Atmospheric CO2 and Other GHG Study Over India: Climate Change Perspective

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Among the greenhouse gases of anthropogenic origin, the increase of atmospheric carbon dioxide (CO2) is of concern because carbon is not removed from the atmosphere by chemical reactions in the atmosphere unlike other greenhouse gases (GHG). Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations [IPCC, 2007]. Climate change that takes place due to increases in CO2 concentration is largely irreversible for 1,000 years after emission stops [Solomon, 2009]. The stated objective of the United Nations Framework Convention on Climate Change (UNFCC) is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a low enough level to prevent "dangerous anthropogenic interference with the climate system" [Ramanathan and Feng, 2008].

In order to monitor the emission of CO2 NOAA USA has established a network of measurement stations all over the globe [GLOBALVIEW-CO2, 2008] which has been used in an inverse sense to estimates of sources and sinks by de-convolving the atmospheric transport. The paucity of monitoring sites in Asia, especially India, however leads to poor resolvability of their estimates.

We have established a long term monitoring setup of Atmospheric CO2 and other core GHG at the Indian Institute of Tropical Meteorology (I.I.T.M), Pune, India. Along with other Institutions we have started continuous air sampling through glass flask at various stations over Indian continent. We have already established an International standard Gas Chromatograph (GC) laboratory at the IITM Pune where we have used calibration standards adapted from NOAA as per WMO mole fraction scale. Also, we have participated in a cruise campaign where we have collected glass flask air samples and analyzed through GC.

In this study we will present overall setup of GHG monitoring at the IITM as well as some of preliminary results obtained from these setups.

References

[1] GLOBALVIEW-CO2: Cooperative Atmospheric Data Integration Project - Carbon Dioxide, CDROM,
NOAA CMDL, Boulder, Colorado (2008), [Also available on Internet via
anonymous FTP to ftp.cmdl.noaa.gov, Path: ccg/co2/GLOBALVIEW].
[2] IPCC, edited by Susan Solomon, Working Group I: The Physical Basis for Climate Change
(Summary for Policymakers). IPCC. ISBN 978 0521 88009-1. http://ipccwg1.
ucar.edu/wg1/Report/AR4WG1_Print_SPM.pdf. (2007)

[3] Ramanathan V, Feng Y, On avoiding dangerous anthropogenic interference with the climate
change: formidable challenges, Proc. Natl. Acad. Sci. USA (PNAS), 105 (2008)
[4] Solomon et al., Irreversible climate change due to CO2 emissions, PNAS, 106 (2009)