

UPWARD TRENDS IN PHOTOCHEMICAL OXIDANTS AND CLIMATE CHANGE IN SUMMER IN THE GREATER TOKYO REGION

H. Yoshikado¹, T. Tsubaki²

¹*Center for Chemical Risk Management, AIST, Tsukuba, Japan*

²*Japan Weather Association, Tokyo, Japan*

In the greater Tokyo region, photochemical oxidant Ox (which can be considered to be basically equivalent to ozone) concentrations have shown clear upward trends during the recent decade. The most striking observation is the frequent occurrences of afternoon peaks above the warning level in summer. Several reasons for these trends have been discussed, but none of them seems sufficient to explain the phenomena at the present time. The results of our study appear to implicate climate change, either local or global, as one possible cause for the observed increase in the occurrence of high Ox concentration values in summer. Decadal changes in the Ox concentration during summer were obtained by comparing June-August Ox concentration values observed during 1989-1991 with those obtained during 1999-2001. High Ox days, defined as days on which the daily maximum concentration exceeded 120 ppb and lasted at least two hours over an area, increased especially in the areas several tens of km inland from central Tokyo, typically from 23 to 50 days. The high Ox days for the entire greater Tokyo region tended to coincide with sea breeze days or those with sea breeze-like wind variation under small insolation (78% and 82% of the cases during the 1989-1991 and 1999-2001 periods, respectively). Furthermore, the sea breeze and sea breeze-like days increased from 105 (during 1989-1999) to 133 (during 1999-2001). The study results indicate that changes in the meteorological condition over the greater Tokyo region are a contributing cause for the observed increase in high Ox days.