Soils carbon stocks and litterfall fluxes from the Bornean tropical montane forests, Sabah, Malaysia

ABSTRACT

Tropical forests play an important role in carbon storage, accumulating large amounts of carbon in their aboveground and belowground components. However, anthropogenic land-use activities have increasingly threatened tropical forests, resulting in accelerated global greenhouse gas emissions. This research aimed to estimate the carbon stocks in soil, organic layer, and litterfall in tropical montane forests under three different land uses (intact forest, logged-over forest, and plantation forest) at Long Mio, Sabah, Malaysia. Field data were collected in a total of 25 plots from which soil was randomly sampled at three depths. Litterfalls were collected monthly from November 2018 to October 2019. The results showed that the soil in the study area is Gleyic Acrisol, having pH values ranging between 4.21 and 5.71, and high soil organic matter contents. The results also showed that the total soil carbon stock, organic layer, and litterfall is higher in the intact forest (101.62 Mg C ha^{-1}), followed by the logged-over forest (95.61 Mg C ha^{-1}) and the plantation forest (93.30 Mg C ha^{-1}). This study highlights the importance of conserving intact forests as a strategy to sequester carbon and climate change mitigation.