



Impacts of South East Biomass Burning on local air quality in South China Sea

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Biomass burning is a significant source of carbon monoxide and particulate matter, which is not only contribute to the local air pollution, but also regional air pollution. This study investigated the impacts of biomass burning emissions from Southeast Asia (SEA) as well as its contribution to the local air pollution in East and South China Sea, including Hong Kong and Taiwan. Three years (2012 - 2014) of the Hybrid Single Particle Lagrangian-Integrated Trajectory (HYSPLIT) with particles dispersion analyses using NCEP (Final) Operational Global Analysis data (FNL) data (2012 - 2014) were analyzed to track down all possible long-range transport from SEA with a sinking motion that worsened the surface air quality (tropospheric downwash from the free troposphere). The major sources of SEA biomass burning emissions were first identified using high fire emissions from the Global Fire Emission Database (GFED), followed by the HYSPLIT backward trajectory dispersion modeling analysis. The analyses were compared with the local observation data from Tai Mo Shan (1,000 msl) and Tap Mun (60 msl) in Hong Kong, as well as the data from Lulin mountain (2,600 msl) in Taiwan, to assess the possible impacts of SEA biomass burning on local air quality. The correlation between long-range transport events from the particles dispersion results and locally observed air quality data indicated that the background concentrations of ozone, PM_{2.5} and PM₁₀ at the surface stations were enhanced by 12 $\mu\text{g}/\text{m}^3$, 4 $\mu\text{g}/\text{m}^3$ and 7 $\mu\text{g}/\text{m}^3$, respectively, while the long-range transport contributed to enhancements of 4 $\mu\text{g}/\text{m}^3$, 4 $\mu\text{g}/\text{m}^3$ and 8 $\mu\text{g}/\text{m}^3$ for O₃, PM_{2.5} and PM₁₀, respectively at the lower free atmosphere.