

Biomass Burning and Fossil Fuel Emission Apportionment via Greenhouse Gas Enhancement Ratios Over Southeast Asia as Measured during ASIA-AQ

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Abstract

As Southeast Asian economies continue to grow, so will their contribution to global greenhouse gas (GHG) emissions, driven primarily by increases in fossil fuel combustion. Left unchecked, these emissions will negatively impact air quality and climate, therefore it is imperative that emission sources are properly identified and accounted for in emission inventories. Enhancement ratios of GHGs have been used to characterize regional emissions as either dominated by fossil fuel combustion or biomass burning. In particular, airborne assessment of short-term continuous emission ratios has proven useful to quantify relative contributions of fossil fuel and biomass burning to GHG emissions. The 2024 Airborne and Satellite Investigation of Asian Air Quality (ASIA-AQ) campaign, flying over the Philippines, Korea, Thailand, and Taiwan, sampled a variety of emissions including significant biomass burning, local urban pollution, and transport events. This work will explore the impact of GHG emissions on the distinctive pollution of the sampled locations. As airborne GHG measurements over Southeast Asia are scarce if not nonexistent, this work provides a crucial link between established ground-based measurements and state-of-the-art satellite observations such as those from South Korea's Geostationary Environment Monitoring Spectrometer (GEMS). Analysis of GHG enhancement ratios in East Asia will lead to more accurate emission inventories which can be used to implement more effective GHG control measures leading to improved air quality and minimizing the effect on climate.

Early Career Scientist

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