

Southeast Asian river CO₂ emissions regulated by water pH

Alexandra Klemme
(IUP)

Abstract

Inland waters and especially rivers, which exist at the transition between the terrestrial biosphere, ocean and atmosphere are an integral part of the global carbon cycle. Southeast Asia has been recognized as a hotspot for river carbon dioxide (CO₂) outgassing. This is because of large peatland areas in this region, representing a globally important carbon store that is destabilized by deforestation and drainage. Despite the fact that peatland degradation is assumed to have increased carbon leaching from peat soils by about 200%, more recent estimates suggest only moderate CO₂ emissions from Southeast Asian rivers. We investigated the cause for limited river CO₂ emissions from Southeast Asia and found that water pH, which decreases along with increasing dissolved organic carbon (DOC) concentrations hampers respiration processes. High concentrations of carbonate, e.g. derived from rock weathering or soil erosion upstream of the coastal peatlands can suspend these natural limits due to its buffering impact on pH.