Remote sensing of CO2 to evaluate the CO2 emission from forest/peat-land fires

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The evaluation of CO2 emission especially from peat-land is one of key issues of MRV (Measurement, Reporting and Verification). The surface temperature of peat-land fire is relatively low and it is frequently discounted in fire hot-spot data. The amount of carbon loss or CO2 emission is difficult to estimate from the carbon stock change because it is accompanied by inhomogeneous and small subsidence. The loss in peat-lands occurs underground in some cases. So, the loss estimation from the flux observation superiors to the stock-change measurement.

The flux observation over forest is usually conducted by flux tower measurement (Eddy covariance method) for carbon budget of ecosystem which includes tree and soil processes. However, this measurement is limited to the homogeneous process, which is not the case for tropical peatland fire.

The CO2 flux from fire can be measured by observing the CO2 concentration and wind speed surrounding the area of interest. The remote sensing of CO2 column amount (integrated CO2 amount from surface to the space) can be done either from space on a satellite (GOSAT) or on the ground observing the direct solar spectrum. The authors have developed a fully automated optical fiber system to observe CO2 emission continuously. Two instruments were installed at Banjar Baru and Palangka Raya in August-October, 2011. The CO2 concentration difference between south/north sites and its diurnal variability will be discussed.

Observation of carbon-mono-oxide CO is expected to be a useful tool to identify between above and below-ground fires. Preliminary observation has been tried at Palangka Raya as well.

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