Estimation of global carbon dioxide emissions by fires

*Tomohiro Shiraishi[1], Ryuichi Hirata[1]

1. National Institute for Environmental Studies

Global warming accelerates snow melting and drying which cause forest fires. The forest fire gives positive feedback in global warming because large greenhouse gases are emitted into the atmosphere by the forest fire. The purpose of this study is to estimate carbon emissions caused by forest fire with high spatial and temporal resolution, which are 500 m and daily base.
In this study, we used several satellite observation data to estimate global carbon dioxide emissions by fires from 2001 to 2018. We used MODIS MOD14A 1 product for fire detection, MODIS MCD12Q1 product as land cover classification map, and above ground biomass map created by (Avitabile et al., 2016) in Wageningen university. Carbon dioxide emissions were estimated from burned area, biomass densities, burning efficiencies and emission factors for each land cover categories. The estimated carbon dioxide emissions through 18 years were 6159.77 [Tg/year] on yearly average and 607.26 [Tg/year] on standard deviation. These results underestimated to approximately 11% for GFED4.1s and FINN1.0, 8%, 36% for GFAS 1.0 and G-G (Shi et al., 2015), respectively.

Keywords: Carbon dioxide emissions

