Carbon sequestration in coastal soils under different land use in Schleswig-Holstein, Northern Germany

ABSTRACT

Carbon sequestration was studied in the coastal soils of the "Katinger Watt", a former tidal flat of the North Sea coast in Schleswig-Holstein, Northern Germany. Carbon sequestration was determined by the ecological approach and calculated as the difference between total annual net primary production and total annual heterotrophic respiration. The measurement was conducted every month from June 2006 to May 2007. All sites were underlain by very young soils that developed after the former marine tidal flat was diked in 1973. After diking, the soils were drained and terrestrial soil formation continued for 35 year. The initial conditions after diking were similar in all sites. All soils were classified as Normkalkmarsch according to the German soil classification, as Calcic Fluvisol (WRB, 2007) and as Typic Fluvaquent (USDA, 2010). The annual carbon sequestration in the arable land was estimated as -0.82 t C ha-1 yr-1 which indicates that the arable land acted as a net CO2 source during the investigation period. In the grassland, about 0.18 t C ha-1 yr-1 was sequestered in the soil. In other words the grassland acted as a carbon sink during the investigation period.