

# 國立中央大學大氣物理研究所書報討論

Date : 2023/10/20

Location : S1-713

Speaker : Chung-Yen Li

Advisor : Prof. Guey-Rong Sheu

## Meteorological Drivers of Atmospheric Mercury Seasonality in the Temperate Northern Hemisphere

### Abstract

Mercury (Hg) is a neurotoxic pollutant ubiquitously present in the environment, with gaseous elemental mercury (GEM), gaseous oxidized mercury (GOM), and particle-bound mercury (PBM). GEM has a long lifetime in the troposphere and can be transported globally through atmospheric circulation before being adsorbed by vegetation and soils through dry deposition or transformed into Hg<sup>II</sup> and removed by wet deposition.

Seasonality of atmospheric Hg concentrations has been observed, particularly in the temperate Northern Hemisphere, with higher summer concentrations than winter. High oxidant concentrations during warm months contribute to the transformation of Hg<sup>0</sup> to Hg<sup>II</sup> and subsequent removal via deposition. Conversely, anthropogenic emissions from coal combustion during cold months also contribute to elevated atmospheric Hg concentrations. Various factors, including vegetation uptake, chemical transformations, natural emissions, and anthropogenic emissions, influence atmospheric Hg seasonality. Meteorological conditions, such as rain, wind, solar radiation, surface wind, and temperature, also play a role in atmospheric Hg seasonality by affecting the removal of Hg through wet deposition and atmospheric transport. Simulation models can help map the spatial distribution of atmospheric Hg seasonality, providing insights into regions without Hg observations. The study quantified the contributions of various meteorological factors to the seasonality of atmospheric Hg concentrations at Northern Hemisphere monitoring sites.

### Keyword

Vegetation uptake

Wet/ dry deposition

### Reference

Xu, Z., L. Chen, Y. Zhang, G. Han, Q. Chen, Z. Chu, Y. Zhang, C. Li, Y. Yang, and X. Wang (2022), Meteorological Drivers of Atmospheric Mercury Seasonality in the Temperate Northern Hemisphere, *Geophysical Research Letters*, **49**(20).