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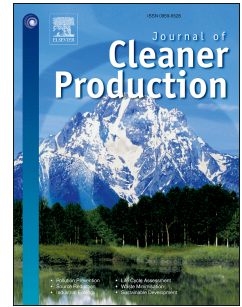
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A comparative study on decoupling relationship and influence factors between China's regional economic development and industrial energy-related carbon emissions

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Abstract: To study the relationship between China's regional economic development and industrial carbon emission, reveal the major influencing factors and mechanism of carbon emission change in all regions, and provide theoretical evidence for governments to formulate emission reduction strategies and policies, big data analysis and the Tapio extended model were adopted to quantitatively analyse the decoupling relationship between carbon emission and economic growth in eight major regions of China between 1996 and 2012. Logarithmic mean Divisia index (LMDI) was also applied to decompose the main factors affecting carbon emission change in all regions. The results show that (1) the proportions of industrial energy related to carbon emissions in central China and the Beijing-Tianjin region decreased year by year while the opposite was the case in coastal areas of northern China. Furthermore, the proportions in other regions basically remained unchanged; (2) a weak decoupling relation between industry energy carbon emission and economic growth was found in most regions except in northwest China during the period 1996–2000, southwest China, south and north coastal regions during the period 2001–2005, Beijing and Tianjin during the period 2010–2012. Energy consumption decoupling factors exerted a consistent positive effect on industry energy carbon emission decoupling, with decoupling impact greater than emission factors; (3) the overall level of carbon emission reduction technology in China was low and backwards, and limited contributions have been made to economic growth and industry energy carbon emission decoupling. Development emphases of decoupling should be put on energy-saving technology promotion, industry structure upgrading and energy structure improvement in the future; (4) economic intensity effect has exerted the most powerful positive influence on carbon emissions, except in developed areas, and the positive effect was weaker than that in other regions.

Keywords: industrial energy-related carbon emissions, region, decoupling analysis, LMDI method

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