Integrated Assessment of Air Quality Monitoring, Emission Inventory and Modelling in Thailand

Vanisa Surapipith[1], Naboon Riddhiraksa[2], Narisara Thongboonchoo[3]

[1] International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

[2] Pollution Control Department (PCD), Bangkok, Thailand; 3 King Mongkut Institute of Technology at Ladkrabang (KMITL), Bangkok, Thailand

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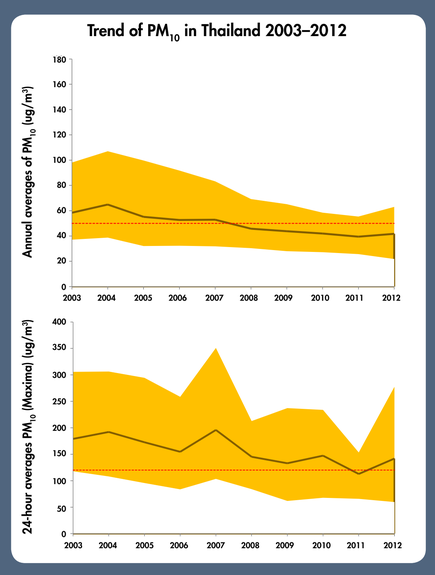
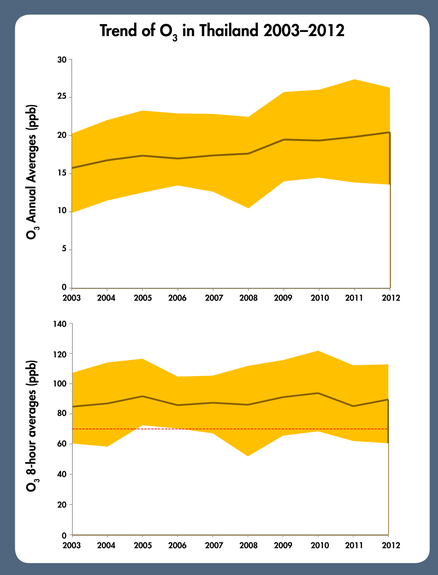
Ground-level ozone and fine particulates (PM_{10} – particulate matter with a diameter of 10 micrometers or less) have been monitored in Thailand by the Pollution Control Department (PCD) since 1997, following legislation in 1995 on the establishment of the National Ambient Air Quality Standards (NAAQS). Over the past 10 years, new fuel quality and improvements of vehicle standards have significantly changed the ozone and PM_{10} precursor situation that was assessed previously (PCD, 2012).

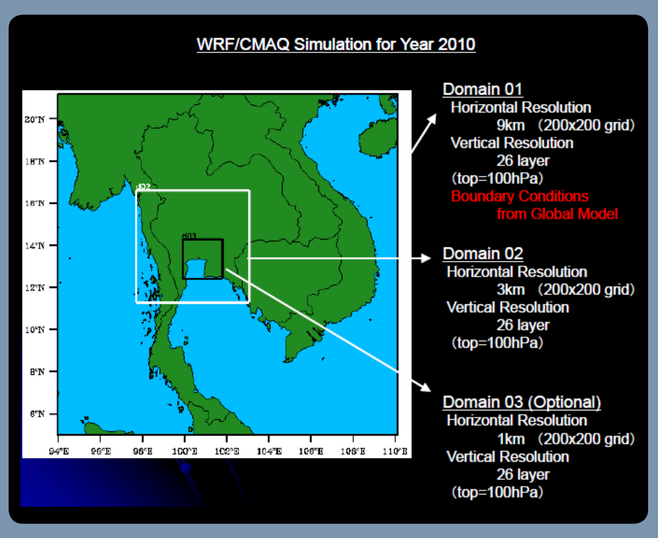
Ambient Air Monitoring 53 Stations for PM_{10} and O_3 (29 provinces)

Analysis of the monitoring data shows increasing trends of the ambient concentration and the number of incidents with exceeding NAAQS. It is, therefore, the priority to find the suitable control strategies and measures in the very near future. This research aims to evaluate the photochemical pollution over the Bangkok Metropolitan Area, where high concentrations of ground-level ozone and PM_{10} have been recorded.

