

ABSTRACT

Greater Bandung has one of the main sources of local air pollution, i.e. the traffic. Based on previous studies, organic carbon (OC), primary OC, and char-elemental carbon (char-EC) concentrations are higher than EC, secondary OC, and soot-EC respectively. A high concentration of OC is caused by diesel engines and primary OC is directly emitted by factory fumes, motor vehicles, and road dust. Meanwhile, char-EC comes from incomplete combustion on motorized vehicles. This study aims to monitor and analyze the horizontal distribution of polluted air in Dayeuhkolot, Greater Bandung air basin. We measured gas (CO_2 and NO_2) and particulate ($PM_{2.5}$) concentrations using a bicycle on three-types of trails that is (1) green lanes, (2) less traffic, and (3) roads. These paths have unique characteristics according to the estimation of pollutant sources and environmental factors such as trees. Developed instruments using low-cost sensors (CO_2 , NO_2 , and $PM_{2.5}$), is equipped by the temperature (T) and humidity (RH) sensor and data logger. We conducted field observation in 15 times during February to March 2019. Each observation was carried out ~2 hours with an average speed of the bicycle ~10 km hour⁻¹. The results show that measurements are affected by transportation, residential waste-burning, market activities, and rain. Motor vehicles can increase the concentration of $PM_{2.5}$ and NO_2 up to $110 \mu g m^{-3}$ and ~0.15 ppm in ~10 minutes. A sudden increase (~4 minutes) of $PM_{2.5}$ concentrations (peak of ~ $163 \mu g m^{-3}$) from ambient level ($77-86 \mu g m^{-3}$) is coming from waste combustion. Meanwhile, routine activities on the morning market can increase CO_2 and NO_2 to ~931 ppm and ~0.13 ppm (~8 minutes). Rainwater that usually occurs in the afternoon can reduce gas and $PM_{2.5}$ concentrations. The scavenging rate of particulates (r) due to rain is ~30%.

Keywords: *air quality, bike-borne monitoring, CO_2 , NO_2 , $PM_{2.5}$.*