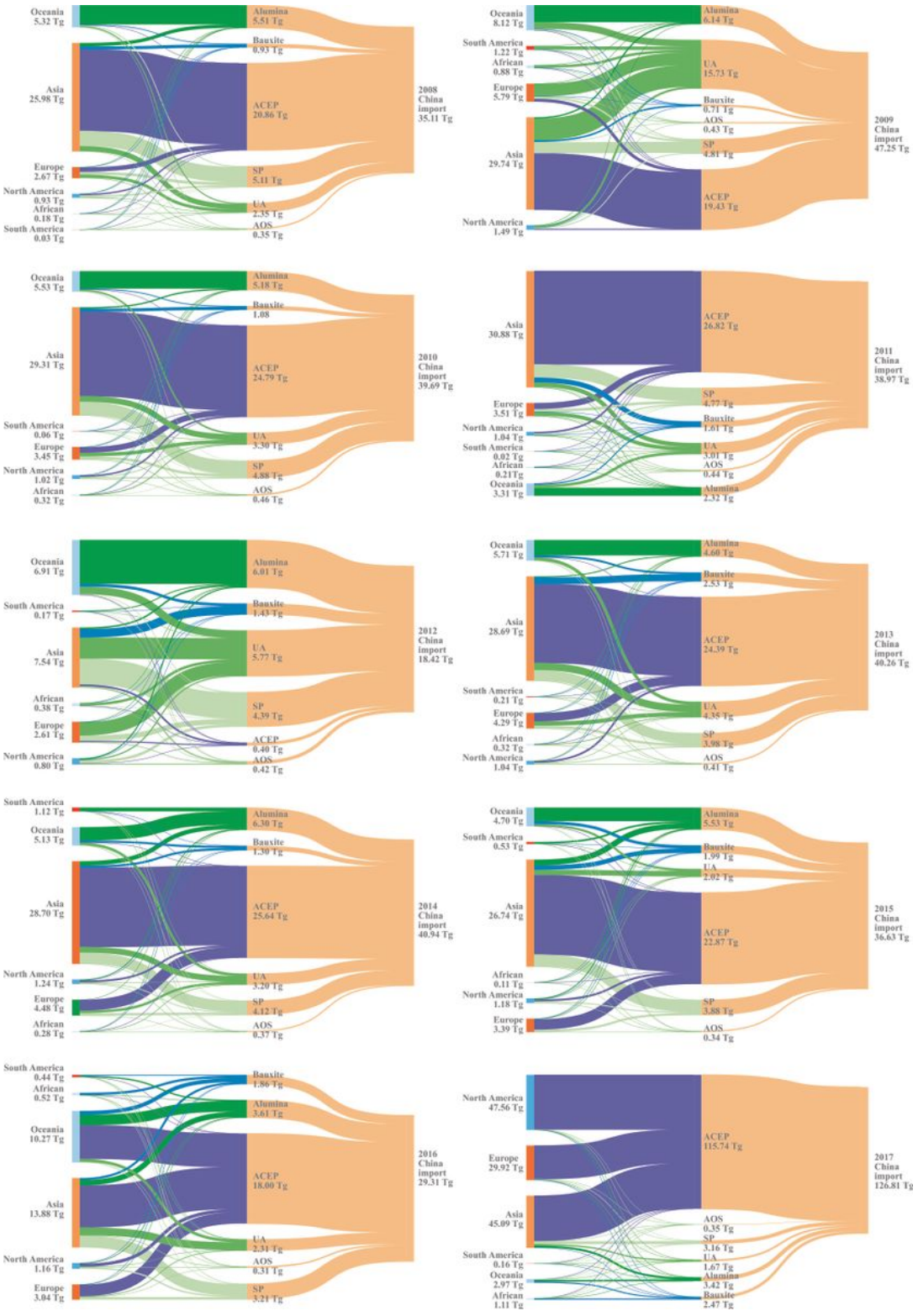

Figure 3

Embodied carbon emissions of aluminum-containing commodities imported to China in 2008–2017.

