

Extended air pollution index (API) as tool of sustainable indicator in the air quality assessment: El-Nino events with climate change driven

ABSTRACT

The main purpose of this research is to detect the air quality changes with a shorter period of timescale over space that can improve and optimize the risk characterization and conjunctive air quality assessment. Air quality assessment could be based on a very large number of various indicators, including the physical parameter, chemical and biological namely sulphur dioxide (SO₂), carbon monoxide (CO), particulate matter (PM), humidity, air pressure and temperature. Nevertheless, often it is not easy to interpret the results of the air quality status when numerous quality elements are analyzed since each parameter indicates different types of quality classes. Moreover, providing appropriate information on air quality to policymakers, including the public, can be challenging. Hence, with this research there is a need to interpret the results in a more simple way and realistic enough by producing one single number for better and more subjective classification on the air quality rather than using the concentrations-based. Therefore, the Air Pollution Index (API) application in this research will overcome this problem by providing a single score that characterizes the air quality and contamination in a more absolute way. In line with that also, the study could help to improve the existing methodology for air quality assessment in a more simplified way and better evaluation of the air quality status, thus can become an alternative way for analysis of changes in air quality, especially in the absence or limitations of the historical or baseline data for comparison, in response for a better and more sustainable indicator in air quality assessment and management. The research shows that the API values across the Regions were recorded largely higher when El-Nino events occurred during the southwest monsoon season with more than 50% frequency of unhealthy days to hazardous status were detected from the API assessment. HYSPLIT model also shows that the air mass has mostly passed through the biomass burning areas from the neighboring country. Hence, the extension application of API was established in this research with the purpose of strengthening the air quality management in Malaysia, and to maximize the usage of the API and at the same time to filling up the gap of the uncertainty on the overall air quality in Malaysia, especially in terms of combine effects of the air pollutants parameters.