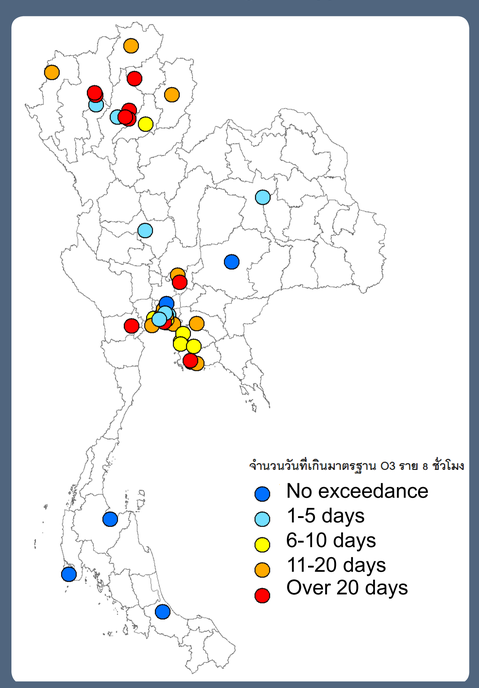




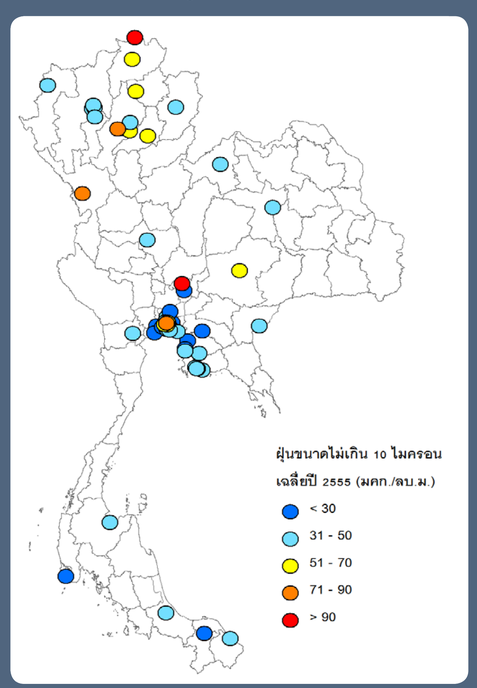
WRF/CMAQ (v.5.0.1) has been developed to primarily evaluate the photochemical pollution over the Bangkok Metropolitan Area, where concentrations of ground-level ozone in 2012 were found as high as 140 ppb, and PM_{10} as high as 239 microgram/m^3.



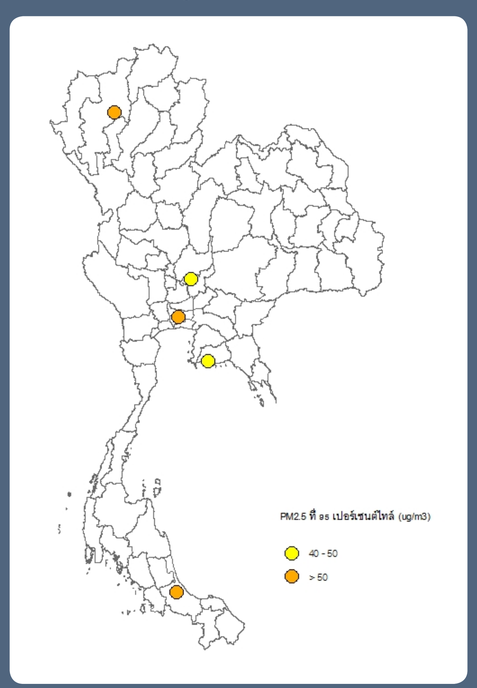
Status of O_3 Exceedances across Thailand in 2012 (8-hour average > 70 ppb)



Status of Thailand Annual Averages PM_{10} in 2012 (microgram/cubic meter)

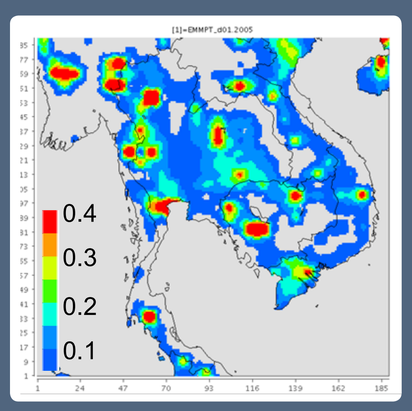


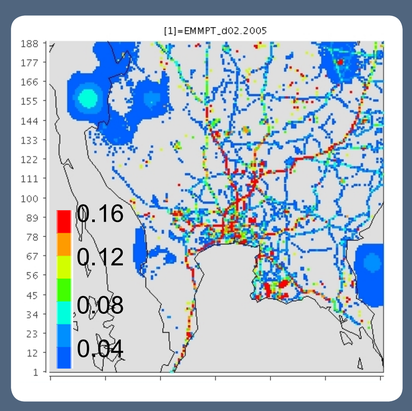
Status of Thailand $PM_{2.5}$ monitoring in 2012 (microgram/cubic meter)

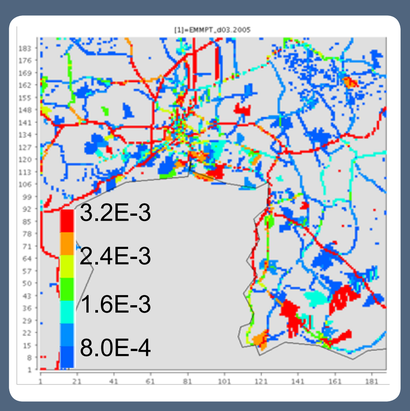


Model sensitivity on input parameters is being carried out with the newly developed Thailand Emission Inventory for the year 2010 in order to find the key controlling factors of the ozone and PM_{10} formation in different seasons. This becomes the crucial tool for making air quality forecasts as well as testing control measures that can take into account the future changes in various aspects, e.g., energy policy, fuel usage, economic, social, and climate changes.

Model ready emission data in CMAQ simulation (anthropogenic + biogenic + biomass-burning)







Acknowledgement

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References

Pollution Control Department (PCD), Report on Status and Trend of Pollution in Thailand (2012).