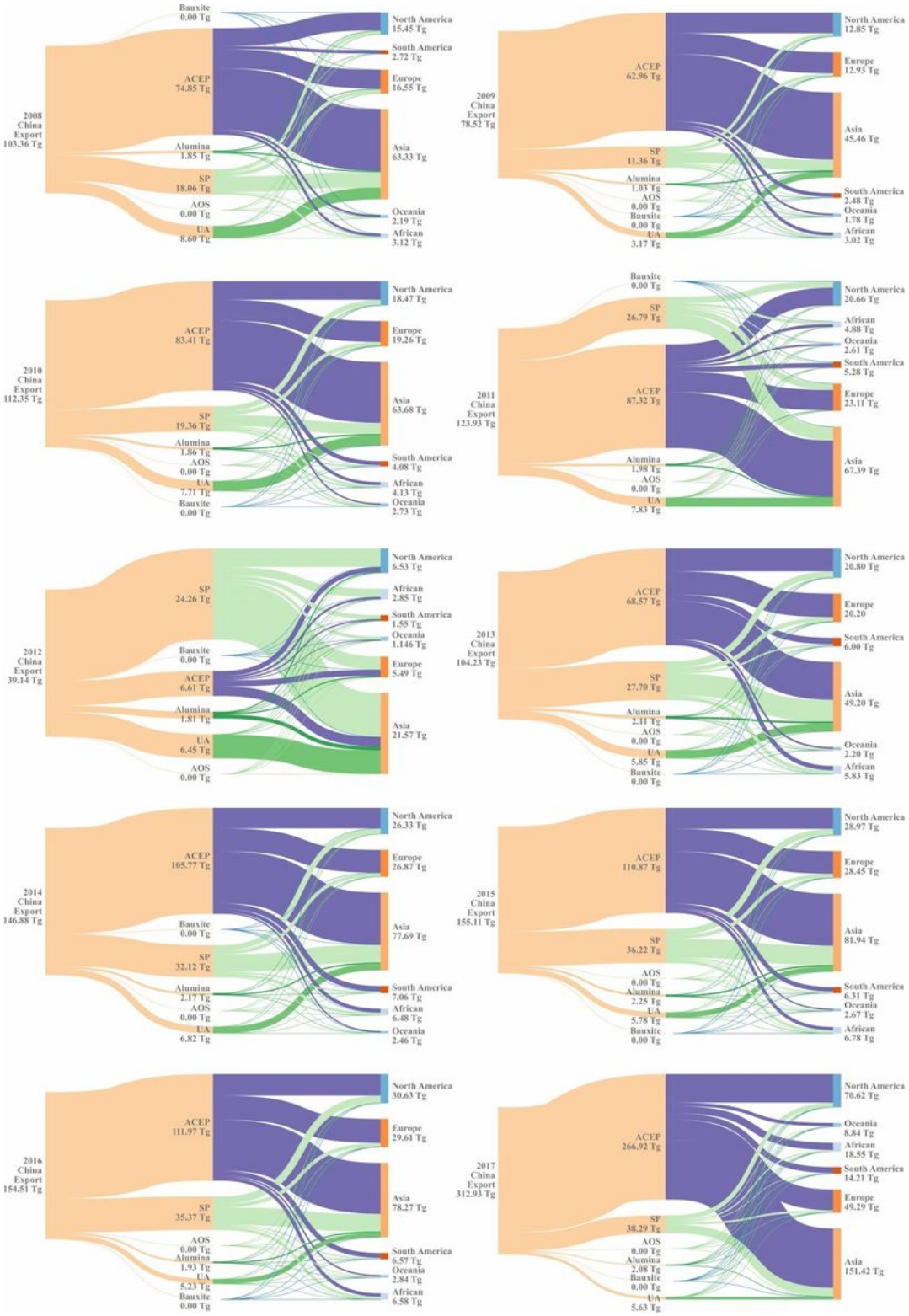

Figure 4

Embodied carbon emissions of aluminum-containing commodities exported from China in 2008–2017.

