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0.0.1 Dissolved organic carbon (DOC) export from the peat draining river Siak in central Sumatra and its faith in the adjacent coastal ocean

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Indonesia holds ∼48% of the tropical peatlands and experiences some of the highest rates of precipitation in the world but hosts no major rivers because it consists mainly of relatively small islands. Dynamics of dissolved organic carbon (DOC) in the peat draining central Sumatran river Siak were investigated within the Indonesian German Project SPICE (Science for the Protection of Indonesian Coastal Marine Ecosystems). The annual mean DOC concentration of 1,962 μmol l^{-1}suggests a DOC export rate of 31.9 g C m^{-2} yr^{-1} which is among the highest reported world wide. Degradation experiments show that approximately 27% of the DOC is of labile nature and gets decomposed by combined photochemical and microbial processes within ∼13 days. Due to the correlation between DOC and the absorption of yellow substances (at 440 nm) which mainly control the water colour, the northward propagation of Siak river water into the Malacca Strait can be traced by satellite data. The spreading of the river plume as seen on satellite images agrees with our model results suggesting a residence time of Siak river water in the Malacca Strait between 20 and 50 days. Such a long residence time, the fast decomposition of the labile DOC and its contribution to the total DOC imply that 73% (0.22 Tg C yr^{-1}) of the riverine DOC is exported into the Indian Ocean.