

4.155 Collective climatology and temporal analysis of air quality from measurement, observation and simulation over the Greater Bangkok area, Thailand.

Early Career Scientist

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Abstract:

The problem of the intense, episodic aerosol events ('haze') has intensified in the last few years in Thailand, and has been a serious issue for northern Thailand for at least a decade. Very recently, in 2018, the Bangkok metropolis, which holds a population of 8.21 million, faced hazardous levels of PM_{2.5}, an exceedance of the WHO 24-hour standard, raising concerns for the impact of haze on human health.

Owing to extensive data Thailand has on air quality measurements which date back nearly ten years, this gives us the opportunity to look in some detail at the factors controlling air quality. Particularly, Bangkok is making increasing amounts of air quality data available to scientists for study. In this work, we present a climatology of air quality data for the Greater Bangkok area over this instrumented period. We will show an analysis of air quality and particulate loading over the Bangkok area using statistical tools and numerical weather simulation, with the aim of uncovering the cause of the prevalent haze. We use data from the most recent years, including sites which have recently begun operation, to determine the extent of the air quality event using MODIS fire hotspot counts, and examine the observed meteorological parameters and air quality data, such as the ozone, PM₁₀ and PM_{2.5}, to determine the overall temporal trend of the situation. We focus on the interannual variability of the haze events, and look at the comparison between interannual data, using back trajectory of analysis, and also statistically examine the correlation of meteorological parameters and the air quality. Finally, we use numerical weather simulation to simulate the atmospheric condition of the haze event.