

New monitoring project of GHGs and air pollutants around Jakarta, Indonesia

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We have conducted a monitoring project of greenhouse gases (GHGs) and related air pollutants around Jakarta urban area (Jabodetabek) in Indonesia since 2015 to observe those anthropogenic emissions from the largest megacity in tropical Asia.

For this purpose, we developed a ground-based comprehensive monitoring system of GHGs and air pollutants which consists of instruments for continuous measurements of CO₂, CH₄ (G2301, Picarro), CO (CO-30r, Los Gatos Research), NO_x (Model 42i-TL, Thermo), SO₂ (Model 43i-TLE, Thermo), O₃ (OA-787, Kimoto Electric), aerosol concentrations (PM_{2.5}, PM_{coarse}, BC) and chemical components (ACSA-14, Kimoto Electric), and for flask sampling of air (Koshin-RS). This system allows us to monitor/control all instruments remotely as well as peripheral devices (e.g., pumps, valves). Also, it is important feature that the monitoring system can operate automatically for electric power failure because not only lightning activity is very high, but also electric power supply is sometimes unstable in Indonesia. After the operating test of the system at National Institute for Environmental Studies, we delivered and installed it at 3 sites in Indonesia: Bogor (centre of Bogor city) in March and May 2016, Serpong (Jakarta suburb) in August and September 2016, and Cibeureum (mountainous area, background-like site) in March and May 2017.

The concentrations of CO₂, CH₄, and CO observed at Bogor from June 2016 to March 2017 show urban characteristics with hourly average values ranging from 389 to 502 ppm for CO₂, from 1818 to 3067 ppb for CH₄, and from 88 to 3733 ppb for CO. While we need to obtain more data set for a long time to understand seasonal and annual variability, we found that those concentrations exhibit low values during December 2016–January 2017 compared with the other months.

We will report the temporal variability of the GHGs concentration observed at the 3 monitoring sites in Indonesia.