
Unraveling the philosophy behind greenhouse gases emissions variability in India

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Abstract

India is one of the largest and fastest-growing economies in South Asia and experiencing a huge energy demand raised from industrial sectors. Industries, the transport sector, power generation, unorganized waste management, and agricultural practices, etc. are hot spots for greenhouse gases (GHG) emissions in India. Some of these emissions are compensated by the terrestrial biosphere. Quantifying the carbon balance between the emissions of industry and transport and the ecosystem uptake in India is an important step towards designing effective greenhouse gas mitigation strategies in this subcontinent. The only land station in India (Cape Rama, Goa) which observed GHG for more than a decade discontinued in 2012. To fill the gap, IITM Pune has initiated various GHG monitoring projects at various locations in India. We have started the first surface monitoring in India at Sinhagad (SNG) Pune. Since Nov. 2009, we have collected glass flask samples on a weekly interval and analyzed them at the GC lab at IITM Pune. We used WMO standards to calibrate all these observations. A fleet of in-situ instruments for the monitoring of GHG concentration and its isotopes on a high temporal scale was inducted into this program. Airplane campaigns were conducted to understand the vertical structure of GHG transport signals at various places in India. GHG flux monitoring network (METflux) was set up at different ecosystems in India. A tall tower is being utilized for GHG monitoring in central India. GHG inverse/forward modeling activity is initiated at the IITM Pune. Model and observations will be utilized to estimate GHG sources and sinks in India. In this study, we will present results obtained from observation and model and will discuss GHG variability in India.

Keywords: greenhouse gases, observations, model simulations, emissions and variability

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