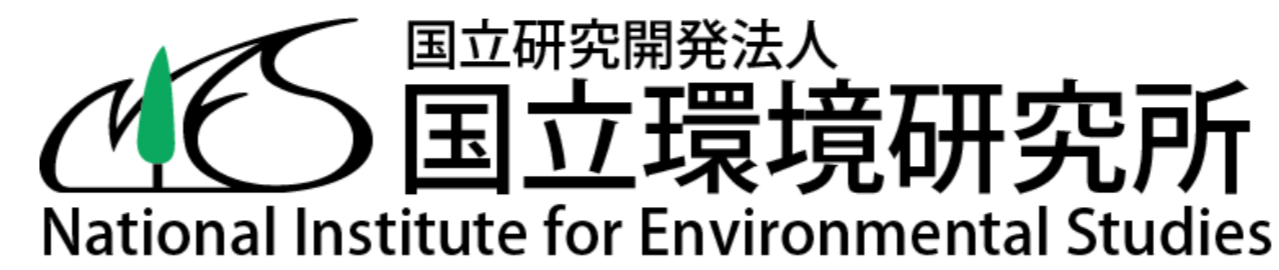


NIES's contribution to greenhouse gas monitoring in Asia

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Here we introduce our atmospheric monitoring network of greenhouse gases (GHGs) in Asia, in collaboration with meteorological agencies, research institutes, and universities in various countries. Air samplings have been performed at Guiyang (GUI) in China since 2004 with Institute of Geochemistry, Chinese Academy of Sciences (CAS), at Nainital (NTL) in India since 2006 with Aryabhata Research Institute of Observational Sciences (ARIES), at Danum Valley GAW station (DMV) in Malaysia since 2010 with Malaysian Meteorological Department (MMD), at Mauna Loa Observatory (MLO) in Hawaii since 2010 with National Oceanic and Atmospheric Administration (NOAA), and at Comilla (CLA) in Bangladesh since 2012 with Dhaka University. Air samples collected by local counterparts were analysed for GHGs concentrations and carbon isotopes by NIES. To estimate the amount of anthropogenic emissions from megacity: Tokyo and Jakarta (Jabodetabek), we started comprehensive atmospheric monitoring of GHGs at Tokyo and GHGs and air pollutants at Bogor in March 2016 with Bogor Agricultural University (IPB), Serpong in August 2016 with Agency for the Assessment and Application of Technology (BPPT), and Cibereum in March 2017 with Meteorological, Climatological, and Geophysical Agency (BMKG). We also started air samplings for GHGs monitoring at two GAW stations in Indonesia operated by BMKG: Palu in Sulawesi and Sorong in West Papua.

Japan

Hateruma Island (HAT) (1992-)

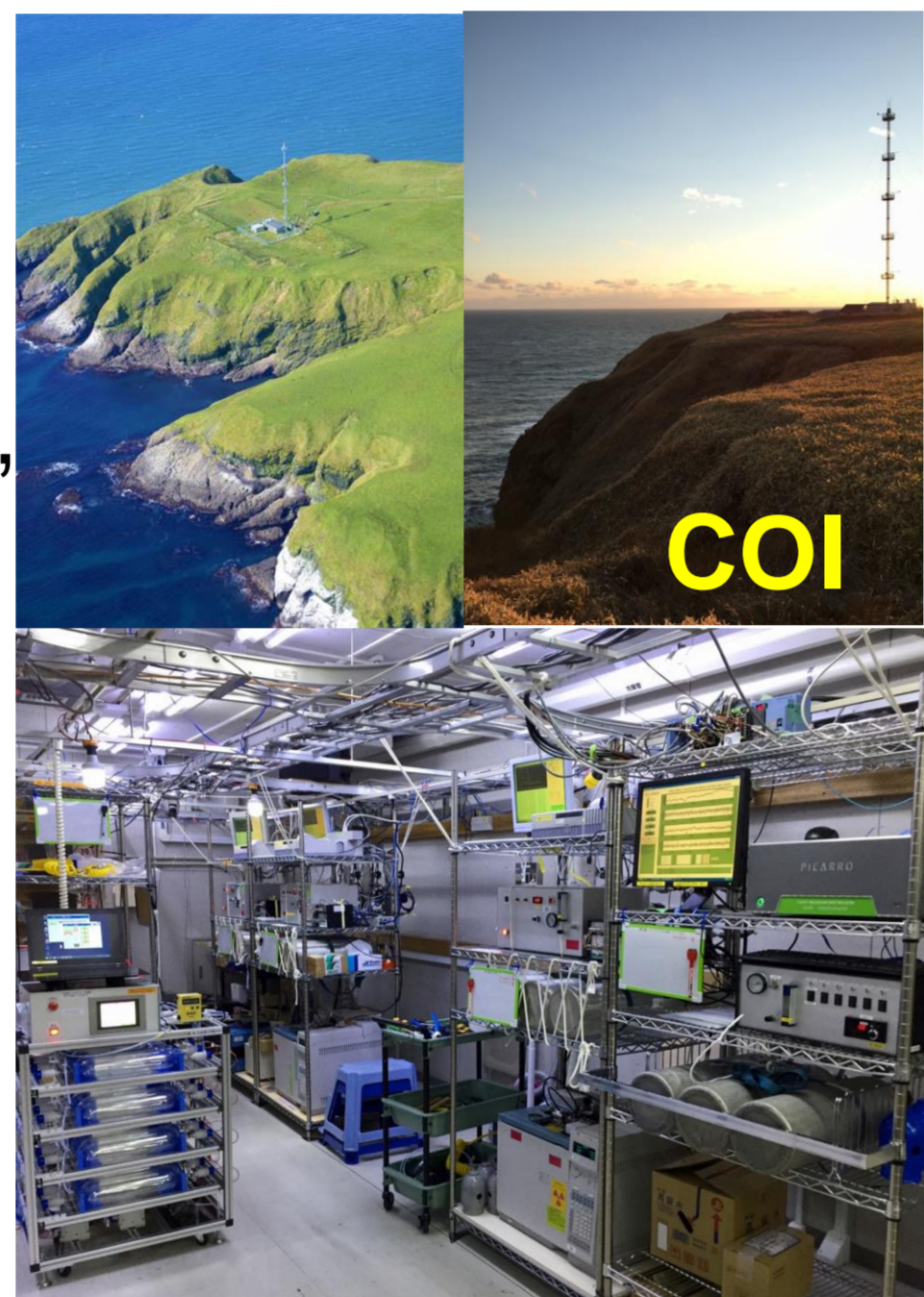
Cape Ochiishi (COI) (1994-)

