1.155 Air pollutants and GHGs monitoring project around Jakarta megacity.

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Abstract:

We have conducted air pollutants monitoring around Jakarta megacity in Indonesia, in addition to greenhouse gases (GHGs) monitoring, to estimate the amount of those anthropogenic emissions from the urban area.
In order to achieve this purpose, we developed a ground-based comprehensive monitoring system of air pollutants and GHGs and installed it at three sites around Jakarta: Bogor (center of Bogor city), Serpong (Jakarta suburb) in 2016, and Cibeureum (mountainous area, background-like site) in 2017.
The monitoring system consists of data acquisition/control units and the instruments for continuous measurements of CO_2, CH_4 (G2301, Picarro), CO (CO-30r, Los Gatos Research), NO_x (Model 42i-TL, Thermo), SO_2 (Model 43i-TLE, Thermo), O_3 (OA-787, Kimoto Electric), aerosol concentrations ($PM_{2.5}$, PM_{coarse}, black carbon (BC)) (ACSA-14, Kimoto Electric), and for flask sampling of air (Koshin-RS). The ACSA-14 also measures the chemical components of aerosols (NO_3^-, SO_4^{2-}, WSOC) automatically. We can monitor/control not only the monitoring instruments but also peripheral devices, such as vacuum pumps and valves, remotely through the Internet. We can also obtain all data in unified format even though we use the monitoring instruments produced by a number of different instrument manufacturers. In Indonesia, lightning frequency is relatively high, thus electric power failures sometimes occur. Hence the monitoring system has an automatic power control function.
We found that urban characteristics (i.e., high concentration) are shown in CO_2, CH_4, CO, NO, NO_2, SO_2, $PM_{2.5}$, PM_{coarse}, and BC observed at Bogor and Serpong, but background-like characteristics are shown at Cibeureum. For instance, the average value of BC observed at Bogor was 4 times larger than Cibeureum. We also found that the values of CO_2, CH_4, NO_2, SO_2, and O_3 observed in December and January were lower than the other months. We will present those temporal variability observed at three monitoring sites around Jakarta.