

## Spatial variation of soil organic carbon fractions in Blue carbon ecosystems at Erukulampiddy, Sri Lanka

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Soils of Blue carbon ecosystems may play a key role in mitigating global climate change through functioning as major carbon sinks. The soil dynamics and vegetation patterns lead to create variations in organic carbon fractions in the soil. Hence, with an intention of explaining the current status of soil carbon fractions and its spatial variation, a study was conducted at Erukulampiddy, Mannar Island, focusing on the mangroves and saltmarsh ecosystems. Random sampling was performed representing mangroves, saltmarsh and littoral woodlands, and samples were collected from top layer (0-15 cm from the surface) and immediately below layer (15-30 cm). Subsequently, Microbial Biomass Carbon (MBC), Permanganate oxidizable carbon (POXC), Water soluble carbon (WSC) and total soil organic carbon (SOC) were determined. Descriptive and multivariate statistics were carried out using MINITAB 17 statistical package. The mean values for carbon fractions at the site for top soil layer were  $0.034\% \pm 0.003$  for WSC,  $1.806\% \pm 0.264$  for SOC and  $382.288 \pm 35.325 \text{ mg kg}^{-1}$  for POXC. Further, POXC varied significantly ( $P > 0.05$ ) between the examined two soil layers. Principal component (PC) analysis revealed a major variation in SOC and POXC over the site (PC loadings for SOC = 0.653 and POXC = 0.651). A cluster analysis performed based on SOC and POXC revealed of clear clusters of sample points and, sampling sites with no vegetation or with beach strand vegetation or proximal part of the lagoon appeared to be clustering together. They were marked with low POXC and low SOC. Meantime, a cluster of sample points which dominated with *Avicenia* or *Rhizophora* spp. showed a high SOC stock but with a high proportion of soil POXC. These confirm the high spatial variation of soil carbon fractions and unstable soil C stocks in Blue carbon ecosystems at Erukulampiddy, Mannar Island, Sri Lanka.

**Keywords:** soil carbon sequestration, climate change mitigation, mangroves and saltmarsh ecosystems