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Overview of wet mercury deposition to Taiwan and the subtropical Northwest Pacific Ocean in 2009-2012

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Taiwan is located downwind to the East Asian continent, which is the largest mercury (Hg) emission source region globally. Model simulations suggested that Taiwan and the surrounding oceans could receive high Hg input via wet deposition. Therefore, a wet Hg deposition monitoring network, consisting of 11 sampling sites in Taiwan and a remote islet site (Pengjiayu) in subtropical Northwest Pacific Ocean, was established to collect weekly rainwater samples for Hg analysis since late 2008. In 2009-2012, the annual volume-weighted mean concentrations of rainwater Hg of all the sites ranged between 6.8-21.8 ng L⁻¹, with higher values usually occurring in urban/industrial areas and southwestern Taiwan. Annual wet Hg deposition fluxes ranged between 11.0 and 63.4 $\mu\text{g m}^{-2}$. Higher wet deposition fluxes were observed at northern Taiwan sites, mainly because of higher rainfall amounts. A positive correlation was observed between the annual rainfall and the annual wet deposition flux ($R^2=0.51$), indicating that wet Hg deposition flux increased with increasing rainfall. At the Pengjiayu site, the annual wet Hg deposition fluxes were 12.6, 19.3, 11.0, and 15.7 $\mu\text{g m}^{-2}$ for 2009, 2010, 2011, and 2012, respectively. These values were about 2.8 to 4.8 times the fluxes measured at sites on the Pacific coast of the USA, indicating higher wet Hg deposition to the western Pacific than to the eastern Pacific.

Biography

Guey-Rong Sheu has completed his PhD in 2001 from the University of Maryland at College Park. Currently he is an Associate Researcher at the Department of Atmospheric Sciences of National Central University in Taiwan. He has established and operated an atmospheric mercury speciation monitoring system at a high-elevation mountain site in Taiwan since April 2006. He has also established and operated a nation-wide wet Hg deposition monitoring network, consisting of 12 sampling sites, in Taiwan since late 2008.

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