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## Isotopic Evidence Unveils Fossil Fuels Contribution to Atmospheric Iodine

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Iodine is a crucial nutrient for public health, and its presence in the terrestrial atmosphere is a key factor in determining the prevalence of iodine deficiency disorders. While oceanic iodine emissions decrease at lower sea surface temperature, the primary contributors to atmospheric iodine can vary from oceanic sources in summer to other sources in winter. However, the specific sources and their respective contributions have remained unexplored. Fortunately, the atomic ratio of  $^{129}\text{I}$  to  $^{127}\text{I}$  significantly differs between nuclear activity and fossil fuels like coal and petroleum, which formed millions to billions of years ago. This distinction makes  $^{129}\text{I}$  a valuable tool for identifying iodine sources. In our study, we for the first time took this advantage of iodine isotopes to successfully identify the sources of atmospheric iodine and estimate their contributions based on the analyses of PM<sub>2.5</sub> samples collected in four Chinese metropolises. This research enhances our comprehension of the impact of human activities on iodine levels in the environment, and may add important information on addressing iodine deficiency-related health concerns and comprehending stratospheric ozone depletion.

### Student Submission

No

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