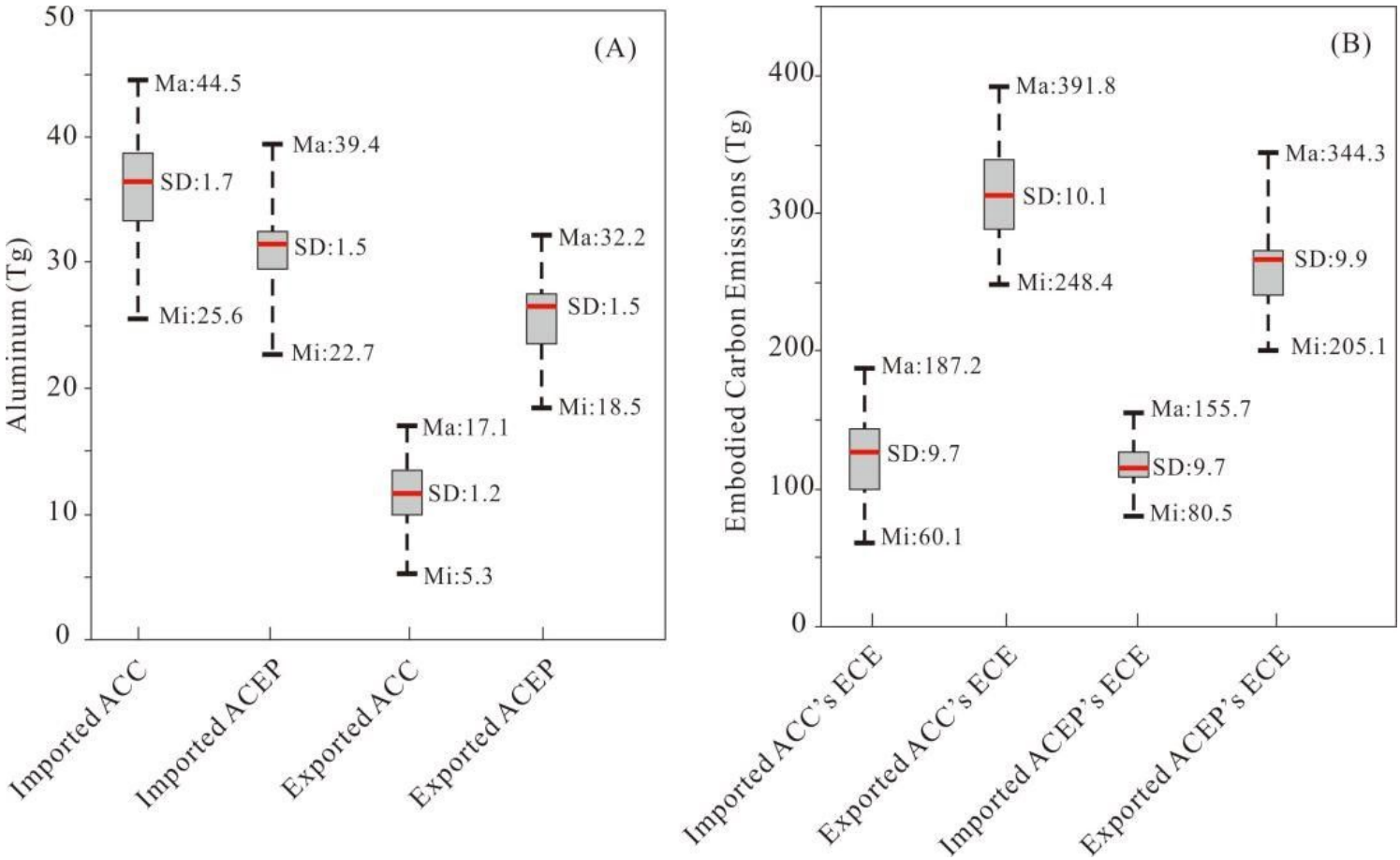

Figure 5

Uncertainty of China's aluminum material flows in 2017. Upper, lower, and middle lines of the boxes are the third quartile, first quartile, and median of the data, respectively. Ma: maximum value; SD: standard deviation; Mi: minimum value.

Supplementary Files

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