CO₂, CH₄, N₂O, SF₆, CO, H₂, O₃, NO_x, SO₂, PM₁₀, PM_{2.5}, BC, Rn, O₂, halocarbon, flask (every 4-days for O₂ and ¹³C, monthly for ¹⁴C, event sampling)

Mt. Fuji (FUJ) (3776m a.s.l.) BG w/NPO

CO₂ (Li-840) (2009-)

flask (monthly; CO₂, CH₄, N₂O, SF₆, CO, H₂, O₂, ¹³C & ¹⁴C) (2017-)



Megacity

Tokyo (5 sites)

TST, YYG, NIES, NDA: CO₂, CH₄, CO (CRDS)

TMU: CO₂ (Li-840); TST, NIES (, YYG): O₂

TST, YYG: flask (CO₂, CH₄, N₂O, SF₆, CO, ¹³C & ¹⁴C)

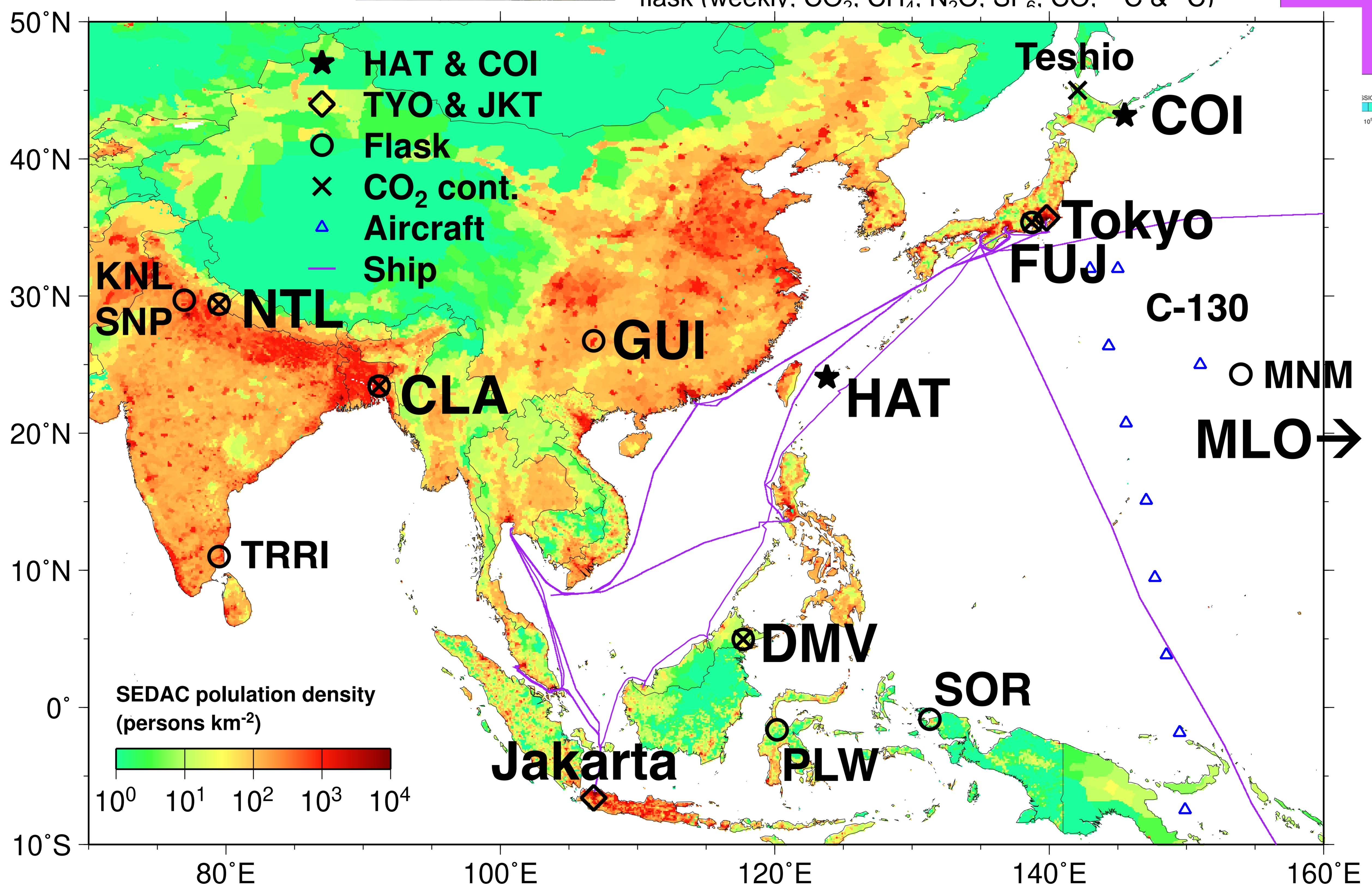
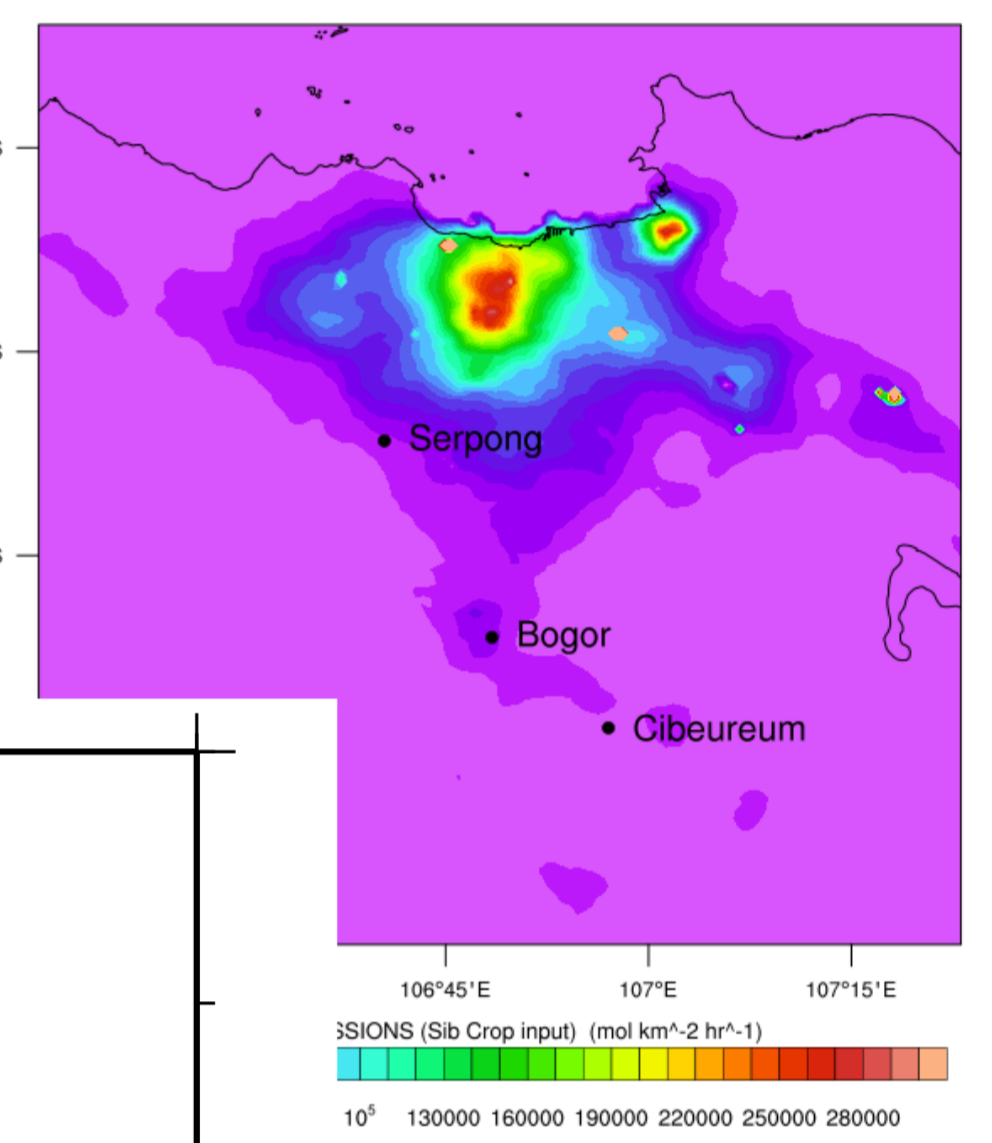
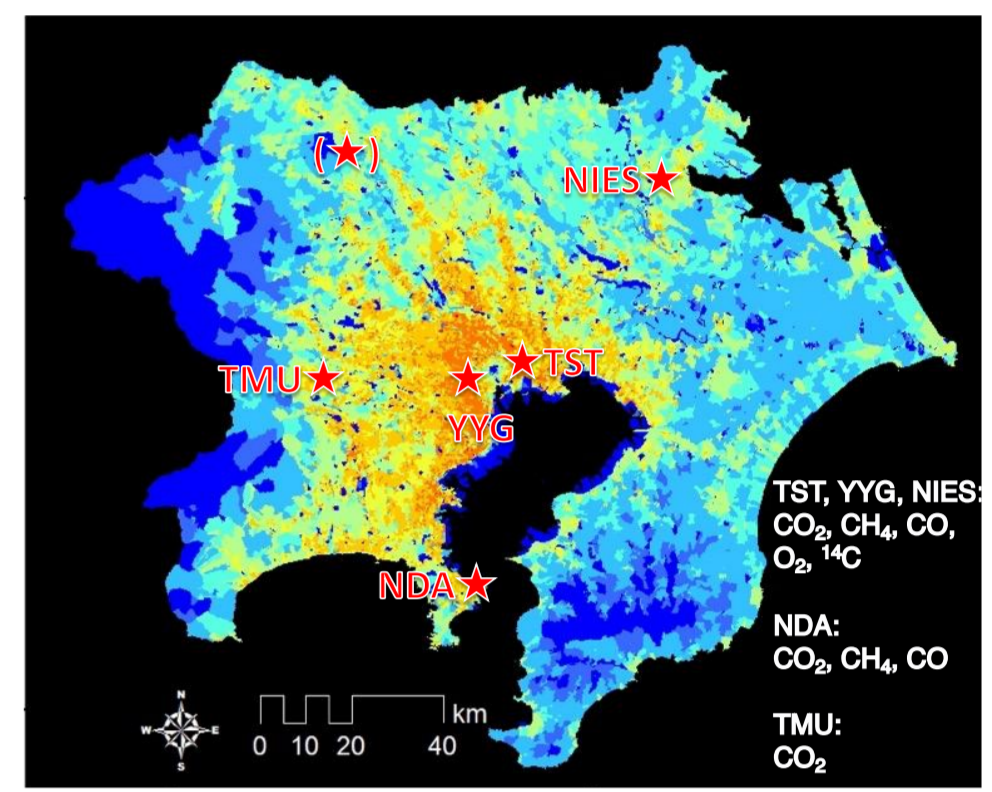
Jakarta (Jabodetabek): GHG and air pollution

• Bogor w/IPB (2016-)

• Serpong w/BPPT (2016-)

• Cibereum w/BMKG (2017-)

CO₂, CH₄, CO (CRDS) O₃, NO_x, SO₂, ACSA (PM_{2.5}, PM_{coarse}, BC, chemical component), flask (weekly: CO₂, CH₄, N₂O, SF₆, CO, ¹³C & ¹⁴C)



Flask+ network

Guiyang (GUI) w/CAS, CMA (2004-)

Nainital (NTL) w/ARIES (2006-)

Danum Valley (DMV) w/MMD (2010-)

Comilla (CLA) w/Dhaka U. (2012-)

Mauna Loa (MLO) w/NOAA (2010-)

flask (weekly; CO₂, CH₄, N₂O, SF₆, CO, H₂, O₂, ¹³CO₂) (¹³C-CH₄ at CLA&NTL)

CO₂ (Li-840) (NTL 2011-, DMV 2015-, CLA 2016-)



Indonesia BMKG GAW station

Palu, Sulawesi (PLW) (2018-)

Sorong, West Papua (SOR) (2018-)

flask (CO₂, CH₄, N₂O, SF₆, CO, ¹³C & ¹⁴C) weekly at Sorong, biweekly at Palu

